



Draft Subsequent Environmental Impact Report

EVENT CENTER AND MIXED-USE DEVELOPMENT AT MISSION BAY BLOCKS 29-32

Office of Community Investment and Infrastructure Case No. ER 2014-919-97
San Francisco Planning Department Case No. 2014.1441E
State Clearinghouse No. 2014112045

Draft SEIR Publication Date: June 5, 2015

Draft SEIR Public Hearing Date: June 30, 2015

Draft SEIR Public Comment Period: June 5, 2015 – July 20, 2015



office of
COMMUNITY INVESTMENT
and INFRASTRUCTURE

Volume 3
Appendices

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Notice of Preparation and Initial Study

**Office of Community
Investment and Infrastructure**
(Successor to the San Francisco
Redevelopment Agency)

One South Van Ness Avenue
San Francisco, CA 94103
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EDWIN M. LEE, Mayor

Mara Rosales, Chair
Marily Mondejar
Darshan Singh
Miguel Bustos

Tiffany Bohee, Executive Director

126-0822014-000

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Date: November 19, 2014

Case No.: Office of Community Investment and Infrastructure (OCII):
ER 2014-919-97
Planning Department: 2014.1441E

Project Title: **Event Center and Mixed-Use Development at Mission Bay Blocks 29-32**

Zoning: MB-RA; Mission Bay South Redevelopment Plan – Commercial/Industrial/
Retail Designation; Design for Development for the Mission Bay South
Project Area Height Zone 5

Block/Lot: Mission Bay South Redevelopment Plan Blocks 29-32; Assessor's Block 8722,
Lots 001 and 008

Blocks Size: Mission Bay Blocks 29-32: Approximately 11 acres

Project Sponsor: GSW Arena LLC
David Kelly
(510) 986-2200
dkelly@warriors.com

Lead Agency: OCII

Staff Contact: Catherine Reilly, OCII – (415) 749-2516
catherine.reilly@sfgov.org

PROJECT DESCRIPTION

GSW Arena LLC (GSW), an affiliate of Golden State Warriors, LLC, which owns and operates the Golden State Warriors National Basketball Association (NBA) team, proposes to construct a multi-purpose event center and a variety of mixed uses, including office, retail, open space and structured parking on an approximately 11-acre site (Blocks 29-32) within the Mission Bay South Redevelopment Plan Area of San Francisco. The project site is bounded by South Street on the north, Third Street on the west, 16th Street on the south, and by the future planned realigned Terry A. François Boulevard on the east. The proposed event center would host the Golden State Warriors basketball team during the NBA season, as well as provide a year-round venue for a variety of other uses, including concerts, family shows, other sporting events, cultural events, conferences and conventions. GSW has entered into an agreement to purchase the project site from the current site owner, an affiliate of salesforce.com. The project is subject to review under the California Environmental Quality Act (CEQA) and a number of local and state approvals.

FINDING

This project may have a significant effect on the environment and a Subsequent Environmental Impact Report (SEIR) is required. This determination is based upon the criteria of the State CEQA Guidelines, Sections 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance), and for the reasons documented in the Environmental Evaluation (Initial Study) for the project, which is attached.

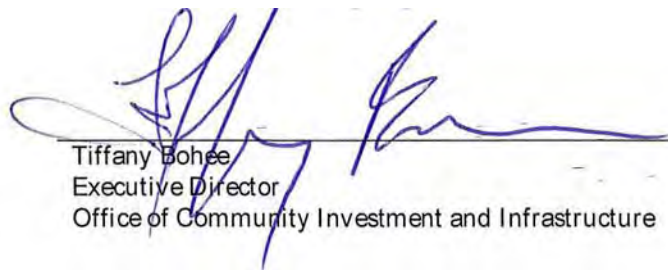
PUBLIC SCOPING PROCESS

The Office of Community Investment and Infrastructure (OCII) will hold a PUBLIC SCOPING MEETING on Tuesday, December 9, 2014, at 6:30 p.m. at the Mission Creek Senior Community, 225 Berry Street, Second Floor Cafeteria, San Francisco. The purpose of this meeting is to receive comments to assist the OCII in reviewing the scope and content of the environmental impact analysis and information to be contained in the SEIR for the project. To request a language interpreter or to accommodate persons with disabilities at the scoping meeting, please contact the staff listed above at least 72 hours in advance of the meeting. Written comments will also be accepted until 5:00 p.m. on December 19, 2014. Written comments should be sent to Tiffany Bohee, OCII Executive Director c/o Brett Bollinger, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103, or by email to warriors@sfgov.org.

If you work for a responsible State agency, we need to know the views of your agency regarding the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the SEIR when considering a permit or other approval for this project. Please include the name of a contact person in your agency.

Members of the public are not required to provide personal identifying information when they communicate with the OCII Commission, OCII or the Planning Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the OCII or Planning Department's website or in other public documents.

11-17-14
Date


Tiffany Bohee
Executive Director
Office of Community Investment and Infrastructure

INITIAL STUDY

**Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
Office of Community Investment and Infrastructure Case No. ER 2014-919-97
Planning Department Case No. 2014.1441E**

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List of Abbreviations and Acronyms

1990 FEIR	Mission Bay Final Environmental Impact Report
ABAG	Association of Bay Area Governments
AB 26	California Assembly Bill 26
AB 32	California Global Warming Solutions Act (California Assembly Bill 32)
AB 939	California Integrated Waste Management Act of 1989 (California Assembly Bill 939)
AB 900	California Assembly Bill 900
AB 1484	California Assembly Bill 1484
ATCM	Airborne Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
Btu	British thermal units
CCSF	City and County of San Francisco
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRHR	California Register of Historical Resources
CSC	California Species of Concern
CSD	combined sewer discharges
CSO	combined sewer overflow
CWA	Federal Clean Water Act
cy	cubic yards
DPH	San Francisco Department of Public Health
DBI	San Francisco Department of Building Inspection
DPW	San Francisco Department of Public Works
EIR	Environmental Impact Report
FARR	Final Archaeological Resources Report
FTE	full-time equivalent

GHGs	Greenhouse gases
gsf	gross square feet
GSW	Golden State Warriors Arena, LLC
HEPA	High Efficiency Particulate Air Filter
HMBP	hazardous materials business plan
I-280	Interstate 280
I-80	Interstate 80
kWh	kilowatt-hours
LEED®	Leadership in Energy and Environmental Design
mgd	million gallons per day
LRDP	Long Range Development Plan
Mission Bay FEIR	Mission Bay Final Environmental Impact Report
Mission Bay FSEIR	Mission Bay Final Subsequent Environmental Impact Report
Mission Bay TMA	Mission Bay Transportation Management Association
MMcf	million cubic feet
MMRP	Mitigation Monitoring and Reporting Program
MLD	Most Likely Descendant
Muni	San Francisco Municipal Railway
NAHC	Native American Heritage Commission
NAVD88	North American Vertical Datum of 1988
NBA	National Basketball Association
NIH	National Institutes of Health
NOP	Notice of Preparation
North Design for Development	Design for Development for the Mission Bay North Project Area
North Plan	Mission Bay North Redevelopment Plan
North Plan Area	Mission Bay North Redevelopment Plan Area
NWIC	Northwest Information Center
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OCII	Office of Community Investment and Infrastructure
OPA	Owners Participation Agreement
OPR	Governor’s Office of Planning and Research
PDA	Priority Development Area

PDR	Production, Distribution, and Repair
Port	Port of San Francisco
RMP	Risk Management Plan
RRMP	Revised Risk Management Plan
ROSE	San Francisco General Plan Recreation and Open Space Element
RWQCB	Regional Water Quality Control Board
SB 743	California Senate Bill 743
Secretary's Standards	Secretary of the Interior's Standards for the Treatment of Historic Properties
SEWPCP	Southeast Water Pollution Control Plant
SEIR	Subsequent EIR
sf	square feet
SFD	San Francisco City Datum
SFPUC	San Francisco Public Utilities Commission
SFFD	San Francisco Fire Department
SFMTA	San Francisco Municipal Transportation Agency
SFUSD	San Francisco Unified School District
SHPO	State Historic Preservation Officer
SoMa	South of Market
South Design for Development	Design for Development for the Mission Bay South Project Area
South Plan	Mission Bay South Redevelopment Plan
South Plan Area	Mission Bay South Redevelopment Plan Area
SVP	Society of Vertebrate Paleontology
SWL	Seawall Lot
SWPPP	Stormwater Pollution Prevention Plan
TACs	toxic air contaminants
TMP	Transportation Management Plan
TSP	Transit Service Plan
UCMP	University of California Museum of Paleontology
UCSF	University of California at San Francisco
U.S. 101	U.S. Highway 101
USFWS	United States Fish and Wildlife Service
UWMP	Urban Water Management Plan
WAS	Water Availability Study

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INITIAL STUDY

Event Center and Mixed-Use Development at Mission Bay Block 29-32 Office of Community Investment and Infrastructure Case No. ER 2014-919-97 Planning Department Case No. 2014.1441E

A. PROJECT DESCRIPTION

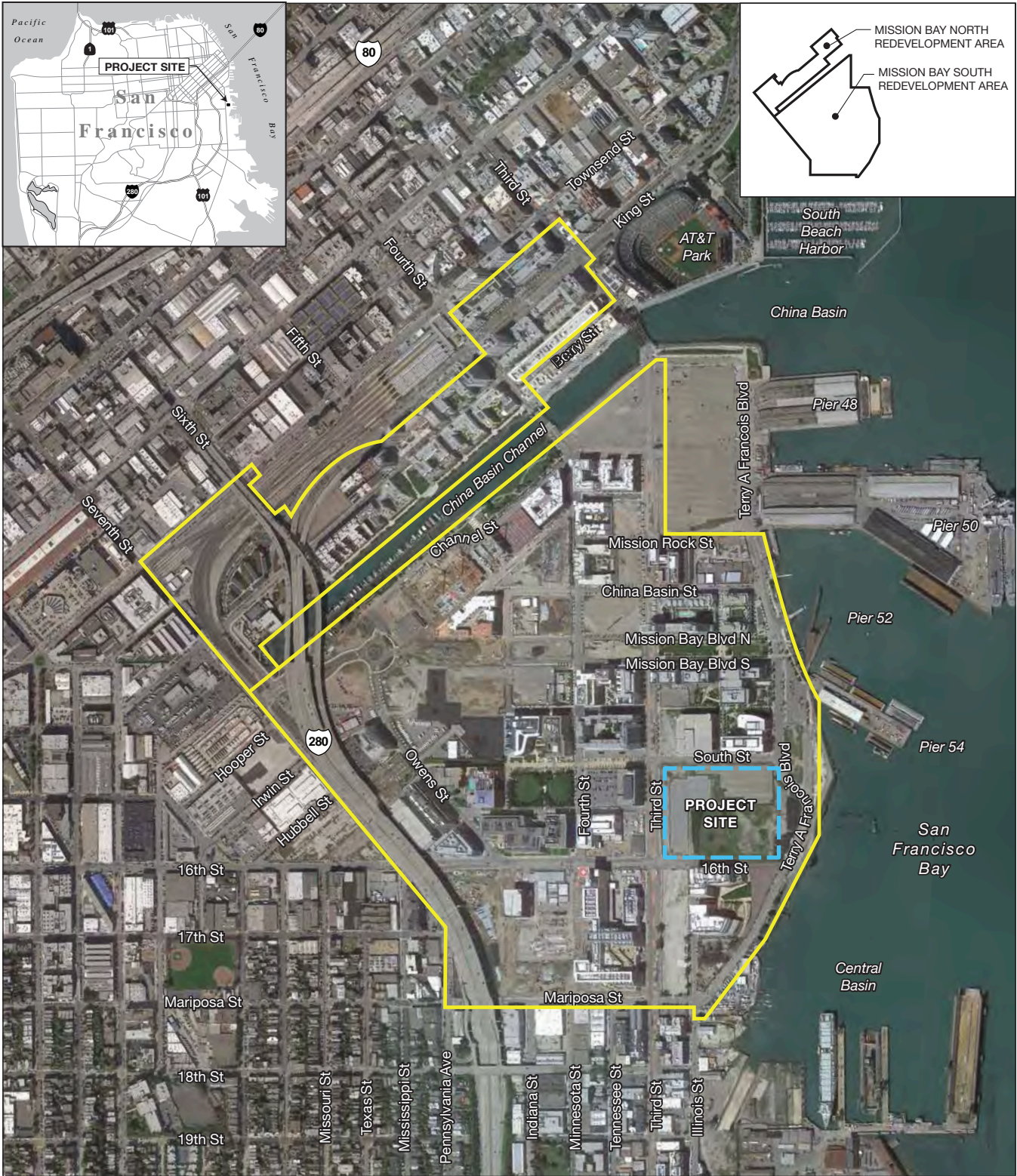
A.1 Overview

GSW Arena LLC (GSW), an affiliate of Golden State Warriors, LLC, which owns and operates the Golden State Warriors National Basketball Association (NBA) team, proposes to construct a multi-purpose event center and a variety of mixed uses, including office, retail, open space and structured parking on an approximately 11-acre site (Blocks 29-32) within the Mission Bay South Redevelopment Plan Area of San Francisco (see **Figure 1** for aerial photograph and **Figure 2** for existing roadway network in Mission Bay). The project site is bounded by South Street on the north, Third Street on the west, 16th Street on the south, and by the future planned realigned Terry A. François Boulevard on the east. The proposed event center would host the Golden State Warriors basketball team during the NBA season, as well as provide a year-round venue for a variety of other uses, including concerts, family shows, other sporting events, cultural events, conferences and conventions. GSW has entered into an agreement to purchase the project site from the current site owner, an affiliate of salesforce.com. The project is subject to review under the California Environmental Quality Act (CEQA) and a number of local and state approvals.

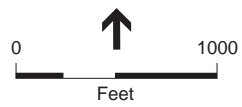
Development is allowed within the Mission Bay South Redevelopment Plan Area, including Blocks 29-32, consistent with the land use program and subject to the development controls of the *Mission Bay South Redevelopment Plan*, *Mission Bay South Design for Development*, and other related documents (see *Background*, below). No amendment to the South Plan would be required, although the proposed project at Blocks 29-32 would require certain amendments and/or variations to other documents.

The *Mission Bay Final Subsequent Environmental Impact Report* (Mission Bay FSEIR), certified in September 1998, is a program EIR under CEQA Guidelines 15168 and a redevelopment plan EIR under CEQA Guidelines 15180 (see *Background*, below). The Mission Bay FSEIR analyzed the environmental impacts associated with the development program proposed for the entire plan area, including the program under the Mission Bay South Redevelopment Plan, which includes Blocks 29-32. Thus, under CEQA, the proposed project at Blocks 29-32 is considered a subsequent activity under the Mission Bay South Redevelopment program, and this Initial Study evaluates the environmental effects of the proposed project relative to the certified Mission Bay FSEIR.

This Initial Study is prepared in accordance with the CEQA Guidelines Section 15063, which provides for preparation of an initial study to determine if a project may have a significant effect on the environment, and with CEQA Guidelines Section 15168(c), which provides for subsequent activities in a program to be examined in the light of a previously certified program EIR. The City's Office of Community Investment and Infrastructure (OCII) is the CEQA lead agency for this project, and has entered into an agreement with the San Francisco Planning Department, Environmental Planning Division, to assist in the preparation of the related environmental review documents.



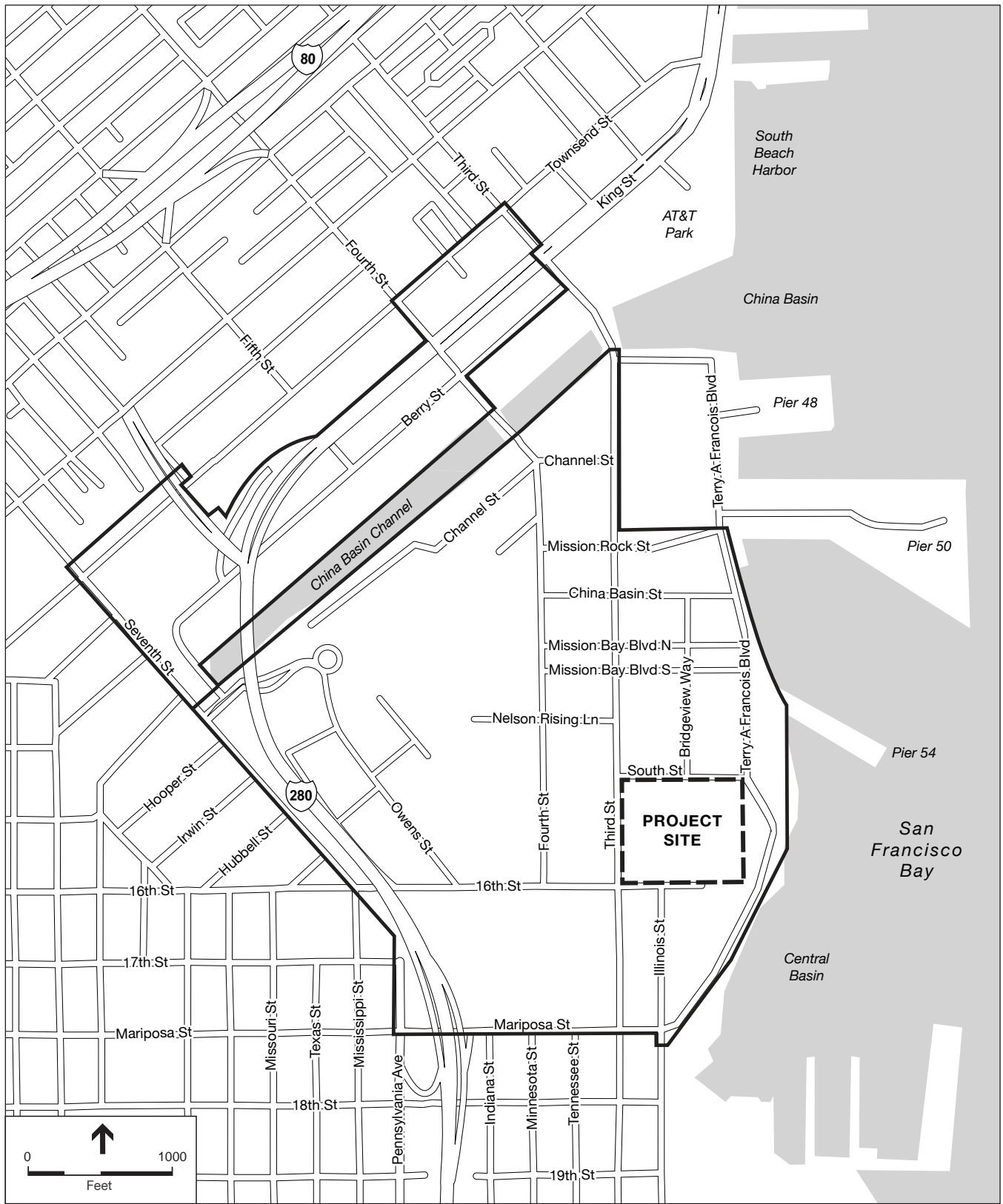
- Mission Bay Redevelopment Plan Area Boundary
- Project Site Boundary



SOURCE: Google Maps, ESA, 2014

OCII Case No. ER 2014-919-97; Planning Department Case No. 2014.1441E:
Event Center and Mixed-Use Development at Mission Bay Blocks 29-32

Figure 1
Aerial Photograph of Mission Bay



- Mission Bay Redevelopment Plan Area Boundary
- - - Project Site Boundary

SOURCE: ESA, 2014

OClI Case No. ER 2014-919-97; Planning Department Case No. 2014.1441E:
Event Center and Mixed-Use Development at Mission Bay Blocks 29-32

Figure 2
Existing Roadway Network in Mission Bay

This Initial Study, consistent with CEQA Guidelines Sections 15063(b)(1)(C) and 15168(d)(1), provides documentation to determine which of the project's effects were adequately examined in the Mission Bay FSEIR and which topics warrant more detailed environmental analysis (see Section D, Approach to Analysis, below). The topics which warrant more detailed environmental analysis are those that implementation of the proposed project could result in either new significant effects or substantially more severe impacts than were previously identified in the Mission Bay FSEIR. For these topics, a focused environmental impact report (EIR) will be prepared; the focused EIR will be a Subsequent EIR (SEIR) per CEQA Guidelines Section 15162.

A.2 Background

Mission Bay South Redevelopment Plan Approval Process and Prior Environmental Review

On August 23, 1990, the San Francisco Board of Supervisors certified the *Mission Bay Final Environmental Impact Report* (the "1990 FEIR").¹ The 1990 FEIR assessed the development program that was ultimately adopted as the *Mission Bay Plan, an Area Plan of the San Francisco General Plan*. In 1996-97, the former San Francisco Redevelopment Agency, with Catellus Development Corporation as project sponsor, proposed a new project for the Mission Bay area, consisting of two separate redevelopment plans (*Mission Bay North Redevelopment Plan* and *Mission Bay South Redevelopment Plan*) ("North Plan" and "South Plan" or, collectively, the "Plans") in two redevelopment project areas separated by the China Basin Channel.

On September 17, 1998, the San Francisco Planning Commission and the former Redevelopment Agency Commission certified the *Mission Bay Final Subsequent Environmental Impact Report* ("Mission Bay FSEIR").² The Mission Bay FSEIR analyzed reasonably foreseeable development under the Plans. It incorporated by reference information from the original 1990 FEIR that continued to be accurate and relevant for analysis of the Plans. Thus, the 1990 FEIR and the Mission Bay FSEIR together constitute the environmental documentation for the Plans. The 1990 FEIR and Mission Bay FSEIR are program EIRs under CEQA Guidelines 15168 and redevelopment plan EIRs under CEQA Guidelines 15180.

The former Redevelopment Agency Commission adopted the North and South Plans on September 17, 1998, along with the Mission Bay North Owner Participation Agreement (as subsequently amended, the "North OPA") and Mission Bay South Owner Participation Agreement (as subsequently amended, the "South OPA"), which are between the former Redevelopment Agency, now OCII as successor to the Redevelopment Agency, and the Mission Bay Master Developer (originally Catellus Development Corporation and now FOCIL-MB, LLC, the successor to Catellus Development Corporation).³ The land uses in the adopted Mission Bay plan are generally illustrated in **Figure 3**.⁴

¹ Planning Department Case No. 86.505E.

² Planning Department Case No. 96.771E, Redevelopment Agency Case No. ER 919-97.

³ Resolution No. 191-98, and No. 188-98, respectively.

⁴ It should be noted that the land use program in the adopted Mission Bay plan was developed from the proposed plan plus a combination of plan variants described and analyzed in the Mission Bay FSEIR. Specifically, the adopted Mission Bay Redevelopment Plan was based on the plan description in the Mission Bay FSEIR, plus Variant 1 (Terry A. François Boulevard Variant/Expanded Bayshore Open Space Proposal), Variant 2 (Esprit Commercial Industrial/Retail Variant), Variant 3A (Modified No Berry Street Crossing Variant), and Variant 5 (Castle Metals Block Commercial Industrial/Retail Variant). The adopted plan was described in the Mission Bay FSEIR Chapter III, Project Description, and Section VII.G, Combination of Variants Currently under Consideration by the Project Sponsors. The Mission Bay FSEIR concluded that the environmental effects of the combination of plan variants would be similar to those of the proposed plan, and consequently, would not result in any new or substantially more severe significant effects identified in the Mission Bay FSEIR for the proposed plan.



— Mission Bay Redevelopment Plan Area Boundary

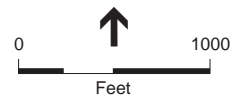
— Project Site Boundary

Note: Numbers in figure represents Mission Bay Redevelopment Plan block numbers

"X" represents parcels not owned by master developer at the time Mission Bay Redevelopment Plan was adopted

"P" represents open space parcels

"N" represents blocks within Mission Bay North Redevelopment Area



SOURCE: OCII, ESA, 2014

OCII Case No. ER 2014-919-97; Planning Department Case No. 2014.1441E:
Event Center and Mixed-Use Development at Mission Bay Blocks 29-32

Figure 3
Land Uses in the Mission Bay Redevelopment Plan

The North and South OPAs incorporated into the Plan the mitigation measures identified in the Mission Bay FSEIR and adopted by the former Redevelopment Agency Commission at the time of Plan approval.⁵ As authorized by the Plans, the former Redevelopment Agency Commission simultaneously adopted design guidelines and standards governing development, contained in companion documents, the Design for Development for the Mission Bay North Project Area (the “North Design for Development”) and the Design for Development for the Mission Bay South Project Area (the “South Design for Development”), respectively.⁶ The San Francisco Board of Supervisors adopted the North Plan on October 26, 1998, and the South Plan on November 2, 1998.⁷ The South OPA has been amended four times, the first amendment dated February 17, 2004, the second dated November 1, 2005, the third dated May 21, 2013, and the fourth dated June 4, 2013.

The Redevelopment Agency has prepared nine addenda to the Mission Bay FSEIR (completed between 2000 and 2013) for specific developments within Mission Bay that required additional environmental review of specific issues beyond those that were covered in the 1998 FSEIR; in all of these cases, none of the conditions triggering a Subsequent or Supplemental EIR were met. These addenda are as follows:

- The first addendum, dated March 21, 2000, analyzed the ballpark parking lots.
- The second addendum, dated June 20, 2001, addressed Infrastructure Plan revisions related to the 7th Street bike lanes and relocation of a storm drain outfall.
- The third addendum, dated February 10, 2004, addressed revisions to the South Design for Development with respect to the maximum allowable number of towers, tower separation, and required setbacks.
- The fourth addendum, dated March 9, 2004, addressed revisions to the South Design for Development with respect to the permitted maximum number of parking spaces for biotechnical and similar research facilities, and specified certain changes to the North OPA to reflect a reduction in permitted commercial development and associated parking.
- The fifth addendum, dated October 4, 2005, addressed revisions to the University of California San Francisco (UCSF) Long Range Development Plan and the Final Environmental Impact Report for the Long Range Development Plan.
- The sixth addendum, dated September 10, 2008, addressed revisions of the UCSF Medical Center at Mission Bay.
- The seventh addendum, dated January 7, 2010, analyzed the development of a Public Safety Building on Mission Bay Block 8 to accommodate the headquarters of the San Francisco Police Department, a local Police Station, and new San Francisco Fire Department station, and adaptive reuse of historic Fire Station 30, along with parking for these uses.
- The eighth addendum, dated May 15, 2013, analyzed amendments to the South Plan and South OPA to allow a mix of hotel, residential, and retail use on Block 1.
- The ninth addendum, dated May 30, 2013, addressed development on Block 7E for a facility housing extended stay bedrooms and associated facilities to support families of patients receiving medical treatment primarily at UCSF’s medical facilities.

⁵ North and South OPAs, Attachment L.

⁶ Resolution No. 191-98 and Resolution No. 186-98, respectively.

⁷ Ordinance No. 327098 North and South OPAs, Attachment L and Ordinance No. 335-98, respectively.

Successor Agency/Oversight Board Jurisdiction

The former San Francisco Redevelopment Agency, along with all 400 redevelopment agencies in California, was dissolved on February 1, 2012, by order of the California Supreme Court in a decision issued on December 29, 2011 (*California Redevelopment Association et al. v. Ana Matosantos*). On June 27, 2012, the California Legislature passed and the Governor signed Assembly Bill (AB) 1484, a bill making technical and substantive changes to AB 26, which was the original bill that resulted in the dissolution of all redevelopment agencies. (Together, AB 26 and AB 1484 are referred to as “Dissolution Law,” which is codified at California Health and Safety Code Sections 34161 – 34191.5). In response to the Dissolution Law the San Francisco Redevelopment Agency became the Successor Agency to the Redevelopment Agency of the City and County of San Francisco (Successor Agency), commonly known as the Office of Community Investment and Infrastructure (OCII). Pursuant to state and local legislation, the Successor Agency is governed by two bodies, the Oversight Board of the Successor Agency and the Commission on Community Investment and Infrastructure.

On January 24, 2012, the Board of Supervisors of the City and County of San Francisco adopted Resolution No. 11-12 in response to the Supreme Court’s December 29, 2011 decision upholding AB 26. On September 25, 2012, the Board of Supervisors adopted Ordinance No. 215-12 in response to the Governor’s approval of AB 1484. Together, these two local laws (“Successor Agency Legislation”) create the governing structure of the OCII. Pursuant to the Successor Agency Legislation, the Commission on Community Investment and Infrastructure exercises certain land use, development and design approval authority for the Mission Bay North and Mission Bay South Plan areas (and other major approved development projects), and the Oversight Board exercises certain fiscal oversight and other duties required under the Dissolution Law.

South Plan Area Development Controls

The primary development controls for the Mission Bay South Redevelopment Plan Area (“South Plan Area”) are the South Plan and the South Design for Development, which together specify development standards for the project site at Blocks 29-32, including standards and guidelines for height, setbacks, and coverage. In accordance with California Community Redevelopment Law, when the Board of Supervisors approved the South Plan in 1998, land use and zoning approvals within Mission Bay came under the jurisdiction of the former Redevelopment Agency, now OCII, as described above. Together, the South Plan and South Design for Development constitute the regulatory land use framework for the project site, and they supersede the City’s *Planning Code*, except as otherwise specifically provided in those documents and associated documents for implementing the Plans.

The infrastructure serving the South Plan Area is provided by the master developer, FOCIL-MB, LLC, consistent with the South OPA, including the Mission Bay South Infrastructure Plan (Attachment D to the South OPA). The South OPA includes triggers for the phasing of required infrastructure improvements based on adjacency, ratios, and performance standards to ensure that the master developer phases the required infrastructure to match the phasing of private development occurring on adjacent blocks. In addition to the South Plan and South Design for Development, the other major development controls that apply to the project site include:

- Mitigation measures included in the Mission Bay FSEIR and which OCII has identified as required to be implemented by the developer of the project site;
- All other associated adopted plans and documents that apply in the South Plan Area under the Plan and OPA, such as the 1999 Mission Bay Risk Management Plan, with amendments (including Article 22A of the San Francisco Health Code for analyzing soils for hazardous waste), Mission Bay South Streetscape Master Plan, and Mission Bay South Signage Master Plan; and
- Other adopted City plans and regulations that apply in the South Plan Area, such as the San Francisco Building Code; Chapter 7 of the San Francisco Environment Code, "Resource Efficiency Requirements," and any engineering requirements applicable under City Code to the development.

Relevant portions of the South Plan and South Design for Development as they pertain to Blocks 29-32 are described below.

South Plan Development Controls for Blocks 29-32

In addition to providing overall planning objectives for the plan area, the South Plan designates land uses for specific parcels. Proposed land uses to be permitted for Blocks 29-32 are designated as Commercial Industrial/Retail (Attachment 3 of the South Plan), and the plan provides for either principal or secondary uses at this site. Primary uses are permitted in accordance with the plan's provisions, and secondary uses are permitted provided that such use generally conforms with redevelopment objectives and planning and design controls established pursuant to this plan. The OCII Executive Director must make a determination that secondary uses make a positive contribution to the character of the plan area, and that the secondary use "will provide a development that is necessary or desirable for, and compatible with, the neighborhood or the community."

The South Plan identifies the following principal uses under the Commercial Industrial/Retail land use designation applicable to Blocks 29-32: manufacturing; institutions; retail sales and services; arts activities and spaces; office use; home and business services; animal care; wholesaling; automotive; and other uses (e.g., greenhouse, nursery, open recreation and activity areas, parking and certain telecommunications-related facilities). The following secondary uses are identified: institutions, assembly and entertainment, and other uses (public structure or use of a nonindustrial character).

The South Plan also describes general controls and limitations for development, and sets limits on leasable square footages of various uses within defined zones within the plan area, including the project site. The plan sets a maximum floor area ratio of 2.9 to 1 for the commercial industrial/ retail uses at the project site, and the maximum building height within the entire plan area is 160 feet. The plan further indicates that within the limits, restrictions and controls established in the plan, OCII is authorized to establish height limits of buildings, land coverage, density, setback requirements, design and sign criteria, traffic circulation and access standards and other development and design controls in the Design for Development.

South Design for Development Controls for Blocks 29-32

The Mission Bay South Design for Development, a companion document to the South Plan, contains the design standards and design guidelines applicable to Blocks 29-32. The project site is within Height Zone 5,

which specifies that 7 percent of the developable area (within the entire height zone) may be occupied by a maximum of three towers up to 160 feet in height, and the remaining 93 percent of the development could be at a maximum of 90 feet. However, buildings along Terry A. François Boulevard, including Blocks 30 and 32, may not exceed 90 feet in height, and no towers are permitted on Blocks 30 and 32.

Within this Height Zone 5, the South Design for Development also establishes bulk limits for development at a height greater than 90 feet (i.e., towers). The maximum tower length above 90 feet is 200 feet, and the maximum floor plate is 20,000 square feet. Further, the South Design for Development identifies setback requirements applicable to Blocks 29-32, with a minimum of 5 feet along Third Street and 20 feet along 16th Street; these setbacks are in addition to specified sidewalk widths on these streets and may be used for paved pathways and landscaping as appropriate. The minimum streetwall height is 15 feet.

Design guidelines for Commercial/Industrial buildings along the Bayfront Park (adjacent to the project site) indicate that homogeneous and unrelieved façades should be avoided. Design guidelines for city-serving retail uses at Blocks 29-32 include: street level frontage should provide visually interesting features; the block façade line should be consistent with block development throughout Mission Bay; and curb cuts are strongly discouraged along Third Street.

A.3 Project Characteristics

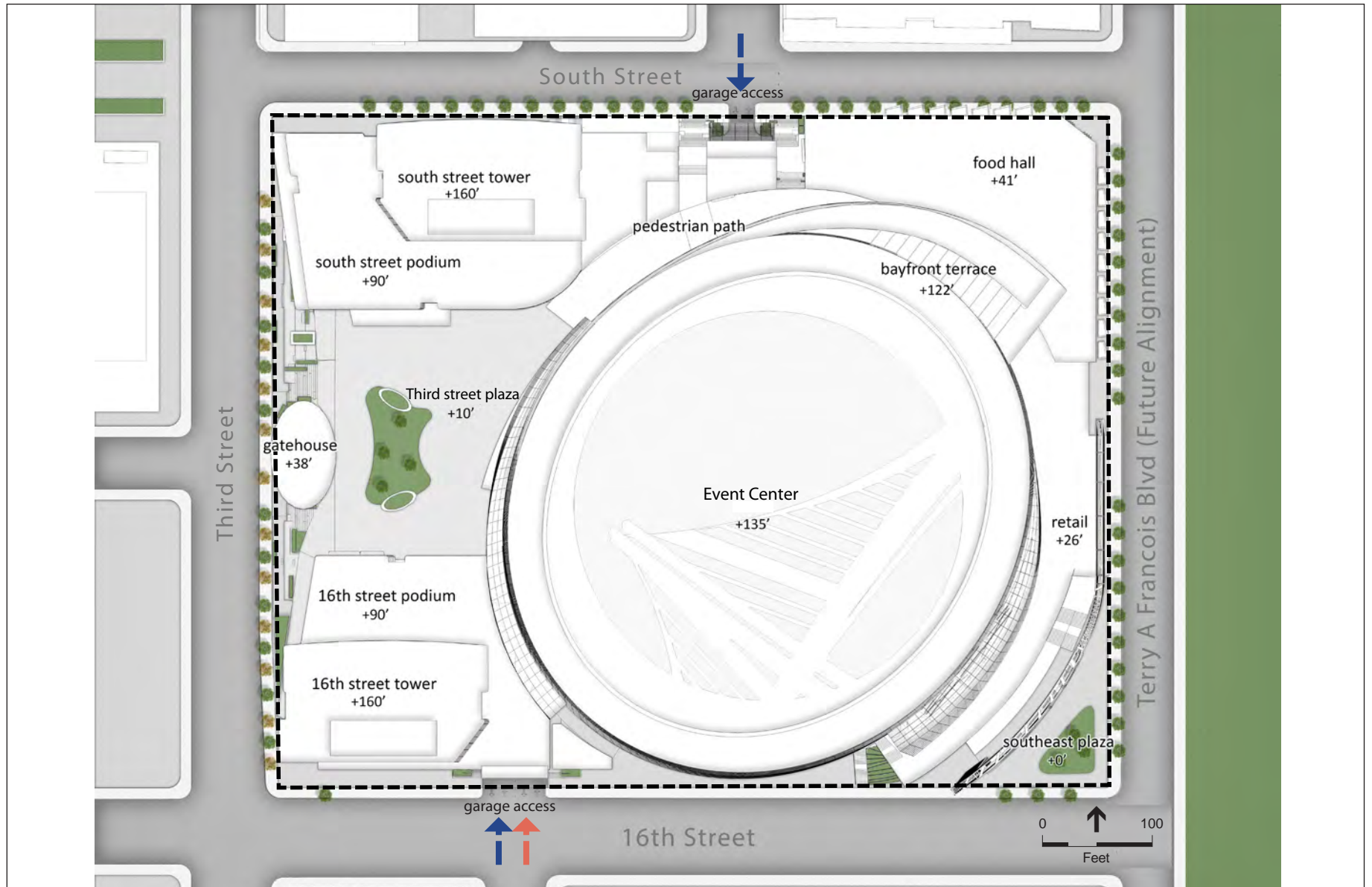
Proposed Facilities

Development Plan Overview

Under the project, Blocks 29-32 would be developed with a multi-purpose event center and a variety of mixed uses, including office, retail, open space and structured parking on the approximately 11-acre site. **Figure 4** presents the conceptual project site plan, illustrating primary project features and associated building heights.⁸ **Table 1** provides a summary overview of the key characteristics of the project facilities.

The proposed roughly circular-shaped event center building would be located in the central-east portion of the site. The event center building would be approximately 135 feet at its roof peak, and would include multiple levels of varying elevations. The event center would include a wide variety of facilities, including spectator seating and suites, restaurants/bars and clubs, meeting rooms; spectator support facilities such as food service/kitchens, concessions, merchandising and restrooms; Golden State Warriors management offices and practice facility; media support facilities, and event center operations such as loading, staging and marshaling areas, mechanical/electrical/plumbing space and storage and maintenance facilities. Two

⁸ For purposes of this Initial Study, ground elevations and building heights, except where noted otherwise, are as measured relative to San Francisco City Datum (SFD). SFD establishes the City's zero point for surveying purposes at approximately 8.6 feet above the mean sea level established by 1929 U.S. Geological Survey datum, and approximately 11.3 feet above the current 1988 North American Vertical Datum. Note there is also a Mission Bay Datum, equal to SFD + 100 feet. It should also be noted the method used in this Initial Study for measuring building heights differs from that specified in Section 102.12 of the San Francisco Planning Code, which provides a method for measuring building heights for purposes of consistency with the Planning Code. Under Section 102.12, building heights are generally measured from the height of the curb of the sidewalk most proximate to the property.



Project Site Boundary
 ← Auto Access Location
 ← Truck Loading Access

SOURCE: Manica Architecture, 2014

OCII Case No. ER 2014-919-97; Planning Department Case No. 2014.1441E:
Event Center and Mixed-Use Development at Mission Bay Blocks 29-32

Note: Elevation values as measured relative to San Francisco City Datum

Figure 4
Conceptual Project Site Plan

**TABLE 1
SUMMARY OF PROPOSED PROJECT FACILITIES**

Project Component	Characteristic
Event Center Basketball Seating Capacity	18,064 seats ^a
Size	Total GSF
Event Center ^b	750,000
Golden State Warriors Office Space	25,000
Office Space	580,000
Retail Space ^c	125,000
Parking and Loading	<u>475,000</u>
Total Building Area	1,955,000 GSF^d
Height^e/Levels	
Event Center	135 feet
Office and Retail Buildings	160 feet (11 stories) total [90-foot (6-story) podiums with 70-foot (5-story) towers above]; retail uses within street level and plaza-level floors
Retail-only Buildings	41 feet in market hall building northeast corner of site; 38 feet in gatehouse building along Third Street
Parking/Loading Spaces	Blocks 29-32: 950 parking stalls below-grade or at-grade (concealed by Third Street Plaza) 13 truck docks below-grade Existing off-site at 450 South Street Parking Garage: 132 parking stalls
Vehicular Access	Access point for autos and all large trucks on 16th Street at Illinois Street Access point for autos and small trucks on South Street at Bridgeview Way
Open Space	3.2 acres

NOTES:

GSF = gross square feet.

- ^a Presented maximum seating capacity is for basketball games. However, as discussed under *Proposed Operations and Employment*, below, there would other types of events at the event center, including certain concerts and conventions, that would be able to accommodate a maximum attendance of up approximately 18,500 patrons.
- ^b The event center would include a variety of supporting uses, including Golden State Warriors practice facility and management offices, bayfront terrace, limited retail, and other uses. For purposes of estimating areas, the Golden State Warriors management office space square footage is presented separately from square footage of the other event center uses.
- ^c Proposed retail uses are approximately 51,500 GSF sit-down restaurant, 11,000 quick-service restaurant, and 62,500 GSF soft goods retail including food retail.
- ^d The CEQA analyses are based on gross square footage. However, the Mission Bay South Redevelopment Plan permits development based on adjusted gross square footage and leasable square footage. Gross Square Footage and Leasable Square Footage as defined in the Mission Bay South Redevelopment Plan for this project would be less than the gross square footage presented in this environmental document.
- ^e Building heights as measured relative to San Francisco City Datum (SFD). Excludes unoccupied top floor level with mechanical equipment.

SOURCE: Manica Architecture, 2014

office and retail buildings would be located on the west side of the project site, at the corner of Third Street and South Street (northwest corner of site) and at the corner of Third Street and 16th Street (site southwest corner). The two office and retail buildings would each consist of 11 stories (160 feet tall); each office and retail building would consist of a podium ground level plus 5 podium levels (90 feet tall), with a 5-story (70-foot) tower (with smaller floorplate than the podium) above. These buildings could serve a variety of office and/or research and development uses. Retail uses would occupy several areas of the site, including the lower floor(s) of the two office and retail buildings, within or adjacent to certain plaza-facing areas of the

event center (including in the 38-foot high “gate house” building located along Third Street), and 41-foot high retail building along Terry A. François Boulevard and South Street.

Three levels of enclosed on-site parking (two below grade, and one at street level) providing 950 parking spaces would be located below the office and retail buildings and plaza areas. (See also *Off-site Parking Facilities*, below.) Approximately 3.2 acres of open space would be located on-site, including a proposed Third Street Plaza (elevated at approximately 8 feet above Third Street) on the west side of the project site between the event center and Third Street, and a proposed ground-level Southeast Plaza in the southeastern corner of the site.⁹ These plazas would be connected by a pedestrian ramp wrapping around the exterior of the north and eastern-sides of the event center, and an outdoor covered passageway, or atrium, wrapping around the southwest portion of the event center.

While the project would not be subject to the City’s *Standards for Bird-Safe Buildings*, the project sponsor proposes to incorporate bird-safe measures that would reduce the potential effects of the project on birds.

Vehicular Access and Circulation

All vehicular ingress/egress for the garage would occur at 16th Street (at Illinois Street) or South Street (at Bridgeview Way). The 16th Street driveway would serve as the primary vehicular access point for autos to the parking garage, and the sole access point for trucks to the below-grade loading docks. Most proposed loading and service areas would be located on the lower level, while one loading slip would be provided at grade (concealed from view beneath the pedestrian path) to serve retail located at the site’s northeastern corner. A total of 13 truck docks would be provided to serve the event center and office and retail uses. The South Street driveway would provide a secondary access for autos to the garage and small delivery trucks for retail located at the site’s northeastern corner. (See also *Proposed Operations*, below, for a description of the proposed *Transportation Management Plan* that the sponsor would implement as part of the project.)

Pedestrian and Bicycle Access

The primary pedestrian access to the event center for large attendance events would be via the Third Street Plaza. The Southeast Plaza would serve as a primary pedestrian access for smaller-attendance events, and as a secondary access point for large-attendance events. Pedestrian access to the two office and retail buildings would be available on South and 16th Streets and from the Third Street plaza, with additional access to ground-floor retail uses within those buildings available via South and Third Streets. The retail buildings in the northeast corner of the site would be accessed directly via Terry A. François Boulevard and South Street. New sidewalks would be constructed along the perimeter of the project site.

Bike storage rooms would be located in each of the proposed office and retail buildings. Bike parking and storage racks would also be available at various locations along the perimeter of the project site, with bike valet service in proximity to the site and temporary bike corrals located within the plaza areas to serve patrons as needed.

⁹ It should be noted that midpoint on the sidewalk on Terry A. François Boulevard adjacent to the site is approximately 0 feet SFD, and midpoint on the sidewalk on Third Street adjacent to the site is approximately 2 feet SFD.

Infrastructure Improvements

The project proposes all new utility infrastructure facilities on-site, including water supply (low- and high-pressure water lines and recycled water lines); wastewater collection; storm drainage; electrical/gas, and communications. Infrastructure and utilities within adjacent streets that serve the project site are provided by the master developer, FOCIL-MB, LLC, as part of the Mission Bay South Infrastructure Plan.

Off-Site Parking Facilities

As part of the project, the sponsor has acquired 132 existing off-site parking spaces in the 450 South Street parking garage, accessed from South Street and Bridgeview Way directly north of the project site, to provide additional parking to serve the project.

Sustainability

The proposed development would be subject to a number of sustainability requirements, including the California CalGreen Code, City of San Francisco Green Building Code, Design for Development for the Mission Bay South Area, and the 2012 NBA Arena Design Standards – Sustainability Requirements. The project would be designed to Leadership in Energy and Environmental Design (LEED®) Gold standards using a campus approach, whereby each individual proposed structure as well as the overall site would qualify for individual Gold ratings.¹⁰ This would be achieved through incorporation of a variety of design features and implementation of practices during construction and operation to provide energy and water conservation and efficiency, encourage alternative transportation, promote a healthy indoor environment, minimize waste, and maximize recycling opportunities.

South Plan Improvements Planned in the Vicinity of the Project Site: Terry A. François Boulevard Realignment and Public Access Improvements at Bayfront Park

Pursuant to the Mission Bay Plan and not part of the proposed project, development of Blocks 29-32 would trigger the realignment of Terry A. François Boulevard to extend adjacent to the east side of Blocks 29-32, and the construction of public access improvements at Bayfront Park east of this realigned roadway. The realigned Terry A. François Boulevard would contain four travel lanes (two northbound and two southbound) plus two parking lanes; and - on the east side of the roadway – a two-way cycletrack (bike path) separated from the roadway by a raised buffer.

Following realignment of Terry A. François Boulevard, Bayfront Park would be improved and expanded to 5.5 acres, encompassing an area roughly south of Pier 54, north of 16th Street, east of Terry A. François Boulevard, and west of the Bay shoreline. Both the realignment of Terry A. François Boulevard and Bayfront Park public access improvements would be implemented by the master developer, FOCIL-MB, LLC, prior to occupancy of buildings at the project site.

¹⁰ The Leadership in Energy and Environmental Design (LEED®) is a program developed and administered by the U.S. Green Building Council that provides third-party verification of green building projects. LEED® uses a green building rating system designed to reduce the negative environmental impacts of buildings and improve occupant health and well-being. Building projects satisfy prerequisites and earn points to achieve different levels of certification.

Proposed Operations and Employment

Under the project, the event center at Blocks 29-32 would serve as the new venue for the Golden State Warriors home games, and provide a year-round venue for a variety of other uses, including concerts, family shows, other sporting events, cultural events, conferences and conventions. The event center would be used for up to approximately 225 events per year, with events ranging in capacity from approximately 3,000 up to about 18,500. All existing Golden State Warriors operations, including management offices and practice facility, would relocate from their existing facilities in Oakland to the new event center. The proposed office and retail facilities on Blocks 29-32 would operate year-round, independent of the event center operations. The following provides additional information for each of the proposed new operational components at Blocks 29-32.

Event Center Programming

Golden State Warriors Games. Under the project the Golden State Warriors would host two to three preseason basketball games (in mid- to late October) and 41 regular season basketball games (from late October to mid-April) at the event center. If the Golden State Warriors reach the postseason, they would host anywhere from 2 to 16 playoff games (from mid-April to mid-June). The large majority of Golden State Warriors home basketball games would start at 7:30 p.m. and conclude between 10:00 p.m. and 10:30 p.m. The home game schedule at the proposed event center would be similar to the Warriors schedule at Oracle Arena, the team's existing home venue in Oakland.

As described in Table 1, the maximum basketball seating capacity at the event center would be 18,064, less than the maximum basketball seating capacity of approximately 19,600 at Oracle Arena. The average basketball attendance levels at the proposed event center are estimated to be approximately 17,000 during the regular season, with regular season and post-season attendance reaching the maximum capacity of 18,064.

It is estimated that approximately 1,000 day-of-game non-Warriors employees¹¹ would be required on game days at the event center to work in various operations and jobs, including security, ushers, ticket takers, team store, food service, cleaning crew, scoreboard/video operators and other event-related operations. In addition, up to 100 Golden State Warriors' employees (e.g., representatives from Warriors sales, services, marketing and game operations) would work at the games at the event center (please see additional detail of Golden State Warriors employment under *Golden State Warriors Operations*, below).

Non-Golden State Warriors Events at the Event Center. The event center would serve as a venue for a variety of non-Golden State Warriors events throughout the year, including concerts, family shows, other sporting events, and conventions/corporate events. Approximately 160 non-Golden State Warriors game events would occur annually at the event center, that could typically include the following:

¹¹ This event center day-of-game employee estimate does not include Warriors employees that would occupy the management offices in the event center and employees of the proposed retail uses on the project site, both of which are described separately, below.

- *Family Shows:* It is estimated that the event center would host 55 family shows per year. Examples of family shows include Disney on Ice, Disney Live, Harlem Globetrotters, and Sesame Street Live. Family show series would typically occur over a five-day block of time (Wednesday through Sunday) during which time as many as 10 total performances would occur in the daytime and evening periods. Estimated average attendance would be approximately 5,000 patrons, and estimated maximum attendance would be approximately 8,200 patrons.
- *Full Arena Concerts:* It is estimated that the event center would host 30 full arena concerts per year. Concerts would typically occur on Friday and Saturday evenings within a 7:30 p.m. to 10:30 p.m. window. Attendance would vary depending on the artist and stage configuration. Estimated average attendance would be approximately 12,500 patrons with a maximum capacity of about 18,500.¹²
- *Arena Theater Concerts:* It is estimated that the event center would host 15 arena “theater” (cut-down arena) concerts per year. Concerts typically occur on Friday and Saturday evenings within a 7:30 p.m. to 10:30 p.m. window. Attendance would vary depending on the artist and cut-down configuration. Estimated average attendance would be approximately 3,000 patrons.¹³
- *Other Sporting Events:* It is estimated that the event center would host 30 non-Warriors sporting events per year. Examples of non-Warriors sporting events include college basketball, hockey, boxing, figure skating, arena football, gymnastics, lacrosse, tennis, and mixed martial arts. These events could be professional, collegiate, or amateur competitions. Estimated average attendance for other sporting events would be 7,000 patrons per event, and estimated maximum attendance of 18,064 (consistent with maximum seating capacity for Warriors games). These events would be distributed throughout the year and have variable start times.
- *Conventions, Conferences and other Events:* It is estimated that the event center would host 31 events annually related to conventions, conferences, cultural events, civic events, corporate events, and other gatherings, with an estimated average attendance level of 9,000 patrons and maximum attendance of 18,500 patrons. For smaller events the event center would be configured to reduce the perceived bowl volume to create a more intimate experience. These events would be distributed throughout the year and have variable start times; however, the majority of events are expected to occur during day time hours, consistent with typical events at the Moscone Convention Center.

It is estimated that day-of-event employees for non-Golden State Warriors events at the event center would range from 675 to 1,000, depending on the specific event and anticipated attendance levels.

(Please see also *Golden State Warriors Operations* and *Office and Retail Uses*, below, for a description of operations and additional employment associated with the Golden State Warriors, and for office and retail uses.)

¹² The event center design would allow for an end-stage concert configuration that would accommodate up to 14,000 patrons. It is estimated that nearly 90 percent of concerts would use the end stage configuration. Occasionally, concerts would occur in a 360-degree center-stage configuration which would accommodate a maximum attendance of approximately 18,500 patrons. However, no more than four center-stage concerts are expected per year.

¹³ The cut-down arena theater design would allow for a concert with up to 4,000 attendees.

Potential Outdoor Events at the Project Site

The proposed Third Street Plaza would provide opportunities for public gatherings and events, such as spring festivals, Cinco de Mayo celebration, summer film series, fall festival/pumpkin patch, and winter tree lighting ceremony/ice skating rink.

Golden State Warriors Operations

The Golden State Warriors organization currently includes approximately 150 full-time equivalent (FTE) employees, and associated operations are based in Oakland. Under the project, all existing Golden State Warriors employees and operations, including management offices and practice facility, would relocate to the project site at Mission Bay. Furthermore, the Golden State Warriors estimate that up to 105 additional FTE employees would be required for year-round event center and site management, for a total estimated Golden State Warriors employment of 255 FTE employees.

Office and Retail Uses

The proposed office uses on the site would be expected to operate similar to other existing office developments within Mission Bay, and is estimated to generate approximately 2,101 FTE employees.¹⁴ The proposed retail uses, including restaurants and other food and beverage service, would operate seven days a week, year-round, independently of the event center operations. It is estimated that the uses within the retail areas would require approximately 372 FTE employees.¹⁵

Transportation Management Plan

As part of the project, the project sponsor would prepare and implement a Transportation Management Plan (TMP) to manage on- and off-site access for all anticipated travel modes (including vehicles, transit, pedestrians, and bicyclists) during project operation for events and activities at the project site. The TMP would identify a range of transportation control strategies for various operational scenarios at the project site, including strategies for non-event and event days; communication strategies for public outreach and wayfinding measures; transportation demand management strategies; and monitoring methods for TMP strategies to ensure effectiveness.

In addition, the project sponsor would participate in the existing Mission Bay Transportation Management Association (TMA) shuttle service program. Sponsor participation in the TMA shuttle service program would allow for potentially expanded Mission Bay TMA shuttle service, as needed during evenings and weekends.

¹⁴ Based on San Francisco Planning Department's Transportation Impact Analysis Guidelines rate of 350/240/350 (Sit-down/QSR/In-line) gross square feet per FTE employee.

¹⁵ Based on San Francisco Planning Department's Transportation Impact Analysis Guidelines rate of 276 gross square feet per FTE employee.

Pre-Construction Testing

Prior to finalizing the project design, in order to inform design and reduce the risk of construction delays due to the potential presence of archaeological resources, the project sponsor is retaining the services of an archaeologist to develop and implement a program of archaeological testing at Blocks 29-32. The results of the archaeological testing will be used to develop a construction monitoring program to ensure potential effects on subsurface archaeological resources would be avoided or minimized prior to the commencement of ground disturbance activities, foundation excavation and pile driving. In addition, the project sponsor will conduct a pile test program at Blocks 29-32 to determine site-specific pile installation methods and requirements.

Construction

Construction of the proposed project is anticipated to begin in late 2015, and occur over an approximate 26-month period. Construction activities would include, but not be limited to: site demolition, clearing and excavation; dewatering; pile installation and foundation construction; construction of all proposed development, including event center, podium structure, office towers and plazas; installation of associated utilities; interior finishing; and exterior hardscaping and landscaping improvements. The sponsor estimates that the maximum depth of excavation on-site would be approximately 30 feet below San Francisco City Datum; this would require approximately 350,000 cubic yards of soils on-site to be excavated and removed from the site. The sponsor proposes alternative methods to pile driving for installation of piles at the project site (e.g., auger pile installation). The sponsor is also considering multiple approaches to address potential groundwater infiltration to proposed below grade facilities and potential localized flooding, including a waterproofing design and implementation of adaptive management strategies. The sponsor indicates the proposed design would preclude the need to conduct any long-term dewatering of the project site during project operation.

The majority of the construction is proposed to occur Monday through Friday, although some construction activities would occur on nights and weekends. A typical work day shift would be between 7:00 a.m. and 6:00 p.m., and a typical second shift (i.e., for below-grade and interior work within buildings) would be between 4:00 p.m. and 12:30 a.m. There would also be the potential for overnight deliveries of materials and/or equipment. All construction activities are proposed to be conducted within allowable construction requirements permitted by City code. The project would also be subject to the Mission Bay Good Neighbor Policy, which limits extreme noise-generating activities in Mission Bay to Monday to Friday from 8:00 a.m. to 5:00 p.m.¹⁶

¹⁶ The Mission Bay Good Neighbor Policy specifies that pile driving or other noise generating activity (80 dBA at a distance of 100 feet) shall be limited to 8:00 am to 5:00 pm, Monday through Friday. No pile driving or other extreme noise generating activity is permitted on Saturday, Sundays and holidays. Requests for pile driving on Saturdays may be considered on a case by case basis by OCII with approval at the sole discretion of the OCII Executive Director.

B. PROJECT SETTING

B.1 Mission Bay

Before 1998, Mission Bay was characterized by low-intensity industrial development and vacant land. Since adoption of the North and South Plans in 1998, Mission Bay has undergone redevelopment into a mixture of residential, commercial (light industrial, research and development, labs and offices), retail, and educational/institutional uses and open space. As of 2014, 4,067 housing units (including 822 affordable units) of the planned 6,400 housing units within Mission Bay (roughly 64 percent) are complete, with another 900 (including 150 affordable units) under construction. Regarding office and laboratory space, approximately 1.7 million square feet of the 4.4 million square feet in the Mission Bay plan area (approximately 39 percent) is complete. Approximately 60 percent of the approved 2.65 million-square-foot UCSF research campus has been developed, including seven research buildings, a campus community center, and a university housing development. The first phase of the UCSF Mission Bay Medical Center is expected to open in early 2015. Construction of the City's new Public Safety Building at Third and Mission Rock Streets is completed and will be operational in early 2015. More than 15 acres of new non-UCSF parks and open space within Mission Bay have also been completed.

B.2 Project Site and Existing Uses

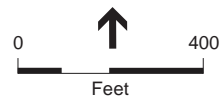
Figure 5 presents an aerial map of the project site vicinity. The approximate 11-acre project site encompasses Blocks 29, 30, 31, and 32 within the Mission Bay South Redevelopment Plan Area. The project site consists of the majority of Assessor's Block 8722, Lot 001, and all of Assessor's Block 8722, Lot 008. The project site is bounded by South Street on the north, Third Street on the west, 16th Street on the south, and by the future planned realigned Terry A. François Boulevard on the east. The City has designated the Mission Bay South Redevelopment Plan Area as a Priority Development Area (PDA). The project site is also located in the southeast corner of the City's South of Market neighborhood, and just north of the City's Potrero Hill and Dogpatch neighborhoods.

The site is relatively level, with the majority of the ground surface elevations ranging between approximately -1 foot to +3 feet San Francisco City Datum (SFD), roughly equivalent to 6½ to 10½ feet above mean sea level. Paved surface metered parking facilities currently operate in the west and north portions of the site. Lot E, accessed from 16th Street, contains 289 parking spaces; and Lot B, accessed from South Street, contains 316 parking spaces, for a total of 605 parking spaces. These parking facilities contain night lighting. Immediately east of, and adjacent to, Parking Lot B is a depressed area (measuring approximately 320 feet by 280 feet) created by an excavation and backfill associated with a prior environmental cleanup of that portion of the site. A surface swale extends west within this portion of the site to allow for drainage of surface water into the depression.¹⁷ Chain link fencing is installed on the perimeter of the project site, and around Parking Lots B and E within the site.

¹⁷ Langan Treadwall Rollo, *Updated Phase I Environmental Site Assessment, Mission Bay Blocks 29-32, San Francisco, California*, April 11, 2014.



- Mission Bay Redevelopment Plan Area Boundary
- Project Site Boundary
- MUNI UCSF/Mission Bay Station
- MUNI Third and Mariposa Street Station



SOURCE: Google Maps, ESA, 2014

OClI Case No. ER 2014-919-97; Planning Department Case No. 2014.1441E:
Event Center and Mixed-Use Development at Mission Bay Blocks 29-32

Figure 5
Aerial Photograph of Project Site Vicinity

B.3 Surrounding Uses

The University of California at San Francisco (UCSF) Mission Bay campus is located west, northwest, southwest, and partially south of the project site. Fronting on Third Street directly west of the project site is an eight-story UCSF parking structure (Third Street Garage), and new construction of the UCSF Global Health and Clinical Sciences Building (Mission Hall). To the northwest of the project site fronting along Third Street is UCSF Hearst Tower, a 14-story building containing student housing; and to the north of that, the UCSF Helen Diller Family Cancer Research building. To the southwest of the project site fronting along Third Street is new construction of the UCSF Energy Center, Betty Irene Moore Women's Hospital, Bakar Cancer Hospital and Benioff Children's Hospital. Directly south of the project site across 16th Street, between Third Street and Illinois Street, is a vacant lot recently acquired by UCSF. UCSF is currently preparing a new Long Range Development Plan to guide future campus growth and development at its facilities, including the UCSF Mission Bay campus, through 2035.

Directly south of the project site across 16th Street, between Illinois Street and Terry A. François Boulevard, is a recently-constructed six-story office building (409 Illinois Street) housing Fibrogen Life Science and other biotech/high tech companies, and south of that another recently-constructed six-story office building (499 Illinois Street). Directly north of the project site across and fronting on South Street are (from west to east) a vacant lot (recently acquired by Uber Technologies and Alexandria Real Estate Equities), a six-story parking garage (450 South Street), and a six-story office building housing the Old Navy corporate headquarters. Immediately east of the project site and west of Terry A. François Boulevard are City-owned parcels containing covered stockpiled materials. Further east of the project site across Terry A. François Boulevard is the site of the planned Bayfront Park; this area presently includes a paved trail (which constitutes a segment of the Bay Trail), surface parking lot, and unimproved open space.

Third Street, a north-south major arterial roadway defined as a Transit Important Street in the San Francisco General Plan, extends along the west project site boundary providing access to and from downtown San Francisco to the north and the Bayview neighborhood to the south. Third Street contains two vehicular travel lanes in each direction, separated by a paved median and Muni light rail tracks. Muni light rail lines K-Ingleside and T-Third Street operate along The Embarcadero, with the Muni UCSF/Mission Bay Station located at South Street and the Muni Third & Mariposa Street Station located one block south of the project site. Muni bus routes 91 and T-Owl operate along Third Street, with a Muni bus stop located north of the project site on Third Street. Campus Lane, a two-lane east-west local street, terminates at the intersection with Third Street, directly across from and west of the project site.

16th Street extends east of Third Street along a portion of the south project site boundary, terminating just east of Illinois Street. There are two vehicular travel lanes on 16th Street adjacent to the project site, increasing to four lanes west of Third Street. Bollards installed on 16th Street east of Illinois Street prevent through vehicular travel between Third Street and Terry A. François Boulevard. 16th Street is defined as a secondary arterial west of Third Street in the San Francisco General Plan. 16th Street contains a Class III bicycle route between Illinois Street and Third Street, and two Class II bike lanes west of Third Street. Illinois Street, a two-lane north-south local street, terminates at the intersection with 16th Street, directly across from and south of the project site. Illinois Street contains a Class II bicycle lanes between 16th Street and Mariposa Street.

Terry A. François Boulevard roughly follows the Bay shoreline east of the project site. There are currently two vehicular travel lanes and Class II bicycle lanes in each direction. Terry A. François Boulevard is signed as a Tsunami Evacuation Route.

South Street extends along the north boundary of the project site between Third Street and Terry A. François Boulevard. South Street contains two vehicular travel lanes in each direction. Bridgeview Way, a two-lane north-south local street, terminates at the intersection with South Street, directly across from and north of the project site.

Vehicle parking is currently provided along 16th Street and Terry A. François Boulevard adjacent to the project site.

B.4 Approvals Required

Project approvals or permits from the following agencies for construction or long-term operation are anticipated at this time:

- Approval by the OCII Executive Director of secondary use findings of consistency for the proposed event center
- Approval by the OCII Commission of a new Major Phase for Blocks 29-32
- Approval by the OCII Commission of individual Combined Basic Concept and Schematic Designs (Schematic Designs) for the project
- Approval by the OCII Commission (and any other City departments as required under the Mission Bay South Plan, OPA, Interagency Corporation Agreement, and associated documents) of: Amendments to the Mission Bay South Design for Development, and Modifications to the Mission Bay South Signage Master Plan and Mission Bay South Streetscape Plan
- Approval by Mayor, Department of Public Works Executive Director and OCII Executive Director of any non-material changes to Mission Bay South Infrastructure Plan
- Entertainment Commission approval of applicable entertainment permits, including, but not limited to, a Place of Entertainment permit
- Planning Commission approval of office building Schematic Designs related to Proposition M allocation
- Port of San Francisco staff approval of changes to waterfront infrastructure, including roadway striping
- San Francisco MTA/Department of Public Works approval for reconfiguration of adjacent streets
- San Francisco Department of Public Works and Board of Supervisors approval of subdivision map
- Governor's approval of project sponsor's Assembly Bill 900 (AB 900) application
- San Francisco Public Utilities Commission approvals for connections to infrastructure systems, including water supply, fire flow, recycled water, stormwater, and wastewater systems

C. COMPATIBILITY WITH EXISTING ZONING AND PLANS

	<i>Applicable</i>	<i>Not Applicable</i>
Discuss any variances, special authorizations, or changes proposed to the Planning Code or Zoning Map, if applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Discuss any conflicts with any adopted plans and goals of the City or Region, if applicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Discuss any approvals and/or permits from City departments other than the Planning Department or the Department of Building Inspection, or from Regional, State, or Federal Agencies.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The SEIR will discuss the project's compatibility with existing zoning and plans.

D. SUMMARY OF ENVIRONMENTAL EFFECTS AND APPROACH TO ANALYSIS

D.1 Summary of Environmental Effects

The proposed project could potentially result in either new significant environmental effects or substantially more severe impacts than were previously identified in the Mission Bay FSEIR, as noted by the environmental factor(s) checked below. The resource areas checked below indicate topic areas to be discussed in detail in the SEIR, but all resource areas are addressed in this Initial Study. This section describes the approach to analysis for this Initial Study, and Section E, presents a more detailed checklist and discussion of each environmental factor and the associated impact assessment.

<input type="checkbox"/> Land Use	<input checked="" type="checkbox"/> Air Quality	<input type="checkbox"/> Biological Resources
<input type="checkbox"/> Aesthetics	<input checked="" type="checkbox"/> Greenhouse Gas Emissions	<input type="checkbox"/> Geology and Soils
<input type="checkbox"/> Population and Housing	<input checked="" type="checkbox"/> Wind and Shadow	<input checked="" type="checkbox"/> Hydrology and Water Quality
<input type="checkbox"/> Cultural and Paleo. Resources	<input type="checkbox"/> Recreation	<input type="checkbox"/> Hazards/Hazardous Materials
<input checked="" type="checkbox"/> Transportation and Circulation	<input checked="" type="checkbox"/> Utilities and Service Systems	<input type="checkbox"/> Mineral/Energy Resources
<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Public Services	<input type="checkbox"/> Agricultural and Forest Resources

D.2 Approach to Analysis

The following approach to analysis is used in this Initial Study to determine which topics require no additional environmental analysis beyond what is presented in the Mission Bay FSEIR and this Initial Study and which topics require more detailed analysis in the SEIR. With the exception of Aesthetics and parking, the evaluation of environmental impacts is based on potential effects of the proposed project compared to existing (2014) conditions using the significance criteria listed in the San Francisco Planning Department's Initial Study Checklist. Significance criteria that do not apply to the proposed project, if any, are first identified, and neither the Initial Study nor the SEIR provide further discussion of those criteria; for example, since the project is not located within an airport land use plan, none of those criteria apply to this project. Environmental review of Aesthetics and parking impacts are considered pursuant to CEQA Section 21099(d) as discussed in the Aesthetics and Transportation sections of this Initial Study.

Project Impacts

For those topics determined in this Initial Study to be focused out from further analysis in the SEIR, this analysis first summarizes how these topics were addressed in the Mission Bay FSEIR as it related to Blocks 29-32, including identifying any applicable mitigation measures from the Mission Bay FSEIR and conclusions reached regarding significance of effects. Second, the Initial Study analyzes the impacts of the proposed project to determine: (1) if the proposed project, circumstances under which the project is undertaken, or new information (which could not have been ascertained at the time of the preparation of the Mission Bay FSEIR) would lead to new or more severe significant environmental effects from what was identified in the Mission Bay FSEIR; (2) if newly feasible or different mitigation measures or alternatives are available that would substantially reduce one or more significant effects of the project; and (3) if the mitigation measures identified in the Mission Bay FSEIR and/or newly added mitigation measures would reduce impacts to a less-than-significant level. The impact evaluation presents the significance determination for each impact and includes the detailed description of all mitigation measures applicable to the proposed project, whether it is the same as that specified in the Mission Bay FSEIR or an updated mitigation measure.

For those topics to be analyzed in detail in the SEIR, this Initial Study provides the checklist response identifying the potential for new significant impacts or substantially more severe impacts than those identified in the Mission Bay FSEIR. However, the summary of the Mission Bay FSEIR and the detailed analysis of the proposed project are deferred for discussion in the SEIR.

For the purposes of this Initial Study, the checklist questions in Appendix G have been modified to reflect the fact that the proposed project is a subsequent activity under the Mission Bay South Redevelopment program and that this analysis is being tiered from the certified Mission Bay FSEIR as a program EIR, consistent with CEQA Guidelines 15168(c). The four revised checklist questions used in this Initial Study are described below.

1. *Would the project result in potentially significant effects not identified in the prior EIR?* This question examines whether or not the proposed project would result in new significant or potentially significant environmental effects that were not identified in the Mission Bay FSEIR. This could include significant effects that are due to:
 - Project-specific features of the proposed event center and mixed-use development.
 - Substantial changes with respect to the circumstances under which the project would be undertaken, such as real estate development trends in the surrounding area or major projects that were previously unanticipated.
 - New information of substantial importance which was not known and could not have been known at the time the Mission Bay FSEIR was certified, such as newly available information related to climate change or sea level rise.

If the analysis identifies a new significant or potentially significant impact, this Initial Study then determines if either previously identified mitigation measures or newly identified mitigation measures would reduce the impact to less than significant. In this event, the mitigation measures are presented in this Initial Study and no further analysis is required. On the other hand, if a new significant or potentially significant impact is identified and/or further analysis is necessary to

determine if mitigation measures are available to reduce the impacts to less than significant, then this issue will be addressed in further detail in the SEIR.

2. *Would the project result in a potentially substantial increase in severity of a significant impact identified in the prior EIR?* This question examines whether or not the proposed project would result in substantially more severe environmental effects than what was identified in the Mission Bay FSEIR. This increase in severity of a significant effect could be due to:
 - Project-specific features of the proposed event center and mixed-use development.
 - Substantial changes with respect to the circumstances under which the project would be undertaken, such as real estate development trends in the surrounding area or major projects that were previously unanticipated.
 - New information of substantial importance which was not known and could not have been known at the time the Mission Bay FSEIR was certified, such as newly available information related to climate change or sea level rise.

If the project would result in an increase in severity of a previously identified significant impact, this Initial Study then determines if either previously identified mitigation measures or newly identified mitigation measures would reduce the more severe impact to less than significant. In this event, the mitigation measures are presented in this Initial Study and no further analysis is required. On the other hand, if a more severe significant impact is identified and/or further analysis is necessary to determine if mitigation measures are available to reduce the impacts to less than significant, then this issue will be addressed in further detail in the SEIR.

3. *Does the project sponsor decline to adopt a feasible mitigation measure or alternative?* This question addresses the case in which the Initial Study identifies a new significant impact or a substantial increase in severity of a significant impact but the project sponsor has declined to adopt a feasible mitigation measure or alternative. In the event of such cases, if any, the issue will be addressed in further detail in the SEIR.
4. *Would the project result in no new or more severe significant effects?* This question addresses several possible scenarios for certain topics which the Initial Study provides the complete analysis and no further analysis is necessary in the SEIR. These scenarios include the following:
 - The Mission Bay FSEIR identified a significant impact, and the proposed project would result in the same significant impact. In addition, the same mitigation measure identified in the Mission Bay FSEIR would reduce the impact to a less-than-significant level. In this case, the previous mitigation measure as applicable to the proposed project is presented in this Initial Study.
 - The Mission Bay FSEIR identified a significant impact and the proposed project would result in the same significant impact. However, a new or revised mitigation measure is recommended to reduce the impact to a less-than-significant level, and this new measure would replace the previously identified mitigation measure. In this case, only the new mitigation measure is presented in this Initial Study, and the reader is referred to the Mission Bay FSEIR for the original mitigation measure.
 - The Mission Bay FSEIR identified a significant impact and the proposed project would result in the same impact. However, under the current approach to analysis, the impact would be considered less-than-significant due to implementation of actions required to comply with applicable regulations (e.g., hazardous materials regulations). In this case, the revised analysis would supersede the analysis in the Mission Bay FSEIR, and with

compliance with applicable regulations, no mitigation measures are required and none are presented in this Initial Study. The reader is referred to the Mission Bay FSEIR for the original mitigation measure(s).

- The Mission Bay FSEIR identified either no impact or a less-than-significant impact, and the proposed project would also result in no impact or a less-than-significant impact. In this case, no mitigation measures are required and none are presented either in the FSEIR or this Initial Study.
- The Mission Bay FSEIR did not address an environmental topic under the Planning Department's current CEQA Initial Study checklist, and the proposed project would result in a significant impact that could be reduced to less than significant with implementation of a feasible mitigation measure. In this case, the new mitigation measure is presented in this Initial Study.
- The Mission Bay FSEIR did not address an environmental topic under the current Planning Department CEQA Initial Study checklist, but the proposed project would result in either no impact or a less than significant impact. In this case, no mitigation measures are required and none are presented.
- In a few instances, the discussion of why the project is not expected to result in any new or more significant effects is deferred to the SEIR, either as part of a larger discussion (such as Transportation) or for public disclosure.

Cumulative Impacts

Similar to the project impacts, cumulative impacts are analyzed by responding to the same four revised checklist questions but with regard to the potential for the proposed project to contribute to *new* significant cumulative impacts or substantially *more severe* cumulative impacts than those identified in the Mission Bay FSEIR. The Mission Bay FSEIR used the year 2015 for the analysis of the full buildout of the Mission Bay plan as well as for the cumulative impacts analysis, and cumulative impacts were assessed on the basis of regional population and employment projections for the year 2015 as determined by the Association of Bay Area Governments.

A cumulative impact is determined to be significant if the project in combination with other planned, proposed, or probable future conditions in the project vicinity would result in environmental effects that exceed the significance criteria listed in the San Francisco Planning Department's Initial Study Checklist when compared to existing conditions. In addition, the analysis must indicate that the project's incremental effect would be a "cumulatively considerable" contribution to the significant impact. In this Initial Study, the cumulative impact analysis identifies if the proposed project would contribute to a new significant cumulative impact or if a previously-identified cumulative impact would be substantially more severe under the proposed project.

Cumulative impacts for each resource area are analyzed with respect to the appropriate geographic scope for that topic and either (1) a list of past, present, and probable future projects that in combination with the proposed project could contribute to cumulative impacts, or (2) a summary of projections contained in general plan or related planning document (CEQA Guidelines Section 15130(b)(1)). Which of the two methods used varies from topic to topic.

For topics using the list approach, in addition to those projects considered in the Mission Bay FSEIR cumulative analysis, the projects/programs listed below were not anticipated in the Mission Bay FSEIR and are considered in the cumulative impact analysis.

- **University of California at San Francisco (UCSF), 2014 Long Range Development Plan (LRDP), Mission Bay Campus.** UCSF is updating its LRDP to guide future campus growth and development over the next 20 years. The 2014 LRDP updates information that was assumed in the Mission Bay FSEIR. The existing 60.2-acre UCSF Mission Bay campus site is located adjacent to Blocks 29-32, generally bounded by Mission Bay Boulevard South to the north, Owens Street to the west, Mariposa Street to the south, and Illinois and Third Streets to the east. Under the 2014 LRDP, the development capacity for the North Campus is proposed to increase from 2,650,000 to 3,641,800 gsf. The 2014 LRDP proposes to increase the square footage of the North Campus by 1,450,300 gsf, which includes 458,500 gsf of existing remaining entitlement from the 1996 LRDP, plus 991,800 gsf of new entitlement. On the South Campus, construction of a 124,500-gsf cancer outpatient building is anticipated prior to 2035, which will complete Phase 1 of the UCSF Medical Center at Mission Bay. This will bring the total space for Phase 1 to 993,500 gsf. Phase 2 facilities will be located on the west side of the South Campus, across the Fourth Street Public Plaza. Phase 2 Medical Center at Mission Bay is planned for after 2035 as a 261-bed hospital with additional outpatient space, totaling 793,500 gsf. Development of the East Campus would accommodate 500,000 gsf. As a result, the total anticipated development through 2035 with the proposed expansion of the Mission Bay campus site (North, South, and East campuses) would be 5,135,200 gsf.
- **Eastern Neighborhoods Program.** The Eastern Neighborhoods Program included changes in zoning controls and General Plan amendments for an approximately 2,200-acre area on the eastern side of the City. It is intended to encourage new housing while preserving sufficient land for light industrial and service industry (referred to collectively as “Production, Distribution, and Repair,” or “PDR,” uses) in four neighborhoods: the Mission, Showplace Square/Potrero Hill, the Central Waterfront, and the eastern portion of the South of Market (“East SoMa”). In conjunction with the rezoning, the General Plan was amended to include Area Plans for the neighborhoods (including revisions to the existing Central Waterfront and South of Market Area Plans). A key goal of the rezoning process was to encourage the creation of cohesive neighborhoods, particularly where new housing is being encouraged. The plans also propose public benefits and other implementation programs, particularly the creation of affordable housing. The program introduced new zoning districts, including districts that permit at least some PDR uses in combination with commercial uses, districts mixing residential and commercial uses, and areas where only PDR uses would be permitted, with residential use prohibited to alleviate development pressure on PDR uses. The Showplace Square/Potrero Hill Area Plan is located immediately to the west of the Mission Bay Plan (across Interstate 280), the Central Waterfront Area Plan is located immediately to the south of the Mission Bay plan area (south of Mariposa Street), and the East SoMa Area Plan is located immediately to the north (across China Basin and east of Fourth Street). Projects pursuant to the Eastern Neighborhoods Program are currently under construction, including several residential and mixed-used developments south of Mariposa Street.
- **Seawall Lot 337 and Pier 48 Mixed-Use Project (Mission Rock).** This possible future project is located about one-third mile north of Blocks 29-32 on the northeast side of the Mission Bay South Plan area. The project would include a mixed-use, multi-phase waterfront development on Seawall Lot 337, rehabilitation and reuse of Pier 48, and construction of approximately 5.4 acres of net new open space, for a total of 8 acres of open space on the site. Overall, the project would

involve construction of up to approximately 3.7 million gsf of residential, commercial, and retail uses, and a public parking garage on the Project Site. Both Seawall Lot 337 and Pier 48 are owned by the Port of San Francisco. The project is currently in the environmental review phase.

- Pier 70 Mixed-Use Development:** This possible future project is located just under one-half mile south of Blocks 29-32, on 35 acres located south of 20th Street and east of Illinois Street. This project proposes up to approximately 3,040,000 gsf (excluding parking) of above-grade construction in new buildings, and improvements to historic buildings. The project allows for a flexible land use program, including a maximum residential-use and maximum commercial-use scenarios for the Pier 70 Special Use District. Option 1 - maximum residential scenario, would consist of approximately 2,000 dwelling units within 1,605,000 gsf, including up to 904,000 gsf of commercial and office space, plus up to 365,700 gsf of manufacturing, local retail, creative uses and arts which is designated as an "Innovative Industries Zone." Option 2 - maximum office scenario, would consist of approximately 1,052 dwelling units within approximately 903,616 gsf, including up to approximately 1,810,000 gsf of commercial and office space, plus up to 327,700 gsf of manufacturing, local retail, creative uses and arts which is designated as an "Innovative Industries Zone."

E. EVALUATION OF ENVIRONMENTAL EFFECTS

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
1. LAND USE AND LAND USE PLANNING— Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial impact upon the existing character of the vicinity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Summary of Land Use Impacts in Mission Bay FSEIR

The land use significance criteria were addressed in the Mission Bay FSEIR in the Land Use section; the Plans, Policies, and Permits section; and the Initial Study Land Use section. Relevant information from these sections is summarized below.

The Mission Bay FSEIR Land Use setting section characterized existing land uses present within and near the Mission Bay plan area at that time. The Mission Bay FSEIR indicated the land uses within Blocks 29-32 at the time of preparation of the FSEIR consisted of industrial and commercial uses, parking facilities and vacant land (see Hazards and Hazardous Materials, below, for a discussion of known historical land uses within Blocks 29-32, and additional detail on specific land uses that existed at the time of preparation of the Mission Bay FSEIR).

While the Mission Bay FSEIR provided CEQA environmental analysis for the entire Mission Bay program, it divided the plan area into subareas to facilitate the analysis. Block 29-32 was located within the East Subarea (the area bounded by existing Terry François Blvd, Mariposa Street, Third Street, and Mission Bay Boulevard South). Development of this subarea was assumed to include commercial industrial and office; entertainment-oriented, neighborhood- and City-serving retail; and public open space land uses. Buildings in the subarea would be allowable up to 90 feet in height, with 7 percent of the developable area allowable up to 160 feet high (along Third Street). Buildings along the future realigned Terry A. François Boulevard would be restricted to 90 feet in height.

The Mission Bay FSEIR Initial Study Land Use section determined that the Mission Bay plan area was a largely underutilized industrial area with no established residential community; this was the basis for the Mission Bay FSEIR finding that the Mission Bay plan would not physically disrupt or divide an established community.

The Mission Bay FSEIR Plans, Policies and Permits section compared the Mission Bay plan and its implementing plans to other City plans, policies and regulations. The Mission Bay FSEIR indicated that the Mission Bay Redevelopment Plans and Design for Development documents would constitute the regulatory land use framework for the Mission Bay plan area, and would supersede the City's Planning Code (except where indicated in those implementing documents), and furthermore, the Redevelopment Plans would be required to be found consistent with the City General Plan prior to adoption. The Mission Bay FSEIR also acknowledged that certain development activities proposed within the Mission Bay plan area would be subject to applicable regional, State and/or federal permitting authority. The Mission Bay FSEIR analyzed the physical environmental impacts of potential policy conflicts for specific environmental topics, such as transportation and noise, in the respective sections of the FSEIR.

The Mission Bay FSEIR Land Use impacts section indicated that the Mission Bay project would result in a substantial change in the type and intensification in land uses in the Mission Bay plan area, involving demolition of most existing buildings and displacement of existing uses within the Mission Bay plan area, and development of the proposed mixed-use land use program over the build-out period. The Mission Bay FSEIR reported that the Mission Bay plan would continue the trend that was occurring in other nearby areas of the City (e.g., South of Market) of redeveloping former industrial areas into residential and commercial neighborhoods. The Mission Bay FSEIR reported that the commercial industrial/retail uses proposed within the East Subarea of the Mission Bay plan area, which includes Blocks 29-32, would be compatible with the medical research and instructional uses proposed within the adjacent proposed UCSF campus subarea (located west of the Blocks 29-32 across Third Street).

The Mission Bay FSEIR also acknowledged that construction activities associated with development of the proposed uses within the Mission Bay plan area would create construction-related effects (e.g., dust, noise, traffic) that may be noticeable and annoying to new residents within the Mission Bay plan area, however, with implementation of mitigation measures identified in the respective sections of the Mission Bay FSEIR, those effects would be mitigated to a less-than-significant level. These factors provided the basis for the Mission Bay FSEIR finding that the Mission Bay plan would not have a significant impact upon the existing character of the vicinity.

In summary, the Mission Bay FSEIR identified no significant impacts on land use from the Mission Bay plan, and accordingly, did not require any mitigation measures related to land use effects.

Impact Evaluation

Physical Division of an Established Community

Impact LU-1: The proposed project would not physically divide an established community. (Less than Significant)

Surface metered parking facilities currently operate in the west and north portions of the site, and a chain-link fence restricts access to the remainder of the site. During construction of the proposed project, the existing surface parking lot uses at the project site would be removed. Although the specific construction details have not yet been determined, the project may require temporary closure of lane(s) along Third Street, South Street, 16th Street and/or Terry A. François Boulevard during construction. Since these closures would be temporary, and alternate routes would be provided as needed, project construction would not physically divide the surrounding established community.

The proposed project would result in the construction and operation of an event center, office and retail uses, parking facilities and open space areas within Blocks 29–32. The proposed project would be incorporated within the established street plan, including realignment of Terry A. François Boulevard, and would not create an impediment to the passage of persons or vehicles. The proposed project design does not include any physical barriers or obstacles to circulation that would restrict existing patterns of movement between the project site and the surrounding neighborhood. To the contrary, the project would include a number of features designed to encourage and promote public access and circulation. For example, the project would include a 20-foot setback along the 16th Street frontage that would serve as a connector to the Bayfront Park, as shown in the Mission Bay South Design for Development document.

During events, particularly at the end of basketball games or other events when the peak flow of patrons would exit the project site, the project would involve implementation of transportation management measures. These measures could result in periodic disruption or division of the physical arrangements of existing surrounding rights-of-way through event-related street or lane closures, sidewalk restrictions, or transit reallocation. These impacts would be limited to a few hours before and/or after events, and they would be intended to most efficiently facilitate the flow of people and vehicles away from the project site, thereby enhancing connections as opposed to increasing divisions.

Given that the proposed project and uses would occur within the boundaries of the existing lot lines and no physical barriers to movement through the community would be involved, the construction and operation of the proposed uses would not result in any new impacts, or increase the severity of previously-identified impacts, related to physical division of an established community.

At the time of preparation of the Mission Bay FSEIR, several buildings and facilities were located and operating on the project site. These buildings and structures were subsequently removed, and the project site has been subject to grading, some excavation, and construction of paved surface parking lots, fencing and associated utilities. This change in conditions on the project site has not altered the fact that the site is within the established street plan.

As discussed above, the Mission Bay FSEIR did not identify a significant impact related to physical division of an established community because the surrounding community contained no residential uses.

As discussed above under Section B.3, Surrounding Uses, the area surrounding the project site has been partially developed since preparation of the FSEIR. The UCSF Mission Bay campus is located west, northwest, southwest, and partially south of the project site, including the UCSF Hearst Tower, a 14-story building containing student housing located northwest of the project site. Office buildings are also located north and south of the project site. In addition, as described above under "Approach to Analysis," the updated UCSF LRDP indicates plans for further development of about 1.46 million gsf of new space at the Mission Bay campus.

These changes in land uses surrounding the project site would not affect the determination whether the proposed event center and mixed-use development within the project site would physically divide an established community. As stated above, development would be undertaken within the existing property lines, and the project would facilitate pedestrian movement through the project site. The proposed project would be adjacent to the UCSF Mission Bay campus but would not physically divide the campus. Therefore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe impacts associated with the proposed project.

As discussed above, the Mission Bay FSEIR did not identify any significant impacts related to physical division of an established community, and accordingly, did not require any mitigation measures. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce impacts related to physical division. Consequently, no new or different mitigation measures or alternatives to reduce project impacts related to physical division of an established community are identified or required with respect to the currently proposed project.

On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those identified in the Mission Bay FSEIR related to physical division of an established community.

Land Use Plan or Policies

Impact LU-2: The proposed 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. (Less than Significant)

As stated above, the Mission Bay FSEIR indicated that the Mission Bay Redevelopment Plans and Design for Development documents would constitute the regulatory land use framework for the Mission Bay plan area. The Mission Bay FSEIR analyzed the physical environmental impacts of potential policy conflicts for specific environmental topics, such as transportation and noise, in the respective sections of the FSEIR.

The proposed project would not obviously conflict with applicable land use plans or policies, including the San Francisco General Plan, with San Francisco Planning Code provisions that apply to the project, or with the Mission Bay South Redevelopment Plan, under which the proposed office and retail uses are considered primary uses, and the proposed event center is considered a secondary use. In addition, the proposed project would be generally consistent with the major development standards of the Design for Development for the Mission Bay South Project Area. However, due to the unique nature of the event

center component of the project, the sponsor intends to seek OCII approval of variations or amendments to some of these standards (see above, Section B.4, Approvals Required).

The project would not substantially conflict with regional plans or policies, including *Plan Bay Area*, the 2010 Clean Air Plan, *San Francisco Bay Plan*, and the *San Francisco Basin Plan*. Aside from land use effects, the physical environmental impacts of potential policy conflicts are addressed in the applicable sections of this Initial Study, including biological resources; the SEIR will provide detailed analysis of the physical environmental impacts of potential policy conflicts for the remaining resource areas, such as transportation and noise.

As part of the project approval process, OCII, the San Francisco Planning Commission, and other relevant regulatory agencies would determine whether the proposed project is consistent with their respective plans as applicable to the proposed project. Thus, the proposed project would have a less-than-significant impact with regard to conflicts with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect.

Since publication of the Mission Bay FSEIR, there have been three notable changes related to the applicable land use plans or policies associated with the project site: revisions to the South Design for Development; change in jurisdictional agency; and the update to the UCSF LRDP. As discussed in Section A.2, Background, above, the Redevelopment Agency/OCII has prepared nine addenda to the Mission Bay FSEIR, between 2000 and 2013. Only the 2004 addendum addressed changes to land use plans or policies applicable to the project site at Blocks 29-32. That addendum analyzed revisions to the South Design for Development regarding towers, tower separation, and setbacks. The unique nature of the proposed event center would require the sponsor to receive OCII approval of variations or amendments to some of these standards, which would occur as part of the project approval process.

As stated in the Project Description, in accordance with California Community Redevelopment Law, when the Board of Supervisors approved the South Plan in 1998, land use and zoning approvals within Mission Bay came under the jurisdiction of the Redevelopment Agency. However, with dissolution of redevelopment agencies statewide, and subsequent state and local legislation creating the Successor Agency, OCII now has jurisdiction and approval authority over the land use and zoning of the project site. This change in jurisdiction would not result in new or more severe impacts related to conflict with land use plans.

As stated above, under Section D, Approach to Analysis, under the UCSF 2014 LRDP 1,450,300 million gsf of new space is proposed on the North Campus (north of 16th Street) which includes 458,500 gsf of existing remaining entitlement from the 1996 LRDP, plus 991,800 gsf of new entitlement. On the North Campus, the 2014 LRDP calls for the same mix of research, support, parking, and open space uses as was analyzed in the Mission Bay FSEIR, but with some land use changes to undeveloped parcels. In particular, the 2014 LRDP calls for new housing on Mission Bay Boulevard South, at Sixth Street. On the South Campus, construction of a 124,500-gsf cancer outpatient building is anticipated prior to 2035, which will complete Phase 1 of the UCSF Medical Center at Mission Bay. This will bring the total space for Phase 1 to 993,500 gsf. On the South Campus, the Mission Bay FSEIR analyzed development of the blocks south of 16th Street with commercial-industrial and retail uses. The development of these blocks with UCSF clinical uses was previously analyzed in the 2008 addendum, as stated in the Project Description.

The clinical land uses called for in the 2014 LRDP would be consistent with the uses analyzed in 2008. Development of the East Campus would accommodate 500,000 gsf, plus 500 parking spaces, and pursuant to the LRDP the site would be functionally zoned for research and parking use. The site is intended to serve as a consolidation location for UCSF, for both owned and leased properties, to reduce costs and improve efficiencies. In the Mission Bay FSEIR, this site is analyzed for development of Commercial Industrial uses to facilitate the development of research and development, biotechnical, semi-conductor research, telecommunications, business or multimedia services, and related light industrial uses. The proposed UCSF uses would be consistent with that land use designation as either primary or secondary use.

None of the changes in land use proposed in the 2014 LRDP would change the regulatory controls on the Blocks 29–32 project site. Moreover, the changes in land use would be limited to specific parcels (notably, the new housing site at Sixth Street, as well as a future research site on Owens Street) that—due to their relative distance from the Blocks 29–32 project site—would not present land use conflicts with the proposed project. Implementation of the 2014 LRDP would intensify research, clinical, housing, and medical office uses east and southeast of the Blocks 29–32 project site, but this intensification would not result in new or more severe land use impacts than those analyzed in the Mission Bay FSEIR.

Therefore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that would result in new or more severe impacts associated with the proposed project.

As discussed above, the Mission Bay FSEIR did not identify any significant impacts related to a conflict with land use plans or policies adopted for the purpose of avoiding or mitigating an environmental effect, and accordingly, did not require any mitigation measures. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce conflict with land use plans or policies. Consequently, no new or different mitigation measures or alternatives to reduced project impacts related to conflict with land use plans or policies are identified or required with respect to the currently proposed project.

On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those identified in the Mission Bay FSEIR related to conflict with land use plans or policies adopted for the purpose of avoiding or mitigation an environmental effect.

Existing Character of the Vicinity

Impact LU-3: The proposed project would not have a substantial impact upon the existing character of the vicinity. (Less than Significant)

As discussed above, the Mission Bay FSEIR indicated that the commercial industrial/retail uses proposed within the east subarea of the Mission Bay plan area (which includes Blocks 29–32) would be compatible with the medical research and instructional uses proposed within the adjacent proposed UCSF campus subarea (located west of the Blocks 29–32 across Third Street).

Examples of potential Mission Bay plan research/light industrial/office land uses for the project site can include research and development, biotechnical or semiconductor research, telecommunications, business services, multimedia services, related light industrial uses, and commercial offices. Potential retail uses

for the site can include city-serving retail uses, and neighborhood-serving retail within ground-floor spaces. Secondary uses could include institutions and assembly and entertainment (nighttime entertainment and recreation building).

The proposed project would result in the construction and operation of an event center, office and retail uses, parking facilities and open space areas within the project site. The retail and office uses would be generally consistent with the previously proposed uses for the site, such that no new or more severe conflicts with land use character would occur.

The proposed event center uses are considered “nighttime entertainment uses” and would be similar to the secondary “nighttime entertainment” uses previously analyzed in the Mission Bay FSEIR. On event days, the project’s event component would attract spectators/attendees, as well as additional visitors to the other restaurant and retail uses. Although this entertainment use was addressed in the FSEIR, the size and intensity of the event center use was not previously analyzed.

Once completed, the proposed project would function as a destination site, with an intensification of use during events. Attendance at these events would alter the overall land use character of the project site from that analyzed in the FSEIR. As discussed in the Project Description, Golden State Warriors basketball games, large concerts, other sporting events and conventions would have average attendance ranging between approximately 7,000 and 18,000 people. Basketball games and concerts would typically occur during the evening hours, and conventions would generally occur during daytime hours. The facility would also host family shows, and smaller concerts with attendance ranging between 3,000 and 8,200 people during the daytime and evening hours. The outdoor plaza would be used for occasional outdoor gatherings and events.

The presence of event spectators/attendees on streets and sidewalks in the vicinity of existing uses would be noticeable compared to existing conditions. Events would also attract people to local restaurant, retail, and open space uses of the wider neighborhood. Similar to operation of such uses in proximity to AT&T Park during a Giants game, local restaurants, retail businesses, and open spaces would be more heavily patronized than under existing conditions, but they would continue to operate as intended.

Although the presence of these attendees on streets and sidewalks in the vicinity of medical research, clinic, and office uses in the surrounding Mission Bay neighborhood would be noticeable compared to existing conditions, these additional people would not impede the operation of those existing uses such that adverse land use impacts would occur. Each use would continue to function as intended. The effects of event center operation on the local transportation network, noise, and air emissions on the surrounding neighborhood will be addressed in the SEIR.

Basketball games and other planned events such as concerts would occur generally after commercial and medical office hours of nearby uses. Although the UCSF Medical Center would be a 24-hour use, hospital uses are generally more intensive during standard medical office hours. Moreover, there is nothing about the event center that would preclude operation of those uses. Therefore, although event center operations are expected to result in an incremental increase in localized traffic, noise, and air pollutant emissions, the uses in the project site vicinity would continue to function as intended.

On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those identified in the Mission Bay FSEIR related to conflict with existing land use character.

At the time of preparation of the Mission Bay FSEIR, the project site vicinity was occupied by a mix of warehouses used for light industrial, commercial, and office uses, as well as truck terminals, truck yards, gravel processing facilities, and expanses of undeveloped land. On the nearby waterfront were the Port's Maintenance Operations Facilities at Pier 50, the public boat launch ramp between Piers 52 and 54, yacht and boat clubs at Piers 50½, 52, and 54, and Agua Vista Park north of 16th Street.

Since preparation of the Mission Bay FSEIR, large portions of the Mission Bay plan area have been built out. The UCSF Mission Bay campus is located west, northwest, southwest, and partially south of the project site, and it currently includes a mix of parking structures, office buildings, research buildings, student housing, and hospital buildings. Other office buildings and vacant lots are located north and south of the site, and immediately east of the site are City-owned parcels containing covered stockpiled materials. The area of the proposed Bayfront Park currently includes a paved trail, surface parking lot, and unimproved open space.

These changes in conditions in land use character surrounding the project site would not result in new or more severe impacts on the existing character of the vicinity. Operation of the proposed office, entertainment, and retail uses would not conflict with the changed land use character. To the contrary, as stated above, the proposed project would be compatible with the existing character of the medical campus, office, and research-and-development uses in the project site vicinity. Therefore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe land use impacts associated with the proposed project.

As discussed above, the Mission Bay FSEIR did not identify any significant impacts upon the existing character of the vicinity, and accordingly, did not require any mitigation measures. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce impacts upon the existing character of the vicinity. Consequently, no new or different mitigation measures or alternatives to reduced project impacts to land use character are identified or required with respect to the currently proposed project.

On the basis of the factors discussed above, the project would not have any new or substantially more severe impacts upon the existing character of the vicinity.

Cumulative Impacts

Impact C-LU-1: The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts to land use. (Less than Significant)

The geographic scope for potential cumulative impacts related to land use generally includes the South Mission Bay Plan Area, as well as the immediately adjacent Eastern Neighborhoods Plan areas (i.e., the Central Waterfront and Showplace Square/Potrero Hill Area Plans), Seawall Lot 337/Pier 48 Mixed-Use project, and Pier 70 project (as discussed above under Section D, Approach to Analysis). Other reasonably foreseeable projects within the project vicinity with the potential to contribute to cumulative, land use

impacts would be required to undergo separate environmental review, as necessary, and to identify mitigation measures for any significant impacts. Cumulative impacts on land use could result if the proposed project, in combination with other reasonably foreseeable projects in the vicinity, would collectively increase the potential for significant impacts.

Other projects within the Mission Bay South Plan Area would be built consistent with the Mission Bay South Plan and Mission Bay South Design for Development within the lot lines of existing streets, within an area of the City with a low residential population, and therefore would not be expected to physically divide an established community. Projects built pursuant to the Eastern Neighborhoods Area Plans would generally be constructed in areas with a mix of uses and higher residential population than the Mission Bay South Plan Area, but these projects would also be constructed within the existing street grid, and their operation would not physically divide an established community. The Pier 70 project, which is encompassed within the boundaries of the Eastern Neighborhoods Central Waterfront Area Plan, would be built entirely east of Illinois Street, as well as primarily south of 20th Street. The project would result in the construction of new streets and the extension of existing streets, as well as new parks and open space for pedestrian and cyclist access. Similarly, the Seawall Lot 337 and Pier 48 Mixed-Use Project would be built within existing lot lines east of Third Street, and create new access routes through the site. These projects would not physically divide an established community.

Cumulative developments in the Mission Bay South Plan Area would be required to generally conform to the Mission Bay South Plan land use designations and Mission Bay South Design for Development height, bulk, and developable area standards. Similarly, cumulative developments in the Showplace Square / Potrero Hill and Central Waterfront Plan Areas (including the Pier 70 project), would be required to conform to the land use controls of the Eastern Neighborhoods Rezoning and Area Plans. The Seawall Lot 337 and Pier 48 Mixed-Use Project would be subject to the Port of San Francisco land use controls, including the Waterfront Land Use Plan, and the Bay Conservation and Development Commission's San Francisco Bay Plan.

The Seawall Lot 337 and Pier 48 Mixed-Use Project is located about one-half mile north of Blocks 29-32 on the northeast side of the Mission Bay South Plan area. The project would include a mixed-use, multi-phase waterfront development on Seawall Lot 337, rehabilitation and reuse of Pier 48, and construction of approximately 5.4 acres of net new open space, for a total of 8 acres of open space on the site. Overall, the project would involve construction of up to approximately 3.7 million gsf of residential, commercial, and retail uses, and a public parking garage on the Project Site. Both Seawall Lot 337 and Pier 48 are owned by the Port of San Francisco. The project is currently in the environmental review phase. Therefore, in combination, these projects would not be anticipated to substantially conflict with land use plans and policies adopted for the purpose of avoiding an environmental effect.

Build-out of the remainder of the Mission Bay South Plan Area, the Eastern Neighborhoods Area Plans, the Seawall Lot 337 and Pier 48 Mixed-Use Project, and the Pier 70 project would result in an overall intensification and diversification of land uses in this area of the City. In particular, the Mission Bay South area and its surroundings is currently partially developed and partially occupied by vacant or underutilized parcels. New higher-density residential, commercial office, research-and-development, and medical uses in the Mission Bay South Plan Area, as well as in parcels south of the plan area, would complement the commercial office, research-and-development, and medical office developments completed to date. The

land use impacts of buildout of the Mission Bay South Plan Area were included in the cumulative impacts analysis of the Eastern Neighborhoods EIR. Regarding projects in the Eastern Neighborhoods plan areas, introduction of more residential, commercial, and mixed-use buildings in the Central Waterfront and Showplace Square / Potrero Hill plan areas, would alter the land use character of these areas. The effects of these land use changes have been analyzed and disclosed in the Eastern Neighborhoods EIR. The Pier 70 project and Seawall Lot 337 and Pier 48 Mixed-Use Project would introduce new commercial office, residential, and retail spaces, as well as recreational open spaces. The land use impacts of these projects will be analyzed in each project’s environmental review, currently under way.

These projects would combine with the proposed commercial office, retail, entertainment, and open space uses at Block 29–32 to create a wider mix of uses than currently exists in this portion of the City. Although this would represent a change in land use character, the combined effect would not be adverse. Each use would still function as intended, and many of the uses would be complementary. Thus, the proposed project in combination with existing and planned future developments in the vicinity would not combine to result in significant adverse cumulative effects to land use character.

Therefore, cumulative land use impacts would be less than significant.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
2. AESTHETICS—Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which contribute to a scenic public setting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Senate Bill 743 and CEQA Public Resources Code Section 21099

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743 (Chapter 386 of the 2013 California Legislation Session), which became effective on January 1, 2014.¹⁸ Among other provision, SB 743 amends the California Environmental Quality Act (CEQA) by adding Public Resources Code Section 21099 regarding analysis of aesthetics (and parking) impacts for urban infill projects.

¹⁸ SB 743 can be found on-line at: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB743.

Aesthetics (and Parking) Analysis

Public Resources Code Section 21099(d), effective January 1, 2014, provides that, “aesthetics and parking impacts of a residential, mixed- use residential, or employment center project on an infill site located within a transit priority area shall not be considered significant impacts on the environment.” Accordingly, aesthetics and parking are no longer to be considered in determining if a project has the potential to result in significant environmental effects for projects that meet the following three criteria:

- The project is in a transit priority area;¹⁹ and
- The project is on an infill site;²⁰ and
- The project is residential, mixed-use residential, or an employment center.²¹

The proposed project meets each of the above three criteria because it (1) is located in proximity to several transit routes; (2) is located on an infill site that has previously been developed with industrial and commercial uses and is surrounded by areas of either recently completed or planned urban development; and (3) would be an employment center supporting a range of commercial uses, located in proximity to several transit routes, and in an urban area on a site already developed and zoned for commercial uses with a floor area ration (FAR) greater than 0.75.²² Thus, this Initial Study and the SEIR do not consider aesthetics (or parking) in determining the significance of project impacts under CEQA.

Nevertheless, Public Resources Code Section 21099(d)(2)(A) states: “This subdivision does not affect, change, or modify the authority of a lead agency to consider aesthetic impacts pursuant to local design review ordinances or other discretionary powers provided by other laws or policies.” Consequently, all applicable City urban design standards and guidelines governing the project site and proposed project, including the Mission Bay South Redevelopment Plan, Mission Bay South Design for Development, and Mission Bay South Signage Plan would apply to the proposed project. Furthermore, the project would be subject to all applicable design review approvals, including Major Phase approval by OCII, and Schematic Designs for each building and private open spaces, which would consider relevant design and aesthetic issues.

Public Resources Code Section 21099(d)(2)(B) states: “For the purposes of this subdivision, aesthetic impacts do not include impacts on historical or cultural resources.” Please refer to Cultural Resources, below, for an assessment of potential project impacts on historic and cultural resources. Environmental effects of lighting on birds are addressed under Biological Resources.

¹⁹ Public Resources Code Section 21099(a) defines a “transit priority area” as an area within one-half mile of an existing or planned major transit stop. A “major transit stop” is defined in Section 21064.3 of the California Public Resources Code as a rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

²⁰ Public Resources Code Section 21099(a) defines an “infill site” as a lot located within an urban area that has been previously developed, or a vacant site where at least 75 percent of the perimeter of the site adjoins, or is separated only by an improved public right-of-way from, parcels that are developed with qualified urban uses.

²¹ Public Resources Code Section 21099(a) defines an “employment center” as a project located on property zoned for commercial uses with a floor area ratio of no less than 0.75 and located within a transit priority area.

²² San Francisco Planning Department, Transit-oriented Infill Project Eligibility Checklist, November 10, 2014.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
3. POPULATION AND HOUSING— Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Summary of Population and Housing Impacts in Mission Bay FSEIR

The Mission Bay FSEIR Business Activity, Employment, Housing and Population setting section characterized existing business and employment conditions that were present within the Mission Bay plan area, nearby areas, the City as a whole, and the region at that time. The Mission Bay FSEIR indicated there were approximately 95 existing establishments within the Mission Bay plan area providing jobs for an estimated 1,670 workers at the time of preparation of the Mission Bay FSEIR. There were no residential units or permanent residents within the Mission Bay plan area at that time.

The Mission Bay FSEIR Business Activity, Employment, Housing and Population impacts section estimated employment by land use within the Mission Bay plan area at build-out. The Mission Bay FSEIR projected that total employment associated with the Mission Bay plan would generate approximately 30,000 jobs at build-out. Of that, uses proposed under the UCSF Long Range Development Plan were estimated to account for 30 percent of the future employment within the Mission Bay plan area; office uses would account for 29 percent; research and development would account for 22 percent; retail would account for 14 percent; and hotel, public facilities, housing and other miscellaneous uses would account for the remaining 6 percent. The Mission Bay FSEIR also indicated construction related to the Mission Bay plan would be a source of construction jobs for many years, estimated at an average of approximately 1,000 full-time construction jobs per year.

The Mission Bay FSEIR determined that development proposed under the Mission Bay plan could displace certain existing businesses. However, it noted that virtually all remaining existing businesses operating within Mission Bay plan area at that time were either on short-term leases or on a long-term lease that would expire soon. Furthermore, the Mission Bay FSEIR determined that most of those businesses would be able to relocate to alternative locations either elsewhere in or outside the City.

The Mission Bay FSEIR estimated that the Mission Bay plan would create approximately 6,100 housing units and 5,900 households and increase population by 10,900 (no housing was proposed within Blocks 29-32), and create approximately 6,900 employed residents within the Mission Bay plan area at build-out. The Mission Bay FSEIR estimated that the housing demand created by the planned employment growth of the Mission Bay plan would exceed the housing supply proposed within the Mission Bay plan area by

approximately 3,700 units. The Mission Bay FSEIR estimated this offset would be accommodated by housing elsewhere in and outside the City. The Mission Bay FSEIR addressed the potential for the plan's jobs/housing imbalance to result in environmental impacts (e.g., transportation and air quality effects from longer commute distances), to be addressed in the corresponding sections in the FSEIR.

In summary, the Mission Bay FSEIR identified no significant impacts to business activity, employment, housing and population from the Mission Bay plan, and accordingly, did not require any mitigation measures related to plan effects on population and housing.

Impact Evaluation

Construction Impacts

Impact PH-1: Construction of the proposed project would not induce substantial growth in the area, either directly (for example, by constructing new homes or businesses) or indirectly (for example, through extension of roads or other infrastructure). (Less than Significant)

Project construction is estimated to last approximately 26 months. Several hundred construction workers would be required to construct the entire project, although the number of construction workers present on-site daily would range considerably, depending on the specific construction activities being performed and overlap between construction phases.

San Francisco and the five-county subregion of San Francisco, Alameda, Contra Costa, Marin and San Mateo Counties experienced persistently high unemployment in recent years. The construction sector was particularly affected by the 2007-2008 mortgage crisis and subsequent recession. Between 2007 and 2010, construction jobs in the five-county region declined by nearly 38,000 jobs, or about a third, over this period. However, the trend for the five counties as a whole began to reverse in 2011, with a net increase of about 520 construction jobs in the five-county region that year. Construction job growth has continued, and between 2010 and July 2014, more than 22,700 construction jobs were added in the five-county region. Therefore, as of July 2014, the net loss in construction employment in the five-county region since 2007 stands at about 15,000 jobs.²³

Given the continuing population of unemployed construction workers, as well as the project being subject to OCII's workforce development program (which includes goals to hire local workers for construction), nearly all project construction labor needs would readily be met by current residents of San Francisco and the rest of the five-county region. Therefore, the project would not result in any new significant construction-related impacts, or increase the severity of previously-identified construction impacts, to population growth. Furthermore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe construction-related impacts to population growth associated with the proposed project.

²³ California Employment Development Department, Labor Market Information, California Regional Economies Employment Series (CREE), 2014.

The Mission Bay FEIR and FSEIR did not specifically address potential indirect impacts to population growth related to extension of roads or other infrastructure. However, the project would not involve the extension of roads or other infrastructure except to the project site itself, at a location already well served by roads and other infrastructure, including previously approved improvements to roads and infrastructure associated with overall Mission Bay plan development. Consequently, the construction-related indirect impacts on population growth associated with the proposed project would be less than significant.

The Mission Bay FSEIR did not identify any significant construction-related impacts to population growth, and accordingly, did not require any mitigation measures for this impact. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce construction-related impacts to population growth. Consequently, no new or different mitigation measures or alternatives to reduce project construction impacts to population growth are identified or required with respect to the currently proposed project.

Impact PH-2: Construction of the proposed project would not displace existing housing units or create substantial demand for additional housing. (Less than Significant)

No housing existed on Blocks 29-32 at the time the Mission Bay FSEIR was prepared, and no housing was planned for the project site under the Mission Bay plan. Consequently, implementation of the Mission Bay plan did not displace any existing housing units on the project site, and the proposed project on Blocks 29-32 would not change that condition. Furthermore, there are no circumstances under which the project would be undertaken that would change that condition, and the project's impacts on displacement of housing units or creation of substantial demand for additional housing would be less than significant.

The Mission Bay FSEIR did not identify any significant construction-related impacts to housing demand, and accordingly, did not require any mitigation measures for this impact. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce construction-related impacts to displacement of housing. Consequently, no new or different mitigation measures or alternatives to reduce project construction impacts to housing demand are identified or required with respect to the currently proposed project.

Impact PH-3: Construction of the proposed project would not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. (Less than Significant)

As was anticipated by the Mission Bay FSEIR, all commercial and industrial uses that existed on the project site at the time of preparation of the Mission Bay FSEIR have since been removed, and their associated businesses displaced and/or relocated to other locations. Presently, the only business operating on the project site are two metered parking lots (Lots B and E) that were developed subsequent to the removal of the prior land uses. These parking facilities use fully-automated pay stations, so no workers are required for daily lot operations (other than potential daily pass-bys that may occur from employees servicing the pay stations). Consequently, the project is not expected to displace any on-site workers, or necessarily result in any reduction of employment for the parking company that owns and operates the parking lots, and impacts would be less than significant.

Therefore, project construction would not result in any new significant impacts, or increase the severity of previously-identified construction impacts, to displacement of people or need for replacement housing. Furthermore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe construction-related impacts to displacement of people or need for replacement housing associated with the proposed project.

The Mission Bay FSEIR did not identify any significant construction-related impacts to displacement or people or need for replacement housing, and accordingly, did not require any mitigation measures. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce construction-related impacts to displacement or people or need for replacement housing. Consequently, no new or different mitigation measures or alternatives to reduce project construction impacts to displacement or people or need for replacement housing are identified or required with respect to the currently proposed project.

Operational Impacts

Impact PH-4: Operation of the proposed project would not induce substantial population growth in the area, either directly (for example, by constructing new homes or businesses) or indirectly (for example, through extension of roads or other infrastructure). (Less than Significant)

Table 2 summarizes the estimated permanent jobs that would result from project implementation. The Golden State Warriors, and office and retail development would employ an estimated 2,728 FTE workers at the project site. Of these, approximately 150 FTE employees would be existing Warriors staff who are currently employed in the Bay Area (Oakland); their jobs would therefore not be considered new Bay Area employment generated by the project. Thus, about 2,578 FTE workers would be employed at new jobs attributable to the project. In addition, the jobs for day-of-game/event staff at the event center are conservatively assumed to be all new.²⁴ Depending on the type of game/event at the event center, between 675 and 1,000 non-Warriors workers would be needed to staff the event center. Thus, the project would create a total of up to approximately 3,578 new jobs.

The estimated total 3,578 new jobs created by the project would incrementally further increase the jobs/housing imbalance that was described for the Mission Bay plan area in the Mission Bay FSEIR. However, similar to that discussed in the Mission Bay FSEIR, the estimated slight increase in this offset created by the project would be accommodated by housing elsewhere in and outside the City.

It should be noted there were 27,900 unemployed workers living in San Francisco in 2013 and 154,700 unemployed workers in the five-county region, out of a total labor force of about 487,000 and 2.35 million, respectively. The approximately 3,578 total new jobs generated by the project would represent about 0.7 percent of San Francisco's current labor force and 0.2 percent of the labor force in the five-county region.

²⁴ It is noted that a certain percentage of the day-of-game/event jobs would be expected to be relocate from existing employment at the Oracle Arena in Oakland to the proposed event center. However, because Oracle Arena would continue to serve as an event venue, and furthermore, that simultaneous events would occur at Oracle Arena and the proposed new event center, there would be a net increase in event-day employment. For purposes of a conservative analysis, all day-of-game/event jobs at the proposed event center are considered net new.

**TABLE 2
PROJECT EMPLOYMENT POPULATION**

Project Component	Existing FTE ^a	New FTE ^a	Day-of-Game/Event Workers	Total
Golden State Warriors Staff	150	105	-- ^b	255
Event Center Non-Warriors Day-of-Game Staff	--	--	1,000 ^c	1,000
Office Staff	--	2,101	--	2,101
Retail Staff	--	372	--	372
Subtotal FTE Employees	150	2,578		2,728 FTE Employees
Subtotal Day-of-Game Staff			1,000	1,000 Day-of Game Staff
Total	150	2,578	1,000	3,728 Total Workers (3,578 New Workers)

NOTES:

^a FTE = full-time equivalent

^b Approximately 100 Golden State Warriors employees would work at Warriors games, however, they are accounted for in the estimate of Golden State Warriors FTE staff.

^c Non-Warriors event center staffing level for a Golden State Warriors game is assumed in this analysis; lower non-Warriors staffing levels (675 – 775 workers) at the event center are anticipated for events such as concerts, family shows, other sporting events and other rentals.

^d See text for assumptions regarding day-of-game/event workers.

SOURCE: Golden State Warriors, 2014

The new jobs would represent about 12.8 percent of the unemployed labor force in San Francisco and about 2.3 percent of unemployed workers in the five-county region. These new jobs would also represent about 1.9 percent of the new jobs that are projected by ABAG to be added in San Francisco by 2040.

Considering current unemployment levels in the City and region, and that the great majority of new jobs would not involve specialized skills, knowledge, or experience that could not be provided by individuals within the local or regional labor force, employment demand generated by project implementation is expected to be readily met by the local work force currently living in San Francisco or the five-county region.

Given that population or employment growth that would result from operation of the proposed project is substantially less than the population and employment growth forecasted to occur in the City, and because employment generated by the project could be met by the local and regional labor force, the project impact related to direct growth inducement would be less than significant.

Based on all these factors, project operation would not result in any new significant operational-related impacts, or substantially increase the severity of previously-identified operational impacts, to population growth. Furthermore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe operational-related impacts to population growth associated with the proposed project.

As discussed under Impact PH-1 regarding project construction, project operation would not involve the extension of roads or other infrastructure except to the project site itself, at a location already well served by roads and other infrastructure, including previously approved improvements to roads and

infrastructure associated with overall Mission Bay plan development. Therefore the indirect impacts on population growth of project operation would be less than significant.

The Mission Bay FSEIR did not identify any significant operational-related impacts to population growth, and accordingly, did not require any mitigation measures for this impact. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce operational-related impacts to population growth. Consequently, no new or different mitigation measures or alternatives to reduce project operational impacts to population growth are identified or required with respect to the currently proposed project.

Impact PH-5: Operation of the proposed project would not displace existing housing units or create substantial demand for additional housing. (Less than Significant)

As discussed above under Impact PH-2, no existing housing is located at the project site, and consequently, the project would not displace any existing housing units. As discussed under Impact PH-4, it is expected that employment needs for project operations would be met by residents already living in San Francisco or the rest of the five-county region. Therefore, project implementation would not create substantial demand for additional housing, and the impact would be less than significant.

Impact PH-6: Operation of the proposed project would not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. (No Impact)

As described under Impact PH-3, the construction of the project would not result in a displacement of population. Given that no impact would occur, project operations would similarly have no impact related to the displacement of people.

Cumulative Impacts

Impact C-PH-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative impacts on population and housing. (Less than Significant)

The geographic context for analysis of potential cumulative population and housing impacts is San Francisco. Forecasts of reasonably foreseeable future development are based on the City and County of San Francisco's most recent Pipeline Report.²⁵ The Pipeline Report describes the development projects that would add residential units or commercial space, applications for which have been formally submitted to the Planning Department or the Department of Building Inspection. Pipeline projects encompass various stages of proposed development, from applications filed to entitlements secured, building permits issued to projects under construction.²⁶ In addition, the UCSF 2014 LRDP anticipates the addition of approximately 1.46 million gsf of new space on UCSF's North Campus (north of 16th Street), as well as approximately 918,000 gsf on the South Campus (south of 16th Street). (UCSF projects are not included in the City's Pipeline Report because the university is not under City jurisdiction.)

²⁵ San Francisco Planning Department, *San Francisco Pipeline Report Quarter 2, 2014*, September 2014.

²⁶ However, the Pipeline Report does not include projects undergoing preliminary Planning Department review or projections based on area plan analysis.

Project Construction

As discussed under Impact PH-1, project construction is expected to generate several hundred construction jobs phased over a duration of approximately 26 months. Because construction employment is temporary, it would not combine with past or future construction projects to contribute to a cumulative impact related to construction employment. Project construction could be occurring concurrently with a considerable amount of other construction activity within San Francisco, however. The City's current Pipeline Report indicates that development proposals for a total of 18,482,800 square feet of commercial development and residential development totaling 50,700 units have been filed with the City, are under review, or are under construction. Some of these projects, potentially also including development pursuant to the UCSF 2014 LRDP, would be under construction at the same time as the proposed project. Despite the current robust level of construction activity in the City, however, considering the substantial job losses in the region experienced by the construction industry until recently, the construction labor force in San Francisco and the surrounding region is expected to accommodate demand for construction labor. Therefore, the cumulative impact of project construction in combination with other concurrent construction projects within the City would be less than significant.

Project Operation

Operation of the proposed project at Blocks 29-32 would add a total of up to 3,578 new jobs at the project site, as discussed under Impact PH-4. The project would not create a residential population, and consequently would not contribute to cumulative population and related housing impacts.

ABAG provides longer-term population, housing, and employment projections for San Francisco. The current projections were prepared, with MTC, in conjunction with development of Plan Bay Area.²⁷ Employment in San Francisco is expected to increase by 190,780 jobs between 2010 and 2040. The anticipated new commercial development discussed in the City's pipeline report would generate approximately 43,500 net new jobs (based on an average City employee density estimates for the proposed land uses). If this development were fully built out, combined with the project's estimated 3,578 new jobs, the cumulative employment increase would be 47,078 jobs. This would represent approximately 25 percent of employment growth estimated to occur in the City by 2040. Additional employment would be attributed to development pursuant to the UCSF 2014 LRDP—about 11,430 new jobs across all UCSF campuses. The same ABAG projections forecast that San Francisco will gain approximately 101,000 households by 2040, an increase of approximately 35 percent from the 2010 total. Given that the combined new employment would not exceed San Francisco's currently projected employment and housing growth for 2040, the cumulative increase in employment associated with the project in combination with other foreseeable nonresidential development would not result in a significant cumulative impact on the City's population and housing resources, and the impact would be less than significant.

²⁷ ABAG and MTC, Plan Bay Area: Final Forecast of Jobs, Population and Housing, July 2013.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
4. CULTURAL AND PALEONTOLOGICAL RESOURCES—Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco <i>Planning Code</i> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Summary of Cultural Resource Impacts in Mission Bay FSEIR

The cultural resources significance criteria were addressed in the Mission Bay FSEIR in the Visual Quality and Urban Design section and the Initial Study Cultural Resources section. Relevant information from these sections is summarized below.

Summary of Historic Architectural Resources in Mission Bay FSEIR

The Mission Bay FSEIR Visual Quality and Urban Design section summarized information from the 1990 Mission Bay FEIR on historic architectural resources present within or adjacent to the Mission Bay plan area. The Mission Bay FSEIR reported that former Fire Station 30, located at Third Street and Mission Rock Street within the Mission Bay plan area, was potentially eligible for the National Register of Historic Places (NRHP); and the Lefty O'Doul and Peter Maloney Bridges, located at China Basin Channel adjacent to but outside of the Mission Bay plan area, were determined to be eligible for listing on the NRHP.²⁸ These historic architectural resources are not located within, or in proximity to, the Blocks 29 to 32 site.

The Mission Bay FSEIR Visual Quality and Urban Design Impacts section determined that the proposed demolition of former Fire Station 30 would be a significant impact to this historic architectural resource, however, with implementation of Mitigation Measures D.2 identified in the Mission Bay FSEIR, this impact would be reduced to a less than significant level. The Mission Bay FSEIR further determined that since the Lefty O'Doul and Peter Maloney Bridges were located outside the Mission Bay plan area, and those structures and their setting would not be modified under the Mission Bay plan, impacts to those historic architectural resources would be less than significant.

In summary, the Mission Bay FSEIR determined the Mission Bay plan would result in a significant impact to historic architectural resources, and identified mitigation measures to reduce the impact to a less than

²⁸ In 1989, the Lefty O'Doul Bridge was designated City Landmark No. 194.

significant level. However, this impact and associated mitigation measures are not applicable to the Blocks 29-32 site.

Historic and Prehistoric Archaeological Resources in Mission Bay FSEIR

The Mission Bay FSEIR Initial Study Cultural Resources section summarized information from the 1990 Mission Bay FEIR on historic and prehistoric resources within the Mission Bay plan area, including information from a Cultural Resources Evaluation conducted in 1987 by David Chavez & Associates, and supplemented with an archaeological resources review conducted in 1997 also by David Chavez & Associates. The Mission Bay FSEIR Initial Study indicated that in 1997 the overall potential for prehistoric Native American sites within the Mission Bay plan area was considered to be low. However, there was potential for historic-period archaeological resources to be present within the Mission Bay plan area associated with the use of the area for industrial purposes and as a City landfill in the 19th and early 20th centuries. The Mission Bay FSEIR Initial Study presented mapping of areas within the Mission Bay plan area that had the most notable potential for subsurface historic and prehistoric cultural resources; this included the portion of the Mission Bay plan area south of and including 16th Street, which is located immediately south of and adjacent to the project site at Blocks 29-32.²⁹ No substantial potential for archeological resources was identified in most areas composed of filled land in the former Mission Bay, including the project site, with the exception of the opposite (north) margin of Mission Bay, which was used as the City dump in the late 19th century. At the time of publication of the FSEIR, no substantial potential for archeological resources was identified in most areas composed of filled land in the former Mission Bay, including the project site, with the exception of the opposite (north) margin of Mission Bay, which was used as the City dump in the late 19th century.

The Mission Bay FSEIR Initial Study concluded that development and associated construction under the Mission Bay plan could disturb potentially significant subsurface historic resources in six historic resource areas within the overall plan area and that the entire Mission Bay plan area has some sensitivity for the presence of unknown historic or prehistoric archaeological resources. However, with implementation of Mitigation Measures D.3, D.4, D.5, and D.6 identified in the Mission Bay FSEIR, these impacts would be reduced to a less-than-significant level.

In summary, the Mission Bay FSEIR determined that the Mission Bay plan would result in potentially significant impacts to subsurface prehistoric or historic archaeological resources within the Mission Bay plan area, including potential impacts within the vicinity of Blocks 29-32, and identified mitigation measures to reduce those impacts to a less-than-significant level.

²⁹ Potential historic-period resources in this area were identified as being associated with 19th century shipbuilding activities at Potrero Point (Point San Quentin), which extended northward into the southeast corner of Mission Bay nearly to 16th Street, and with a nearby glass factory.

Impact Evaluation

Historic Architectural Resources

Impact CP-1: The project would not cause a substantial adverse change in the significance of a historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code. (Less than Significant)

The proposed project would result in the construction and operation of an event center, retail uses, office buildings, parking facilities and open space areas within the project site. However, as discussed above, the Mission Bay FSEIR did not identify any historic architectural resources within or in proximity of the project site, and correspondingly, did not identify any significant impacts to historic architectural resources within the project site. Given the absence of historic architectural resources within or in proximity to the project site, the construction and operation of the proposed uses would not result in any new impacts, or increase the severity of previously-identified impacts, to historic architectural resources.

At the time of preparation of the Mission Bay FSEIR, several buildings and facilities were located and operating on the project site. These buildings and structures were subsequently removed, and the project site has been subject to grading, some excavation, and construction of paved surface parking lots, fencing and associated utilities on portions of the site. This change in conditions on the project site has not altered the fact that the site contains no historic architectural resources, as those facilities that were removed from the project site did not have any historic architectural status or importance, nor would it alter the effects of the project with respect to impacts on historic architectural resources.

Pursuant to mitigation identified in the Mission Bay FSEIR, the sole historic architectural resource located within the Mission Bay plan area (former Fire Station 30) was evaluated and determined to be eligible for the NRHP.³⁰ This change in conditions for this resource, however, has no effect on conditions regarding the absence of historic architectural resources at or in the vicinity of the project site. There are no other new historic architectural resources, including City Landmarks and/or historic districts, which have been identified within the Mission Bay plan area, beyond those previously addressed in the Mission Bay FSEIR. Therefore, there have been no substantial changes with respect to circumstances under which the project is undertaken nor has any new information become available that will result in new or more severe impacts associated with the proposed project.

As discussed above, the Mission Bay FSEIR did not identify any significant impacts to historic architectural resources within the project site, and accordingly, did not require any mitigation measures for historic architectural resources that were applicable to the project site. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce impacts to historic architectural resources within the project site. Consequently, no new or different mitigation measures or alternatives to reduce project impacts to historic architectural resources at the project site are identified or required with respect to the currently proposed project.

³⁰ Former Fire Station 30 has since been rehabilitated consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, converted to provide a community meeting room and house the Arson Task Force, and integrated with the newly-constructed Public Safety Building.

On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those identified in the Mission Bay FSEIR on historical resources as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the *Planning Code*.

Archaeological Resources

Impact CP-2: The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5. (Less than Significant with Mitigation)

As discussed above, the Mission Bay FSEIR determined in 1998 that the Mission Bay plan would result in potentially significant impacts to subsurface prehistoric- or historic-era archaeological resources within the Mission Bay plan area, and identified mitigation measures to reduce those impacts, including within Blocks 29 to 32, to a less-than-significant level.

The proposed project would result in the construction and operation of an event center, retail uses, office buildings, parking facilities and open space areas within the project site. Construction activities would require foundation excavation to about 30 feet below San Francisco datum, pile driving to depths below that, and grading all of the site, which could disturb potentially significant subsurface historic and prehistoric archaeological resources, should such resources be present. These types of subsurface construction activities were anticipated and analyzed in the Mission Bay FSEIR, and there is nothing specific to the proposed subsurface construction activities at the project site that would result in new significant impacts or substantially increase the severity of previously-identified significant impacts to archaeological resources. Thus, impacts of the proposed project on archaeological resources would be potentially significant, but impacts could be reduced to less than significant with identified mitigation measures.

The FSEIR presented detailed mitigation measures for archaeological resources testing, monitoring, and exploration for identified historic resource areas within the Mission Bay plan area (see Mission Bay FSEIR Mitigation Measures D.3 and D.4). These historic resource areas were identified based on historic land uses in the area, such as early shipbuilding activities in the 1860s to 1880s, and pre-construction archaeological testing and construction monitoring is recommended to reduce potential impacts to less than significant. In addition, the FSEIR identified Mitigation Measure D.6 to mitigate for accidental discovery of archaeological resources anywhere in the plan area.

The FSEIR indicated that Blocks 29-32 is not located within any of the identified historic resource areas, which would imply that Mitigation Measures D.3 and D.4 are not specifically applicable to the project site, although one of the identified historic resource areas is located directly south of the Blocks 29-32 project site. FSEIR Mitigation Measure D.5 applies specifically to the area bordered by Berry, Fifth, and Seventh Streets (location of the 19th century), and does not apply to the project site. FSEIR Mitigation Measure D.6 is applicable to the project site, as discussed further below.

As described in the Project Description, the project sponsor has indicated that in order to minimize the risk of construction delays due to the potential presence of archaeological resources, the project sponsor would retain the services of an archaeologist to develop and implement a program of archaeological testing as part of the preliminary site evaluation and planning program for the proposed development at Blocks 29-32. This program would be similar to Mitigation Measures D.3 and D.4 previously identified in

the FSEIR, and the results would be used to inform the construction activities, with the intent to avoid or minimize effects on subsurface archaeological resources prior to the commencement of foundation excavation and pile driving. The project sponsor would use the results of the archaeological testing to develop a construction monitoring program for protection of archaeological resources during construction while still achieving the Warriors' scheduling objectives. Nevertheless, while this component of the proposed project would provide additional protection for potentially present archaeological resources, due to the as yet unknown details of the proposed testing program, there remains the potential for project construction activities to adversely affect archaeological resources, if encountered, and the impact would be potentially significant.

Implementation of Mitigation Measures M-CP-2a (Archaeological Testing, Monitoring and/or Data Recovery Program) and M-CP-2b (Accidental Discovery of Archaeological Resources) would reduce this impact to less than significant. Mitigation Measures M-CP-2a would formalize the project sponsor's commitment to conduct archaeological testing and monitoring (as well as data recovery, if warranted), and would require that the project sponsor's archaeological testing and monitoring program be consistent with the City's standard protocols; this measure would in effect implement the requirements of FSEIR Mitigation Measures D.3 and D.4.

Mitigation Measure M-CP-2b replaces and implements FSEIR Mitigation Measure D.6. This replacement does not infer that there would be a new more severe significant impact or an impact of greater severity than was analyzed and disclosed in the FSEIR. Consistent with the conclusions of the FSEIR, FSEIR Mitigation Measure D.6, as implemented through Mitigation Measure M-CP-2b, would reduce the proposed project's impact to a less-than-significant level. As such, the proposed project would not result in any new or substantially more severe impacts on archaeological resources than were analyzed and disclosed in the FSEIR.

The Mission Bay FSEIR identified feasible mitigation measures to reduce potentially significant impacts to subsurface prehistoric or historic archaeological resources within the Mission Bay plan area, including the project site, to a less than significant level. The Mission Bay FSEIR did not identify any alternatives to reduce archaeological resources at the project site. While there are no new or different mitigation measures or alternatives required to reduce project impacts to archaeological resources beyond those previously identified in the Mission Bay FSEIR, the City has since updated its standard mitigation measures for accidental discovery of archaeological resources, which would augment and replace the FSEIR Mitigation D.6, as specified below.

As discussed under Historic Architectural Resources, above, since preparation of the Mission Bay FSEIR, the project site has been subject to subsurface disturbance from grading, some excavation activities, and construction of paved surface parking lots. In addition, geotechnical investigations at the project site have indicated the top of the Colma Formation geologic unit underlying the site was at depths ranging from 19 to 70 feet below ground surface.³¹ This geologic unit is known to be associated with the presence of archaeological resources. This information is corroborated by other geotechnical reports for development in

³¹ Langan Treadwell Rollo, 2014. Preliminary Geotechnical Evaluation, Block 29-32 Mission Bay, San Francisco, California, Project No. 731617202. March 28, 2014.

the Mission Bay area that has occurred since publication of the Mission Bay FSEIR. No new historic or prehistoric archaeological resources have been identified at Blocks 29-32 since publication of the Mission Bay FSEIR.³² However, this change in conditions on the project site and additional information would not create the potential for the project to result in new or more severe impacts to potentially significant subsurface historic and prehistoric archaeological resources that may be present on the site.

Thus, with implementation of Mitigation Measures M-CP-2a (Archaeological Testing, Monitoring and/or Data Recovery Program) and M-CP-2b (Accidental Discovery of Archaeological Resources), the proposed project would not result in any new or more severe significant effects on archaeological resources than were previously identified in the FSEIR.

Mitigation Measure M-CP-2a: Archaeological Testing, Monitoring and/or Data Recovery Program

Based on a reasonable presumption that archaeological resources may be present within the project site, the following measures shall be undertaken to avoid any potentially significant adverse effect from the proposed project on buried or submerged historical resources. The project sponsor shall retain the services of an archaeological consultant approved by OCII or its designated representative such as those from the rotational Department Qualified Archaeological Consultants List (QACL) maintained by the Planning Department archaeologist. The project sponsor shall contact the Department archaeologist to obtain the names and contact information for the next three archaeological consultants on the QACL. The archaeological consultant shall undertake an archaeological testing program as specified herein. In addition, the consultant shall be available to conduct an archaeological monitoring and/or data recovery program if required pursuant to this measure. The archaeological consultant's work shall be conducted in accordance with this measure at the direction of OCII or its designated representative. All plans and reports prepared by the consultant as specified herein shall be submitted first and directly to OCII or its designated representative for review and comment, and shall be considered draft reports subject to revision until final approval by OCII or its designated representative. Archaeological monitoring and/or data recovery programs required by this measure could suspend construction of the project for up to a maximum of four weeks. At the direction of the OCII or its designated representative, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce to a less than significant level potential effects on a significant archaeological resource as defined in CEQA Guidelines Sect. 15064.5 (a)(c).

Consultation with Descendant Communities: On discovery of an archaeological site³³ associated with descendant Native Americans, the Overseas Chinese, or other descendant group an appropriate representative³⁴ of the descendant group and OCII or its designated representative shall be contacted. The representative of the descendant group shall be given the opportunity to

³² The "Prehistoric Native American Shell Middens on Mission Bay, San Francisco" archaeological district, recently determined eligible for the National Register, is located in the South of Market neighborhood (in the vicinity of the original northern shoreline of the Mission Bay), and consequently, is not located in proximity to the project site, and moreover, is completely outside the Mission Bay plan area.

³³ By the term "archaeological site" is intended here to minimally include any archaeological deposit, feature, burial, or evidence of burial.

³⁴ An "appropriate representative" of the descendant group is here defined to mean, in the case of Native Americans, any individual listed in the current Native American Contact List for the City and County of San Francisco maintained by the California Native American Heritage Commission and in the case of the Overseas Chinese, the Chinese Historical Society of America. An appropriate representative of other descendant groups should be determined in consultation with the Department archaeologist.

monitor archaeological field investigations of the site and to consult with OCII or its designated representative regarding appropriate archaeological treatment of the site, of recovered data from the site, and, if applicable, any interpretative treatment of the associated archeological site. A copy of the Final Archaeological Resources Report shall be provided to the representative of the descendant group.

Archaeological Testing Program. The archaeological consultant shall prepare and submit to OCII or its designated representative for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of archaeological resources and to identify and to evaluate whether any archaeological resource encountered on the site constitutes an historical resource under CEQA.

At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings to OCII or its designated representative. If based on the archaeological testing program the archaeological consultant finds that significant archaeological resources may be present, OCII or its designated representative in consultation with the archaeological consultant shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. No archaeological data recovery shall be undertaken without the prior approval of OCII or its designated representative. If OCII or its designated representative determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, at the discretion of the project sponsor either:

- A. The proposed project shall be re-designed so as to avoid any adverse effect on the significant archaeological resource; or
- B. A data recovery program shall be implemented, unless OCII or its designated representative determines that the archaeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

Archaeological Monitoring Program. If OCII or its designated representative in consultation with the archaeological consultant determines that an archaeological monitoring program shall be implemented the archaeological monitoring program shall minimally include the following provisions:

- The archaeological consultant, project sponsor, and OCII or its designated representative shall meet and consult on the scope of the AMP reasonably prior to any project-related soils disturbing activities commencing. OCII or its designated representative in consultation with the archaeological consultant shall determine what project activities shall be archaeologically monitored. In most cases, any soils- disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), site remediation, etc., shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context;
- The archeological consultant shall advise all project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected

resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;

- The archaeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archaeological consultant and OCII or its designated representative until OCII or its designated representative has, in consultation with project archaeological consultant, determined that project construction activities could have no effects on significant archaeological deposits;
- The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;
- If an intact archaeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The archaeological monitor shall be empowered to temporarily redirect demolition/excavation/pile driving/ construction activities and equipment until the deposit is evaluated. If in the case of pile driving activity (foundation, shoring, etc.), the archaeological monitor has cause to believe that the pile driving activity may affect an archaeological resource, the pile driving activity shall be terminated until an appropriate evaluation of the resource has been made in consultation with OCII or its designated representative. The archaeological consultant shall immediately notify the OCII or its designated representative of the encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to OCII or its designated representative.

Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the OCII or its designated representative.

Archaeological Data Recovery Program. The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan (ADRP). The archaeological consultant, project sponsor, and OCII or its designated representative shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to OCII or its designated representative. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical.

The scope of the ADRP shall include the following elements:

- *Field Methods and Procedures.* Descriptions of proposed field strategies, procedures, and operations.
- *Cataloguing and Laboratory Analysis.* Description of selected cataloguing system and artifact analysis procedures.
- *Discard and Deaccession Policy.* Description of and rationale for field and post-field discard and deaccession policies.

- *Interpretive Program.* Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.
- *Security Measures.* Recommended security measures to protect the archaeological resource from vandalism, looting, and non-intentionally damaging activities.
- *Final Report.* Description of proposed report format and distribution of results.
- *Curation.* Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects. The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner’s determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The archaeological consultant, project sponsor, OCII or its designated representative, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Final Archaeological Resources Report. The archeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to OCII or its designated representative that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Once approved by OCII or its designated representative, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and OCII or its designated representative shall receive a copy of the transmittal of the FARR to the NWIC. As requested by OCII, the Environmental Planning division of the Planning Department shall receive one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, OCII or its designated representative may require a different final report content, format, and distribution than that presented above.

Mitigation Measure M-CP-2b: Accidental Discovery of Archaeological Resources (Implementing FSEIR Mitigation D.6)

The following mitigation measure is required to avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in *CEQA Guidelines* Section 15064.5(a)(c). The project sponsor shall distribute the Planning Department archaeological resource “ALERT” sheet to the project prime contractor; to any project subcontractor

(including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, supervisory personnel, etc. The project sponsor shall provide OCII officer or its designated representative with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) confirming that all field personnel have received copies of the Alert Sheet.

Should any indication of an archaeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify OCII officer or its designated representative and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until OCII officer or its designated representative has determined what additional measures should be undertaken.

If OCII officer or its designated representative determines that an archaeological resource may be present within the project site, the project sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archaeological consultant shall advise OCII officer or its designated representative as to whether the discovery is an archaeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archaeological resource is present, the archaeological consultant shall identify and evaluate the archaeological resource. The archaeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, OCII officer or its designated representative may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archaeological resource; an archaeological monitoring program; or an archaeological testing program. If an archaeological monitoring program or archaeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. OCII officer or its designated representative may also require that the project sponsor immediately implement a site security program if the archaeological resource is at risk from vandalism, looting, or other damaging actions.

The project archaeological consultant shall submit a Final Archaeological Resources Report (FARR) to OCII officer or its designated representative that evaluates the historical significance of any discovered archaeological resource and describing the archaeological and historical research methods employed in the archaeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to OCII officer or its designated representative for review and approval. Once approved by OCII officer or its designated representative, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and OCII officer or its designated representative shall receive a copy of the transmittal of the FARR to the NWIC. OCII and the Environmental Planning division of the Planning Department shall each receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, OCII officer or its designated representative may require a different final report content, format, and distribution than that presented above.

Paleontological Resources

Impact CP-3: The project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (Topic Not Previously Analyzed; Less than Significant)

Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. Paleontological resources are lithologically dependent; that is, deposition and preservation of paleontological resources are related to the lithologic unit in which they occur. If the rock types representing a deposition environment conducive to deposition and preservation of fossils are not favorable, fossils will not be present. Rock types that may contain fossils include sedimentary and volcanic formations.

The Mission Bay FEIR and FSEIR did not specifically address potential impacts on paleontological resources within the Mission Bay Plan area, including the project site. However, excavation for the project would encounter only artificial fill and Holocene-aged Bay Mud, and there are no unique geologic features within the site.

The artificial fill is not naturally occurring and therefore does not likely contain significant fossil remains. There have been no vertebrate or invertebrate fossils identified in Holocene-aged sediments throughout the Bay Area, and the only plant fossils found in sediments of this age have been at Mount Lake in the Presidio.³⁵ While Bay Mud contains some invertebrate remains such as gastropods and bivalves, these are typically not yet fossilized, not yet extinct, and are likely to occur throughout similar deposits around the bay. Such remains are therefore not considered a significant paleontological resource, and these materials are considered to have a low paleontological potential per the Society of Vertebrate Paleontology criteria.³⁶

Proposed project construction activities would require pile driving activities, which were assumed in the Mission Bay FSEIR to occur in the Mission Bay plan area, including within the project site. There is nothing specific to the proposed subsurface construction activities at the project site that would be substantially different from those analyzed in the Mission Bay FSEIR.

The proposed installation of piles at the project site would involve limited disruption of the underlying geologic units. As noted above, excavation at the project site would encounter only artificial fill and Bay Mud. In addition, the project would not involve excavation of exposed rock outcrops that would destroy

³⁵ University of California Museum of Paleontology Specimens, UCMP Specimen Search, <http://ucmpdb.berkeley.edu/>. Accessed on September 8, 2014.

³⁶ The SVP has established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates that geologic units of high paleontological potential are those from which vertebrate or significant invertebrate or significant suites of plant fossils have been recovered in the past (i.e., are represented in institutional collections). Areas that contain potentially datable organic remains older than the Recent era, including deposits associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways, are also classified as significant. Geologic units of low paleontological potential are those that are not known to have produced a substantial body of significant paleontological material. As such, the sensitivity of an area with respect to paleontological resources hinges on its geologic setting and whether significant fossils have been discovered in the area or in similar geologic units. Society of Vertebrate Paleontology (SVP), *Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines*, <http://vertpaleo.org/The-Society/Governance-Documents/Conformable-Impact-Mitigation-Guidelines-Committee.aspx>. Accessed on September 8, 2014.

a unique geologic feature. Therefore, because there is a low potential to encounter paleontological resources during construction, impacts related to paleontological resources and geologic features would be less than significant, and no mitigation is required.

Human Remains

Impact CP-4: The proposed project would not disturb any human remains, including those interred outside of formal cemeteries. (Topic Not Previously Analyzed; Less than Significant)

The Mission Bay FEIR and FSEIR did not specifically address impacts associated with potential disturbance of human remains within the Mission Bay Plan area, including the project site. However, to date, no known human burial locations have been identified within the project site, though the possibility of such a discovery cannot be entirely discounted. Project construction could result in direct impacts to previously undiscovered human remains during earthmoving activities.

Under State law, human remains and associated burial items may be significant resources in two ways: they may be significant to descendant communities for patrimonial, cultural, lineage, and religious reasons; and human remains may also be important to the scientific community, such as prehistorians, epidemiologists, and physical anthropologists. The specific stake of some descendant groups in ancestral burials is a matter of law for some groups, such as Native Americans (CEQA Guidelines Section 15064.5 (d), Public Resources Code Section 5097.98). In other cases, the concerns of the associated descendent group regarding appropriate treatment and disposition of discovered human burials may become known only through outreach. Beliefs concerning appropriate treatment, study, and disposition of human remains and associated burial items may be inconsistent and even conflict among descendent and scientific communities.

If encountered, the treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal Laws, including immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98).

The project sponsor would be required to retain a qualified archaeological consultant, who in conjunction with the project sponsor, OCII (or its designated representative), and the MLD, shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, curation, possession, and final disposition of the human remains and associated or unassociated funerary objects.

These requirements are consistent with provisions listed in Mitigation Measure M-CP-2a, Archaeological Testing, Monitoring and/or Data Recovery Program.

Therefore, because the project would be required to comply with the regulations described above and to implement the measures specified under those regulations, impacts related to disturbance of human remains would be less than significant.

Cumulative Impacts

Impact C-CP-1: The proposed project, in combination with past, present, and reasonably foreseeable projects, could result in significant impacts to cultural resources. (Less than Significant with Mitigation)

The geographic scope for potential cumulative impacts related to cultural resources generally includes the Mission Bay area. Other reasonably foreseeable projects within the project vicinity with the potential to contribute to cumulative, cultural resources impacts would be required to undergo separate environmental review, as necessary, and to identify mitigation measures for any significant impacts. Cumulative impacts on cultural resources could result if the proposed project, in combination with other reasonably foreseeable projects in the vicinity, would collectively increase the potential for significant impacts, even with implementation of project-specific mitigations.

As the proposed project would have no impacts to historic architectural resources, it therefore would not contribute to any such cumulative impact. Similarly, as the proposed project would have less than significant impacts on paleontological resources as described in Impact CP-3, other projects in the vicinity would also be expected to have a less than significant impact on these resources because they are all located on similar underlying geologic units (i.e., artificial fill and Bay Mud) that have low potential for presence of paleontological resources. Therefore, the cumulative impact would also be considered less than significant.

Similar to the proposed project as described under Impacts CP-2 and CP-4, the cumulative projects in the Mission Bay area could have a significant impact on both recorded and unrecorded archaeological resources, including human remains interred outside of formal cemeteries, given the substantial amount of construction-related ground disturbance that could occur. The potential impacts of the proposed project when considered together with similar impacts from other reasonably foreseeable projects in the project vicinity could contribute to a significant cumulative impact to buried archaeological resources. However, implementation of measures required by regulation to address human remains and of Mitigation Measures M-CP-2a and M-CP-2b, as standard City-required mitigation, would also apply to cumulative projects based on each project's potential to affect archaeological resources. These measures would require implementation of legally-required appropriate treatment of human remains as well as archaeological testing, monitoring and/or data recovery programs, which would reduce cumulative impacts to archaeological resources to a less-than-significant level. Therefore, with implementation of Mitigation Measures M-CP-2a and M-CP-2b, the proposed project's contribution to cumulative impacts would be less than significant with mitigation.

Mitigation Measure M-CP-2a: Archaeological Testing, Monitoring and/or Data Recovery Program (see Impact CP-2 above)

Mitigation Measure M-CP-2b: Accidental Discovery of Archaeological Resources (see Impact CP-2 above)

<i>Topics:</i>	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
5. TRANSPORTATION AND CIRCULATION— Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Result in inadequate emergency access?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The SEIR will provide a summary of the transportation impacts from the Mission Bay FSEIR relevant to the project site. It will also include an updated, detailed analysis of transportation impacts associated with the proposed project, including explanation of the checklist items indicated above. The SEIR will include a complete description of the existing transportation setting, impact evaluation of project and cumulative impacts relative to existing conditions, and current mitigation measures, as appropriate.

With regard to the analysis of parking impacts of the proposed project, see discussion above under Aesthetics regarding Public Resources Code Section 21099. As stated above, parking is no longer to be considered in determining if a project has the potential to result in significant environmental effects for projects that meet all of the identified criteria. However, because parking conditions may be of interest to the public and the decision makers, the SEIR will present a parking demand analysis for informational purposes and will consider any secondary physical impacts associated with constrained supply (e.g., queuing by drivers waiting for scarce onsite parking spaces that affects the public right-of-way) as applicable in the transportation analysis.

<u>Topics:</u>	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
6. NOISE—Would the project:				
a) Result in 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Be substantially affected by existing noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The proposed project is not located within an airport land use plan area, within two miles of a public airport, or within the vicinity of a private airstrip. Therefore, criteria E.6(e) and 6(f) are not applicable to the proposed project and are not discussed further in this Initial Study or in the SEIR. The proposed event center, and office and retail land uses would not be considered noise sensitive receptors, similar to the commercial industrial/retail land uses that were envisioned for Blocks 29-32 under the Mission Bay FSEIR. Consequently, the proposed project would not be substantially affected by existing noises levels, and criterion E.6(g) is therefore not discussed further in this Initial Study or in the SEIR.

The SEIR will provide a summary of the noise impacts from the Mission Bay FSEIR relevant to the project site. It will also include an updated, detailed analysis of noise impacts associated with the proposed project, including explanation of the checklist items indicated above related to a potentially substantial increase in severity of significant impacts identified in the Mission Bay FSEIR. The SEIR will include a complete description of the existing noise setting (2014), impact evaluation of project and cumulative impacts relative to existing conditions, and current mitigation measures, as appropriate.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
7. AIR QUALITY—Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The Mission Bay FSEIR did not address odor impacts associated with development of the Mission Bay plan. However, the proposed project would result in the construction and operation of urban land uses at the project site, similar to the types of uses completed or planned in the Mission Bay redevelopment area, and none of these uses would create or generate objectionable odors. Therefore, the proposed project would not result in any new or significant odor impacts, and significance criterion E.7(e) is not discussed further in this Initial Study or in the SEIR.

The SEIR will provide a summary of the air quality impacts from the Mission Bay FSEIR. It will also include an updated, detailed analysis of air quality impacts associated with the proposed project, including explanation of the checklist items indicated above related to a potentially substantial increase in severity of significant impacts identified in the Mission Bay FSEIR. The SEIR will include a complete description of the existing air quality setting (2014), impact evaluation of project and cumulative impacts relative to existing conditions, and current mitigation measures, as appropriate.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
8. GREENHOUSE GAS EMISSIONS— Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Mission Bay FSEIR did not address greenhouse gas (GHG) emissions as a distinct environmental topic. The SEIR will include an updated, detailed analysis of GHG impacts associated with the proposed project, including explanation of the checklist items indicated above. The SEIR will include a complete description of the existing GHG setting (2014), impact evaluation of cumulative GHG impacts, and current mitigation measures, as appropriate.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
9. WIND AND SHADOW—Would the project:				
a) Alter wind in a manner that substantially affects public areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The SEIR will provide a summary of the wind and shadow impacts from the Mission Bay FSEIR relevant to the project site. It will also include an updated, detailed analysis of wind and shadow impacts associated with the proposed project, including explanation of the checklist items indicated above related to a potentially substantial increase in severity of significant impacts identified in the Mission Bay FSEIR. The SEIR will include a complete description of the existing wind and shadow setting (2014), impact evaluation of project and cumulative impacts relative to existing conditions, and current mitigation measures, as appropriate.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
10. RECREATION—Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Physically degrade existing recreational resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Summary of Recreation Impacts in Mission Bay FSEIR

The Mission Bay FSEIR Community Services and Utilities setting section summarized information on existing recreational uses that were present within the Mission Bay plan area at that time. The Mission Bay FSEIR identified the nearest existing public recreational facility to Blocks 29-32 as Agua Vista Park (a small landscaped area and fishing pier), located southeast of the project site across Terry A. François Boulevard.

The Mission Bay FSEIR Community Services and Utilities impacts section reported that residential and commercial development proposed within the Mission Bay plan area would generate a residential and employee demand, respectively, for parks. The Mission Bay FSEIR indicated 47 acres of open space was proposed within the Mission Bay plan area, of which more than 15 acres of new, non-UCSF parks and open space have been completed. Within the Mission Bay east subarea, this included an approximate 6-acre park to be developed as a bayfront linear park east of a realigned Terry A. François Boulevard (across from Blocks 30 and 32) from 16th Street north to Mission Rock Street; and a neighborhood park located along the west side of Terry A. François Boulevard south of 16th Street. In addition, the Mission Bay plan proposed a number of bicycle and pedestrian paths to connect parks and open spaces within the Mission Bay plan area, including a 20-foot wide setback to accommodate a pedestrian path along 16th Street (adjacent to Blocks 31 and 32) between Terry A. François Boulevard and Owens Street. The FSEIR noted that in addition to the proposed public open space, private open space would be developed within the Mission Bay plan area.

The Mission Bay FSEIR determined that the proposed areas of commercial development within the Mission Bay plan area would be located within a recommended 900 feet distance of open space. The Mission Bay FSEIR also determined that all proposed residential development within the Mission Bay plan area would be located within the recommended one-quarter mile distance of neighborhood parks for passive recreation, and would be generally within that distance for active recreation uses. The Mission Bay FSEIR added that the open space would be constructed with each phase of Mission Bay development, in the amount of at least 0.46 acres of open space for each 1.0 acre of developable area until all open space is developed. The Mission Bay FSEIR concluded that given the open space proposed near the development in each phase, that the provision of open space over the course of the Mission Bay plan area development build-out would be adequate.

In summary, the Mission Bay FSEIR identified no significant impacts to recreation from the Mission Bay plan, and accordingly, did not require any mitigation measures related to recreation.

Impact Evaluation

Existing Recreational Resources and Facilities

Impact RE-1: The proposed project would not increase the use of existing parks and recreational facilities such that substantial physical deterioration of the facilities would occur or otherwise result in physical degradation of existing recreational resources. (Less than Significant)

The San Francisco General Plan Recreation and Open Space Element (ROSE) indicates that a half mile is commonly accepted as the distance that can be comfortably walked in 10 minutes, and this distance is what most people are willing to walk to access community uses, including recreational facilities. However a 5-minute walk is more appropriate for activities that involve small children. The ROSE identifies “high needs areas” where the City should prioritize acquisition and renovation of recreational facilities based on walking distance. According to the ROSE, all of Mission Bay is within half-a-mile of passive recreational uses, and a portion of the neighborhood is within half-a-mile of active recreational uses, such as sports fields. However, much of Mission Bay is not within a quarter mile of a playground. The ROSE indicates that the planned open spaces in Mission Bay would shorten these walking distances.

The ROSE also identified high needs areas, based on population density, concentration children and senior citizens, household income, and areas of potential growth. Most of the Mission Bay neighborhood, including the project site, is generally identified as having a “lesser need.” Areas along the waterfront east and northeast of the project site are identified as having a lesser need or a moderate need.

The proposed project would result in the construction and operation of an event center, office and retail uses, parking facilities, as well as 3.2 acres of open space areas within the approximate 11-acre project site. The increase in demand for recreational facilities generated by the project would generally be consistent with that described in the Mission Bay FSEIR for the entire Plan area and would be readily met by planned parks and open space areas developed as part of the Mission Bay Plan, as well as by existing facilities in the project vicinity. In particular, in addition to the 3.2-acres of open space to be constructed as part of the project, future employees and visitors to the project site would have convenient access to the planned 6-acre Bayfront Park east of a realigned Terry A. François Boulevard (across from the project site) and a neighborhood park located along the west side of Terry A. François Boulevard south of 16th Street. Moreover, the 3.2 acres proposed as part of the project would provide some of the planned open space in the Mission Bay area that allowed it to be classified as an area of “lesser need” in the first place. The commercial uses proposed under the project would be located within the recommended 900-foot distance of open space, pursuant to the Mission Bay Plan. Furthermore, the project would not impede residential developments under the Plan from meeting the recommended quarter-mile distance from a neighborhood-serving park.

Therefore, the project would not substantially increase the use of existing parks and recreational facilities and would not lead to physical deterioration of existing recreational resources. Project impacts on recreational resources would be less than significant, and the project would not result in any new or substantially more severe impacts than those previously identified in the FSEIR.

As described in the Mission Bay FSEIR, proposed development within the Plan area would be located within recommended distances to open space and recreational facilities, and that open space areas within the Plan area would be constructed commensurate with each phase of Mission Bay development. Since publication of the FSEIR, in general, development has evolved in the Mission Bay area consistent with this approach and no substantial changes or conditions have occurred at the project site and vicinity that would result in new or more severe impacts than those described in the FSEIR.

Therefore, impacts on existing parks and recreational facilities would be less than significant.

Construction or Expansion of Recreational Facilities

Impact RE-2: The proposed project would not require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. (Less than Significant)

As described above, the proposed project would include 3.2-acres of open space, which would directly serve the project demand for recreational facilities, and would be located in proximity to planned future parks under the Mission Bay plan area. Consequently, the project would not require the construction or expansion of recreational facilities beyond that already included under the project and under the Mission Bay plan, and the project’s effect on new or expanded recreational facilities that might have an adverse effect on the environment would be less than significant. There have been no changes in conditions or

new information available since publication of the Mission Bay FSEIR that would result in new or more severe impacts than those disclosed in the FSEIR.

Cumulative Impacts

Impact C-RE-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative recreation impacts. (Less than Significant)

The geographic scope of potential cumulative impacts on recreational resources encompasses the recreational facilities in the Mission Bay Plan area. Based upon the analysis provided above, the proposed project would have a less than significant impact regarding substantial physical deterioration or degradation of existing recreational resources. The project could have a significant cumulative impact if the project in combination with past, present, and future projects in this area would increase the use of existing parks and recreational facilities such that substantial physical deterioration of the facilities would occur or otherwise result in physical degradation of existing recreational resources. However, as a program EIR, the Mission Bay FSEIR has addressed the cumulative impacts of overall development of the Mission Bay plan area on recreational resources, and the FSEIR identified no significant impacts to recreation from the Mission Bay plan, given that the plan includes substantial public open space that has been, and will continue to be constructed in phases in tandem with development of other uses called for in the plan. Thus, based on the analysis in the FSEIR, there would be no significant adverse cumulative effects on recreational resources.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
11. UTILITIES AND SERVICE SYSTEMS— Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Have sufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Summary of Utilities and Service System Impacts in Mission Bay FSEIR

Water Supply

The Mission Bay FSEIR Community Services and Utilities setting section discussed water supply service to the Mission Bay plan area that existed at the time of preparation of the Mission Bay FSEIR. This Mission Bay FSEIR indicated the San Francisco Water Department (which has now been incorporated as part of the San Francisco Public Utilities Commission [SFPUC]) supplied water to the Mission Bay plan area, and existing water consumption in the Mission Bay plan area at that time was approximately 0.097 million gallons per day (mgd). The Mission Bay FSEIR mapped water mains that existed within the Mission Bay plan area at that time, including low pressure water lines within Third Street and 16th Street adjacent to Blocks 29-32, and bisecting Blocks 29-32 from west to east. The Mission Bay FSEIR also described the City’s Auxiliary Water Supply System (AWSS) used for firefighting, and mapped an AWSS high pressure line within Third Street adjacent to Blocks 29-32.

The Mission Bay FSEIR Community Services and Utilities impacts section estimated the Mission Bay plan would require approximately 2.9 mgd of water at build-out. The Mission Bay FSEIR also described proposed water line improvements within the Mission Bay plan area proposed as part of the Mission Bay plan, including new low pressure water lines within South Street and Terry A. François Boulevard adjacent to the project site; and recycled water (referred to in the FSEIR as "reclaimed water") lines within Third Street, South Street, Terry A. François Boulevard and 16th Street adjacent to Blocks 29-32. The Mission Bay FSEIR determined that there was adequate water supply to serve the Mission Bay plan water demand, and that with the proposed water system improvements and implementation of water conservation measures proposed as part of the plan and included as Mitigation Measures M.2a through M.02g, the plan effects on water supply would be less than significant.

The Mission Bay FSEIR also determined that with implementation of Mitigation Measure M.3, which would improve and extend the high pressure auxiliary water supply system (AWSS) within the plan area, that plan effects on emergency water supply would be less than significant.

Wastewater/Stormwater Collection and Treatment

The Mission Bay FSEIR Community Services and Utilities setting section described existing wastewater collection and treatment services serving the Mission Bay plan area at that time. The Mission Bay FSEIR reported the existing sewage generation from the Mission Bay plan area (based on the 1990 FEIR) was approximately 0.072 mgd. The Mission Bay FSEIR also mapped sewer lines that existed within the Mission Bay plan area at that time. The Blocks 29-32 site was mapped as having an existing sanitary sewer line extending south and connecting to an existing combined sewer line; existing combined sewer lines were also mapped in Third Street and 16th Street adjacent to Blocks 29-32. (see Section E.15, Hydrology and Water Quality, below, for additional information on the City’s combined sewer system and treatment plant capacity).

Mission Bay Plan Impacts at Buildout. The Mission Bay FSEIR Community Services and Utilities impacts section estimated that the Mission Bay plan would generate approximately 2.5 million mgd of wastewater at build-out (average dry weather flow). The Mission Bay FSEIR also described major sewer upgrades that were proposed as part of the Mission Bay plan within the Mission Bay plan area. The Mission Bay FSEIR indicated that the northern portion of the Blocks 29-32 (as part of the proposed Central/Bay sub-basin) would be served by proposed separate sanitary-sewer-only and storm drainage-only lines. The southern portion of Blocks 29-32 (as part of the proposed reconfigured Mariposa sub-basin) would continue to be served by the existing combined sewer system, but augmented with additional new sewer extensions (including within 16th Street east of Illinois Street adjacent to Blocks 31 and 32). (See Hydrology and Water Quality section, below, for additional detail on the proposed Mission Bay plan sewer system improvements.) The Mission Bay FSEIR determined that with the sewer system improvements proposed as part of the plan, the Mission Bay plan would accommodate the projected increases in wastewater generation and stormwater flows, and Mission Bay plan effects on wastewater and stormwater collection and treatment facilities would be less than significant.

Mission Bay Plan Interim Impacts during Phased Development. The Mission Bay FSEIR Community Services and Utilities Impacts section reported that infrastructure development of the proposed separated sewer system for the Central/Bay Basin would occur with each phase, but would not necessarily be immediately operational. The Mission Bay FSEIR indicated that as part of the Mission Bay plan and included as Mitigation Measure M.5, all stormwater runoff from newly developed areas in the Bay Basin would be conveyed to the combined sewer system prior to completion of the initial-flow diversion system, to ensure potential impacts to water quality during this interim period would remain less than significant.

Solid Waste

The Mission Bay FSEIR Community Services and Utilities setting section estimated that at the time of preparation of the FSEIR, the Mission Bay plan area generated approximately 2,700 tons of solid waste annually at that time. The Mission Bay FSEIR Community Services and Utilities impacts section estimated the Mission Bay plan would generate approximately 19,000 tons annually, of which between 12,000 and 9,700 tons annually would be disposed annually at Altamont Landfill assuming diversion rates of between 35 percent (1996 levels) and 50 percent (AB 939-required diversion rate for Year 2000), respectively). The Mission Bay FSEIR reported that the solid waste generation estimates for the Mission Bay plan were included in the landfill capacity projections for the Altamont Landfill, and concluded that the Mission Bay plan would not substantially affect the lifespan of the landfill.

Impact Evaluation

Water Supply

Impact UT-1: The City's water service provider would have sufficient water supply available to serve the project from existing entitlements and resources, and would not require new or expanded water supply resources or entitlements. (Less than Significant)

A water demand memorandum prepared by the sponsor for the proposed project indicates that estimated water demand for the currently proposed development at Blocks 29-32 would be 0.100 mgd as adjusted for water conservation measures as required under the Green Building Requirements in Chapter

13C of the 2010 San Francisco Building Code.³⁷ For outdoor water use, the project would be required to comply with further water conservation measures under the San Francisco Water Efficient Irrigation Ordinance. These requirements specify water efficiency and conservation measures for indoor and outdoor use, including establishing standards for low flow plumbing fixtures and water efficiency standards for landscape irrigation.

The project's estimated demand of 0.100 mgd is conservatively estimated to be entirely for potable water demand, although the project proposes to use recycled water for select non-potable water uses. The project sponsor has indicated that the project would have about 0.094 mgd in non-potable water demands (such as for toilets/urinals, irrigation, cooling tower, or commercial laundry).³⁸ In the future, when recycled becomes available, some of the estimated water demand could be met with recycled water for non-potable uses, which could reduce the project's potable water demand to less than 0.100 mgd.

On July 9, 2013, the SFPUC approved and adopted the Water Supply Assessment for the proposed Event Center and Mixed-Use Development Project at Piers 30-32 and Seawall Lot 330.³⁹ This Water Supply Assessment was conducted for an earlier design of the proposed project at another location in San Francisco about 1.5 miles north of the current project site. The Water Supply Assessment concluded that there are adequate water supplies in the regional water system to serve an estimated 0.109 mgd of water demand for the project and cumulative demands during normal years, single dry years, and multiple dry years from 2015 through 2035. The Water Supply Assessment also indicated that the demand of this project is encompassed within the overall San Francisco retail water demands being used for current water supply planning. Since the estimated water demand for the proposed project of 0.100 mgd is less than the 0.109 mgd identified in the Water Supply Assessment, the water demands of the project would not require new or expanded water supply resources or entitlements.

Therefore, as confirmed by the SFPUC, existing water supplies serving the City would be sufficient to meet the projected water demand of the proposed project, and the project would not trigger the need for new or expanded water supply resources or entitlements. Impacts on water supply would be less than significant, and no mitigation is necessary.

This impact determination is similar to the analysis in the Mission Bay FSEIR, which concluded that at build-out, the entire Mission Bay plan would require approximately 2.9 mgd of water supply from the SFPUC's regional water system. The SFPUC (referred to as the San Francisco Water Department in the FSEIR) determined at the time that there were adequate water supply resources to serve the Mission Bay plan area, provided that Mission Bay water users utilize reasonable water-conserving measures, as listed in FSEIR Mitigation Measure M.2. However, currently, compliance with the Green Building Requirements in Chapter 13C of the San Francisco Building Code would override and supersede FSEIR

³⁷ BKF Engineers, 2014. *Mission Bay Blocks 29-32—Water Demand Memorandum*. Technical Memorandum to Clarke Miller, Strada Investment Group from Sravan Paladugu, P.E. and Jacob Nguyen, P.E. BKF No. 20136004-20, November 14, 2014.

³⁸ BKF, 2014. *Golden State Warriors, Mission Bay Blocks 29-32, On-site Alternate Water Sources*. Technical Memorandum to Clarke Miller, Strada Investment Group, from Jacob Nguyen, P.E. BKF No. 20136004, October 22, 2014.

³⁹ SFPUC, 2013. *Water Supply Assessment for the Event Center and Mixed-Use Development Project at Piers 30-32 and Seawall Lot 330*. July 1, 2013.

Mitigation Measure M.2 with respect to required water efficiency and conservation measures, and therefore FSEIR Mitigation Measure M.2 no longer applies to the proposed project.

Thus, the proposed project would not result in new or more severe impacts on water supply than previously identified in the FSEIR.

Since publication of the Mission Bay FSEIR, no substantial changes have occurred or new information has become available that would result in new or more severe impacts on water supply. However, it should be noted that the SFPUC has revised its assessment of water supply reliability since 1998, as required and documented in an urban water management plan (UWMP), which is updated every 5 years in compliance with the Urban Water Management Planning Act. The UWMP describes the SFPUC's long-term plan for its water supplies to meet the existing and future demands of its customers during normal, dry, and multiple dry years. The SFPUC's current 2010 UWMP was issued in 2011,⁴⁰ and the 2015 UWMP will be issued in 2016. During this interim period, the SFPUC developed a 2013 Water Availability Study⁴¹ to document the SFPUC's current and projected retail water supplies⁴² when compared to projected retail water demands. Future water supply sources include one recycled water project on the eastside of San Francisco, which in contrast to the assumption in the FSEIR that recycled water would be available to the plan area by 2011, is still in the planning stages, but is projected to eventually serve non-potable uses such as irrigation and toilet flushing for portions of the eastside of the City including the project site.

Impact UT-2: The proposed project would not require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. (Less than Significant)

As discussed in Impact UT-1, the proposed project would not result in new or more severe impacts on water supply than previously identified in the Mission Bay FSEIR. Furthermore, the SFPUC has determined in the Water Supply Assessment, that the estimated water demand for the proposed project is already encompassed within the overall San Francisco retail water demands, for which the associated regional water treatment and transmission facilities have been established.

As described above in the Section A.2, Background, the Mission Bay master developer, FOCIL-MB, LLC, is required to provide the infrastructure serving the South Plan Area. Water delivery infrastructure has been completed on the north and west sides of the project site and there are existing water mains located along Third and South Streets. In addition, there are several existing service laterals extending from the utility mains along South Street that can presumably be used to service the project site. The master developer would be required to install new water mains along 16th Street and Terry A. François Boulevard, for both domestic water and recycled water, during the major phase development associated with the proposed project, and additional service laterals extending from the utility mains along South

⁴⁰ SFPUC, 2011. *2010 Urban Water Management Plan for the City and County of San Francisco*, June 2011.

⁴¹ SFPUC, 2013. *Water Availability Study for the City and County of San Francisco*, May 2013.

⁴² The SFPUC provides water supply services to both wholesale and retail customers. The City and County of San Francisco, including the Mission Bay area, is part of SFPUC's retail customers.

Street that can presumably be used to service the project site. Additional service laterals are proposed along 16th Street and the future Terry A. François Boulevard frontage.

As part of the standard permit review process, the Mission Bay master developer, in coordination with the project sponsor, would be required to request a hydraulic analysis of the SFPUC water distribution system to confirm that the existing and planned water distribution system is adequate to meet the project's water distribution demands, including fire suppression system pressure and flow demands. If the water distribution system as approved under the Mission Bay Infrastructure Plan is inadequate to meet the project's demand, the project sponsor would be responsible for funding the construction of required new water mains and appurtenances. The construction of the new water mains and appurtenances would require excavation, trenching, soil movement, and other activities typical of construction of development projects in San Francisco, and similar to those activities analyzed in the Mission Bay FSEIR for the various infrastructure improvements. Activities required to install new water mains, if determined to be required, would be similar to those associated with construction of the project, and these activities would not result in new or more severe environmental impacts than those previously disclosed in the Mission Bay FSEIR.

This impact determination is similar to the analysis in the Mission Bay FSEIR, although the FSEIR also included Mitigation Measure M.3 recommending that the AWSS be extended into the project area as determined by the San Francisco Fire Department and Department of Public Works. However, since publication of the FSEIR, the SFPUC's City Distribution Division currently owns and operates the AWSS (not the San Francisco Fire Department), and a number of infrastructure improvements needed to serve the project site have already been completed, including a high pressure water main along Third Street, bordering the project site. As described above, the Mission Bay master developer, in coordination with the project sponsor would be required to request a hydraulic analysis of the SFPUC water distribution system to confirm that the water distribution system as approved under the Mission Bay Infrastructure Plan is adequate to meet the project's fire suppression system pressure and flow demands; and if the analysis determines the system to be inadequate, the project sponsor would be responsible for the costs of construction of required new water mains and appurtenances. Thus, FSEIR Mitigation Measure M.3 has been superseded by the completion of the high pressure water main in Third Street and does not apply to the proposed project.

Therefore, the proposed project would not require or result in the construction of new or expanded water mains that would cause significant environmental effects, and this impact would be less than significant. The proposed project would not result in new or more severe impacts associated with construction of new water facilities or pipelines than previously identified in the FSEIR.

Solid Waste

Impact UT-3: The proposed project would be served by landfills with sufficient permitted capacity to accommodate the project's solid waste disposal needs. (Less than Significant)

Under the proposed project, as shown in **Table 3**, the proposed project would generate approximately 2,211 tons of solid waste per year.

**TABLE 3
ESTIMATED ANNUAL PROJECT-GENERATED SOLID WASTE**

Proposed Use ¹	Square Footage	Solid Waste Generation Rate ²	Solid Waste Generation (tons/yr)
Event Center	750,000	1.29 tons/1000 sf-yr	968
Retail	125,000	2.0 lb/100 sf-d	456
Office	605,000	1 lb/100 sf-d	787
Total			2,211

NOTES:

¹ See Table 1 of this Initial Study.

² Solid waste generation factor for the event center based on rates used in the Sacramento Entertainment and Sports Center & Related Development EIR, 2013. Generation rates for retail and office based on rates used in the Mission Bay FSEIR, Table L.2. Retail assumed to operate 365 days a year; Office uses assumed to operate 260 days a year.

Since publication of the Mission Bay FSEIR, a number of changes have occurred with respect to solid waste disposal in the City, as described below, all of which would serve to reduce the total volume of solid waste to be disposed of in a landfill.

In 2002, the City adopted a Zero Waste Goal, which included a 75 percent landfill diversion goal citywide by 2010 and the goal of achieving zero waste to landfill by 2020, such that all discarded materials be diverted from landfills through recycling, composting or other means. The City achieved its 75 percent landfill diversion goal by 2008 through implementation of numerous programs and efforts. In 2006, the City adopted the Construction and Demolition Waste Ordinance mandating the recycling of construction and demolition debris. Effective since 2007, the City's Food Service Waste Reduction Ordinance prohibits any establishment that serves food prepared in San Francisco from using polystyrene foam containers, and requires any containers to be either recyclable or compostable. In 2009, the City adopted a Mandatory Recycling and Composting Ordinance, which requires all San Francisco residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, thereby minimizing solid waste disposal and maximizing recycling. In addition, Chapter 13B of the San Francisco Building Code requires that all construction and demolition debris in amounts of one cubic yard or greater must be managed by a registered facility for recovery of the materials.

The Mission Bay FSEIR estimated that total solid waste generated by development under the Mission Bay plan at buildout would be approximately 19,000 tons per year for the entire plan area. However, compliance with all of the above changes in requirements for solid waste disposal since publication of the FSEIR would reduce the volume of solid waste requiring disposal in a landfill. Thus, given these changes, it would be expected that the current annual volume of solid waste would be less than what was projected in the FSEIR, thereby *reducing* the severity of the impact described in the FSEIR.

In addition, the Mission Bay FSEIR indicated that solid waste generated by development under the Mission Bay plan at buildout could be accommodated by the Altamont Landfill. However, the City's contract with the Altamont Landfill, which is based on volume of material disposed of, is anticipated to expire in 2015.

The City is currently conducting solid waste planning efforts and participating in the environmental review process for a potential future landfill contract to a Recology subsidiary for shipment of solid waste by truck and rail to the Recology Ostrom Road Landfill in Yuba County. This facility currently can accept 3,000 tons per day. It has an expected closure date of 2066 with a total design capacity of more than 41 million cubic yards. The City is also conducting environmental review of a short-range plan to haul solid waste to the Recology Hay Road Landfill in Solano County. The Recology Hay Road Landfill is permitted to accept up to 2,400 tons per day of solid waste and has capacity to accommodate solid waste until approximately 2050.

Despite these change in circumstances relative to disposal of solid waste generated by the Mission Bay plan at buildout, the proposed project would not result in new or substantially more severe impacts than those identified in the Mission Bay FSEIR. Compliance with the multiple City ordinances requiring reduction in solid waste for landfill disposal as well as the ongoing commitment of the City to secure a long-term landfill contract at an alternate location from the Altamont Landfill would ensure that the project would be served by landfills with sufficient permitted capacity to accommodate the project's solid waste disposal needs. Furthermore, the project would be designed to achieve a LEED Gold certification, which may be achieved through commitment to specific waste-reduction measures. These actions would reduce the volume of long-term waste generated by the proposed project. Therefore, this impact would be less than significant and no mitigation would be required.

Impact UT-4: The proposed project would comply with federal, state, and local statutes and regulations related to solid waste. (Less than Significant)

The Mission Bay FSEIR did not specifically address compliance with solid waste regulations. However, as discussed below, potential impacts associated with this issue would be less than significant.

The California Integrated Waste Management Act of 1989 required municipalities to adopt an integrated waste management plan to divert 75 percent of waste by 2010. The City of San Francisco achieved a 77-percent landfill diversion rate for 2008, exceeding the plan's goal by two years. Under Senate Bill 1016, the City's per resident disposal target rate is 6.6 pounds per person per day (PPD), and its per employee disposal target rate is 10.6 PPD. Both of these targeted disposal rates were met, with San Francisco generating about 2.9 pounds/resident/day and about 4.4 pounds/per employee/per day.

San Francisco Ordinance No. 27-06 requires a minimum of 65 percent of all construction and demolition debris to be recycled and diverted from landfills, and Chapter 13B of the San Francisco Building Code requires that all construction and demolition debris in amounts of one cubic yard or greater must be managed by a registered facility for recovery of the materials. Furthermore, the project would be required to comply with City Ordinance 100-09, the Mandatory Recycling and Composting Ordinance, which requires everyone in San Francisco to separate their refuse into recyclables, compostables, and trash. The Altamont and Recology Ostrom and Hay Road Landfills are required to meet federal, state and local solid waste regulations. The proposed project would be required to adhere to these regulations. Implementation of the proposed project would not impede the City from meeting solid waste regulations, and the impact would be less than significant.

Cumulative Impacts

Impact C-UT-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative utilities and service systems impacts. (Less than Significant)

The geographic contexts for impacts to utilities and service systems are the service areas for the applicable service providers. The proposed project, when combined with past, present, and reasonably foreseeable future development, would increase demand for water and solid waste disposal services of these providers.

Water Supply. As described in Impact UT-1, the SFPUC has adopted a Urban Water Management Plan (2010) that addresses the future water supply needs of its entire service area, as well as a 2013 Water Availability Study that addresses the future water supply for its retail customers, primarily the City and County of San Francisco. As stated above, the SFPUC has indicated that the water supply service to the proposed development at the site has already been incorporated into its water supply planning when considering the existing and future water demands for its entire service area. Therefore, the project would not contribute to a cumulative impact on water supply.

Solid Waste. As stated above, the City and County of San Francisco intends to achieve zero waste to landfill by 2020. Increased waste generation from the project and cumulative development would be partially offset by existing San Francisco ordinances and policies regarding waste reduction. Therefore, the increased generation of solid waste from these developments would not exceed permitted landfill capacity.

As such, the proposed project would not contribute to significant cumulative impacts on water supply and solid waste utilities and service systems.

Issues to be analyzed in the SEIR

The impact evaluation above explains why the proposed project would not result in new significant impacts or substantially increase the severity of impacts on water supply and solid waste utilities and service systems—with respect to criteria E.11 (b), (d), (f), and (g), and no further analysis is required on these subjects. However, with respect to criteria E.11(a), (b), (c), and (e) as they pertain to wastewater facilities, additional evaluation of the proposed project is necessary for both project and cumulative impacts related to wastewater and stormwater collection and treatment. In concert with the further analysis of hydrology and water quality issues, the SEIR will include a detailed analysis of:

- The potential for wastewater and/or stormwater generated by the project to result in exceedances of wastewater treatment requirements of the RWQCB
- The potential for wastewater and/or stormwater generated by the project to require the construction of new or expanded wastewater treatment or stormwater drainage facilities, the construction of which could cause environmental effects. This analysis will also discuss the applicability of FSEIR Mitigation Measure M.5 regarding stormwater management.
- The potential for the project to result in a determination by the SFPUC that it has inadequate capacity to serve the project demand for wastewater treatment.

<u>Topics:</u>	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
12. PUBLIC SERVICES— Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the 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 public services such as schools, parks, or other services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial adverse physical impacts associated with the provision of, or the 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 public services such as fire protection or police protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Issues related to parks, which is referred to in criterion E.12 (a), are addressed above in Section E.10, Recreation.

Summary of Public Services Impacts in Mission Bay FSEIR

Fire and Police Protection

The Mission Bay FSEIR Community Services and Utilities setting section characterized existing fire and police protection services serving the Mission Bay plan area and surrounding area at that time. The Mission Bay FSEIR noted that there were no San Francisco Fire Department (SFFD) fire stations operating within the Mission Bay plan area at that time, however, the plan area was served by up to six surrounding fire stations. The Mission Bay FSEIR also reported that the Mission Bay South area was located within the San Francisco Police Department’s Bayview District, whose police station was located over 2½ miles south of the plan area.

The Mission Bay FSEIR Community Services and Utilities impacts section determined that the Mission Bay plan would potentially significantly increase demand for fire protection services in the Mission Bay plan area, and that a new fire station and additional fire department personnel and equipment, including a Hazardous Materials Unit, would be required in the Mission Bay South plan area at build-out in order to facilitate access in the event of a major emergency, and maintain adequate levels of service. The FSEIR also indicated the Mission Bay plan would increase demand for a new police station and additional police protection personnel.

The Mission Bay plan included the provision of land at the corner of Third Street and Mission Rock Street in the Mission Bay plan area for a new police/fire station. The Mission Bay FSEIR determined that with implementation of Mitigation Measures M.6a (Construct New Fire Station) and M.6b (Provide New Engine Company) to ensure funding for additional fire protection personnel, equipment and fire station, impacts to

fire protection services would be less than significant. Furthermore, the Mission Bay FSEIR determined that the new police station proposed under the Mission Bay plan would increase community involvement and lower crime rates in the Mission Bay plan area and ensure impacts to police protection services would be less than significant. Potential impacts associated with the construction and operation of the new police/fire station itself were included in the overall analysis of the Mission Bay plan in the FSEIR.

Public Schools

The Mission Bay FSEIR Community Services and Utilities setting section described existing San Francisco Unified School District (SFUSD) school services, and noted that there were no public schools operating in the Mission Bay plan area at the time of preparation of the Mission Bay FSEIR.

The Mission Bay FSEIR Community Services and Utilities impacts section indicated the Mission Bay plan residential population would increase the demand on the San Francisco Unified School District (SFUSD). The Mission Bay FSEIR estimated that at full build-out, the Mission Bay plan residential uses would create approximately 1,615 school-age children residing in the Mission Bay plan area, including approximately 730 students of elementary school age, and approximately 75 percent of these students would be expected to attend public schools.

The Mission Bay plan included the transfer of land within the plan area for a new 500-student elementary school to the SFUSD prior to issuance of building permits for the Mission Bay plan residential units. On this basis, the Mission Bay FSEIR concluded that Mission Bay plan impacts to public schools would be less than significant. Potential impacts associated with the construction and operation of the new school were included in the overall analysis of the Mission Bay plan in the Mission Bay FSEIR.

The Mission Bay FSEIR also determined the proposed school site within the Mission Bay plan area would not be large enough to house a middle school or high school, or all of the potential new elementary school students, and consequently, that additional classroom space would need to be developed by SFUSD outside of the Mission Bay plan area, most likely for all grade levels. The Mission Bay FSEIR concluded it was too speculative to identify impacts from construction of additional school facilities, although any new facilities that would be proposed by SFUSD would be subject to appropriate environmental review for site-specific physical environmental impacts.

Other Public Services

The Mission Bay FSEIR Community Services and Utilities section and Initial Study determined that Mission Bay plan effect on public health services, childcare services, library services, street maintenance services, and emergency medical services would be less than significant, and consequently, the Mission Bay FSEIR did not require any mitigation measures for these topics.

Impact Evaluation

Schools and Other Services

Impact PS-1: The proposed project would not result in substantial adverse physical impacts associated with the provision of or the 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 schools or other services. (Less than Significant)

The proposed project does not include any residential uses, and therefore would not increase the demand for schools. Thus, the project would have no effect on public schools. Similarly, because the project does not include any residential uses, the project's effect on demand on other services (such as public health, childcare, library, street maintenance, and emergency medical) would be within the assumptions analyzed in the Mission Bay FSEIR for the entire plan area. The project would not result in any new or substantially more severe impacts on schools or other services than those previously identified in the FSEIR. Further, no substantial changes or conditions have occurred at the project site and vicinity that would result in new or more severe impacts than those described in the FSEIR.

Cumulative Impacts

Impact C-PS-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative impacts on schools or other services. (Less than Significant)

The geographic scope of potential cumulative impacts on schools and other services encompasses the Mission Bay plan area. As a program EIR, the Mission Bay FSEIR has addressed the cumulative impacts of overall development of the Mission Bay plan area on schools and other services, and the FSEIR identified no significant impacts from the Mission Bay plan. Thus, based on the analysis in the FSEIR, there would be no significant adverse cumulative effects on schools and other services.

Issues to be Addressed in the SEIR

Further discussion of potential impacts on law enforcement and fire protection services associated with construction and operation of the event center and associated development at the project site will be included in the SEIR, including the applicability of FSEIR Mitigation Measures M.6a (Construct New Fire Station) and M.6b (Provide New Engine Company). Although construction of the new Public Safety Building at Third and Mission Rock Streets is completed and will be operational in early 2015, and satisfies the requirements of these mitigation measures, the SEIR will provide a project-specific analysis of the impacts on law enforcement and fire protection services and adequacy of these mitigation measures to reduce project impacts to less than significant.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
13. BIOLOGICAL RESOURCES— Would the project:				
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

There are no applicable adopted habitat conservation plans, natural community conservation plans, or other approved habitat conservation plans that apply to the project site. Therefore, criterion E.13(f) does not apply to the proposed project, and this topic is not discussed further in this Initial Study or in the SEIR.

Summary of Biological Resource Impacts in Mission Bay FSEIR

The biological resources significance criteria were addressed in the Mission Bay FSEIR in the Initial Study Biology section and the China Basin Channel Vegetation and Wildlife section. Relevant information from these sections is summarized below.

The Mission Bay FSEIR Initial Study Biology section evaluated biological resource conditions present in the Mission Bay plan area at that time. The Mission Bay FSEIR Initial Study reported that the upland portion of Mission Bay South was mostly disturbed and sparsely vegetated, and did not contain substantial numbers of mature or scenic trees. Vegetative mapping of the Mission Bay plan area included in the Mission Bay FSEIR indicates Blocks 29-32 did not contain any notable vegetative habitat. The Mission Bay FSEIR Initial Study determined no state-listed threatened, endangered or rare plants, or rare, threatened or endangered animal species were known to occur in the upland portion of the Mission Bay

plan area, as confirmed by biological field surveys. Consequently, the Mission Bay FSEIR identified no significant project impacts to upland plant and wildlife in the Mission Bay plan area, and accordingly, did not require any mitigation measures related to these resources.

Although not within the Blocks 29-32 vicinity, the Mission Bay FSEIR also analyzed potential impacts to aquatic and wetland habitats of China Basin Channel. The Mission Bay FSEIR China Basin Channel Vegetation and Wildlife section determined that significant impacts resulting from disturbance and removal of salt marsh wetland habitat resulting from installation of rip-rap and utilities in the Channel would be mitigated to a less than significant level through preparation and implementation of a salt marsh habitat mitigation plan in accordance with the Section 404 permit process of the U.S. Army Corps of Engineers. In addition, the Mission Bay FSEIR determined that significant impacts to herring reproduction from turbidity in the water of the Channel or Bay would be mitigated to a less than significant level by avoiding construction activities affecting turbidity during the herring spawning season, and, at other times, use of shallow-draft tugboats and barges with enforced speed limits and implementing a plan for minimizing turbidity during removal of existing piles.

Please see also, Hydrology and Water Quality, below, for discussion of potential Mission Bay plan effects on aquatic biota from treated wastewater and stormwater discharge, and sediment; and Hazards and Hazardous Materials, for a discussion of potential Mission Bay plan effects on aquatic biota from the presence of chemicals in construction dust.

Impact Evaluation

Special Status Species

Impact BI-1: The proposed project would not have a substantial adverse effect, either directly or through habitat modification, on any special status species. (Less than Significant)

A qualified biologist conducted a site reconnaissance on August 28, 2014. The reconnaissance visit consisted of a pedestrian survey within the project site's boundary and visual observations of the adjacent environments to identify suitable habitat or supportive communities for special-status⁴³ plant and wildlife species. General habitat conditions were noted and incidental species observations were recorded. Prior to the reconnaissance survey, a review of database queries was conducted for special-status species occurrences documented in the regional project vicinity (i.e. San Francisco County, San Francisco North and San Francisco South 7.5-minute U.S. Geological Survey quadrangles) including the California Department of Fish and Wildlife's (CDFW⁴⁴) California Natural Diversity Database (CNDDDB), U.S. Fish and Wildlife Service (USFWS), and California Native Plant Society (CNPS). Lists compiled of sensitive plant and animal species from these databases document 34 sensitive plant species

⁴³ The term "special-status" species includes those species that are listed and receive specific protection defined in federal or state endangered species legislation, as well as species not formally listed as Threatened or Endangered, but designated as "Rare" or "Sensitive" on the basis of adopted policies and expertise of state resource agencies or organizations, or local agencies such as counties, cities, and special districts. A principal source for this designation is the California "Special Animals List".

⁴⁴ The California Department of Fish and Game (CDFG) changed its name on January 1, 2013 to the California Department of Fish and Wildlife (CDFW). In this document, references to literature published by CDFW prior to Jan. 1, 2013 are cited as 'CDFG, [year]'. The agency is otherwise referred to by its new name, CDFW."

and 41 animal species within the regional vicinity of the project site. Of these 75 special-status species, none were determined to have a moderate or high potential to occur on the proposed project site due to the lack of suitable habitat or supportive vegetation communities which these species require for sustained use (see Appendix A of this Initial Study).

The project site is located in a dense urban setting and currently does not contain desirable habitat that could support sensitive species. The project site currently contains two paved parking lots in the north and west portions of the site, and the remainder of the site consists of an undeveloped ruderal lot largely covered in gravel and surrounded by chain link fencing. Vegetation within the ruderal lot is sparse and dominated by non-native annual grasses and opportunistic weedy species which thrive in such ruderal environments and include, foxtail brome (*Bromus madritensis*), riggut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), Italian rye grass (*Festuca perennis*), rattail sixweeks grass (*Festuca myuros*), Bermuda grass (*Cynodon dactylon*), fennel (*Foeniculum vulgare*), pampas grass (*Cortaderia jubata*), bristly ox tongue (*Helminthotheca echioides*), black mustard (*Brassica nigra*), stinkwort (*Dittrichia graveolens*), white sweetclover (*Melilotus albus*), cut leaf plantain (*Plantago coronopus*), and cheeseweed (*Malva parviflora*). Native prostate coyote bush (*Baccharis pilularis*) was also prevalent throughout the site. Birds commonly found in such areas with limited habitat value are seed-eating and include non-native species such as English sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*) as well as birds native to the area, including house finch (*Haemorhous mexicanus*), lesser goldfinch (*Spinus psaltria*), Brewer's blackbird (*Euphagus cyanocephalus*), and rock pigeon (*Columba livia*). Evidence of Canada goose (*Branta canadensis*) is present on the site.

As discussed in the Section A, Project Description, on the project site, immediately east of, and adjacent to, Parking Lot B, is a depression (measuring approximately 320 feet by 280 feet) created by excavation and backfill associated with prior environmental cleanup of that portion of the site. Site reconnaissance revealed the deepest part of the excavation within this area contains standing water with a mixture of ruderal vegetation described above, and wetland plants, including alkali bullrush (*Bolboschoenus maritimus*), brass buttons (*Cotula coronopifolia*), fat-hen (*Atriplex prostrata*), and saltgrass (*Distichlis spicata*), present around its perimeter. The standing water supports common wildlife as evidenced by a snowy egret (*Egretta thula*) hunting at the water's edge and a black phoebe (*Sayornis nigricans*) sallying insects from a vegetative perch. These features are discussed in further detail under Impact BI-3.

Based on the data above and similar to the conclusions of the Mission Bay FSEIR for the entire plan area, the proposed project would not have a substantial adverse effect on special status species due to the lack of suitable habitat, as summarized in Appendix A. This impact would be less than significant, and no mitigation is required. Thus, the project would not result in any new impacts, or increase the severity of previously-identified impacts, to special-status species.

At the time of preparation of the Mission Bay FSEIR, the project site contained several buildings and facilities and was noted as lacking any notable vegetative habitat, with no state-listed threatened, endangered or rare plants, or rare, threatened or endangered animal species known to occur in the upland portion of the Mission Bay plan area, including the project site. Subsequent to that time, the project site has been subject to building removal, grading, excavation, and construction of paved surface parking lots, fencing and utilities on portions of the site. Other than the creation of the depression as a result of remediation actions, no other changes in the site since the preparation of the FSEIR have altered

the characteristics of the site in relation to biological habitat. These changes in conditions on the project site have not altered the fact that the site provides no suitable habitat for any sensitive or special-status species due to the sparse and ruderal nature of onsite vegetation, as well as the site's location in a densely urbanized environment, as confirmed through the reconnaissance survey and database review of special-status species occurrences within the vicinity of the project site. In addition, there have been no substantial changes with respect to the circumstances under which the project would be undertaken, nor has any new information become available that demonstrates new or more severe impacts associated with the proposed project.

On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those identified in the Mission Bay FSEIR on special status species. Furthermore, the Mission Bay FSEIR did not identify any alternatives to reduce impacts to special-status species. Consequently, no new or different mitigation measures or alternatives to reduce project impacts to special-status species are identified or required with respect to the currently proposed project.

Sensitive Natural Communities

Impact BI-2: The proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations. (No Impact)

As described in Impact BI-1, above, the project site currently does not contain riparian habitat or other sensitive natural community, which is consistent with the description in the Mission Bay FSEIR of no notable vegetative habitat in the project area. Thus, the project would have no impact on any riparian or other sensitive natural community. No changes in conditions at the project site or any new information has become available that would result in new or more severe impacts associated with the proposed project with respect to sensitive natural communities.

Wetlands

Impact BI-3: The proposed project would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act or navigable waters as defined in Section 10 of the Rivers and Harbors Act through direct removal, filling, hydrological interruption, or other means. (Less than Significant)

As described above in Impact BI-1, the deeper excavation and surrounding shallow depressions within the project site are features that exhibit the hydrology and vegetation characteristics of wetlands. Hydric soil is presumed present due to the year-round inundation and presence of some obligate wetland plants. The deeper excavation is at a sufficient depth to intersect groundwater and a review of aerial imagery reveals water within the deeper excavation year round, while the shallow depressions appear to be seasonally wetted.⁴⁵ Vegetation composition within the deeper excavation differ from the upland, ruderal portions of the site and include several species that commonly occur in wetlands such as alkali bulrush,

⁴⁵ Google aerial imagery, 2007-2014.

brass buttons, and fat-hen. Vegetation within the shallow depressions included a combination of saltgrass and Bermuda grass which can be found in both upland and wetland communities.

The jurisdictional status of the deeper excavation and surrounding shallow depressions has not been determined. This topic was addressed in a technical report prepared by the project sponsor's biological consultant⁴⁶, which discussed the origin of these features and how they conform to criteria for jurisdiction under the federal Clean Water Act. The report concluded that the noted features may be exempt from regulatory jurisdiction under the Clean Water Act due to their creation incidental to construction activities⁴⁷, even if they meet some technical criteria for jurisdictional wetlands. Specifically, the report states that the deeper excavation and shallow depressions within the project site may fall under the following exemption:

“Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States.”⁴⁸

Alternatively, because it contains ponded areas and supports wetlands plants, the excavation feature could be determined to be waters of the U.S. and/or waters of the state. Isolated ponded areas, even if artificially created, could also be determined to be waters of the state under the San Francisco RWQCB's Basin Plan as they can provide beneficial cover or foraging habitat for wildlife.⁴⁹

The overall value of Blocks 29-32 to support or sustain wildlife is limited due to the sparse and ruderal nature of onsite vegetation, as well as the site's location in a densely urbanized environment. While several bird species were observed foraging and hunting onsite, these species are common to San Francisco and would continue to be supported by vegetation communities and water features found in the project vicinity. Because the excavation depressions on the site are small, isolated features resulting from recently completed hazardous materials remediation activities and are surrounded by paved areas and urban development, these features do not provide the important biological habitat functions and values that are typically associated with federally protected wetlands. As such, the proposed removal of these features would not constitute a significant adverse impact on wetland habitat resources.

⁴⁶ WRA, 2014. *Construction Related Depressions at Golden State Warriors Mission Bay Site*, San Rafael, CA. Prepared for Golden State Warriors, October 1.

⁴⁷ The report discusses that under Regional Water Quality Control Board (RWQCB) Order R2-2005-0028, a portion of the project site underwent construction activities associated with the remediation of hazardous materials. The report describes that following excavation of the portion of the project site subject to remediation activities in 2005 and 2006, groundwater monitoring was required by the RWQCB between 2007 and 2013 to ensure the affected area met applicable standards for remediation. The report notes that partial backfilling of the excavated area occurred during the period of groundwater monitoring of the project site, however, a proposal to develop an office building with partial basement on the project site (that would have necessitated re-excavation of backfill materials from the excavation area), and unfavorable economic conditions, halted further backfilling of the excavated area. Based on post-remediation groundwater monitoring, RWQCB issued Order No. R2-2014-0022 attaining site closure.

⁴⁸ Preamble to the CWA Regulations (33 CFR Parts 320 through 330), published in the Federal Register on November 13, 1986 (51 Fed. Reg. 41206):

⁴⁹ California Regional Water Quality Control Board (RWQCB), 2013. *Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin*. Oakland, CA.

In the event that regulatory agencies determine that one or more of these features are jurisdictional, as part of the permitting process they may require mitigation to achieve “no net loss” of the function and values of the features. To achieve this performance standard, the following mitigation options could be implemented as compensation for project-related impacts to jurisdictional waters:

- Purchase of appropriate amount of credits at an approved wetlands mitigation bank;
- Payment into an approved in-lieu fee program to preserve or restore wetlands in the same watershed; or
- Provision of off-site mitigation.

The discussion above is consistent with the conclusions of the Mission Bay FSEIR for the entire plan area. The proposed project would not have a substantial adverse effect on identified federally protected wetlands as defined by Section 404 of the Clean Water Act, or navigable waters as defined in Section 10 of the Rivers and Harbors Act, or beneficial uses of wetlands according to the Basin Plan. This impact would be less than significant, and no mitigation is required. Thus, the project would not result in any new significant impacts, or increase the severity of previously-identified impacts, to wetlands.

Wildlife

Impact BI-4: The proposed project could interfere substantially with the movement of native resident or migratory wildlife species resident or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant with Mitigation)

The Mission Bay FSEIR did not specifically address the issue of migratory wildlife species. However, as discussed below, potential impacts associated with this issue would be mitigated to less than significant with implementation of standard mitigation measures.

Breeding Birds. Migratory and resident birds which breed locally in San Francisco have the potential to nest in shrub vegetation observed within the project site. While overall habitat is of marginal quality due to its urban context and disturbed soils, the composition of non-native vegetation can be attractive to seed eating birds, and the presence of native coyote bush, alkali bulrush and non-native pampas grass can provide cover and nesting substrate for smaller passerine species. Migratory birds are protected under the Migratory Bird Treaty Act and native resident nongame birds and their nests are protected from take under the California Fish and Game Code. Breeding birds which may nest within the project site could be adversely affected by project construction. Implementation of **Mitigation Measure M-BI-4a, Preconstruction Surveys for Nesting Birds**, would avoid disrupting or destroying active nests which could occur within the proposed project site during bird breeding season, and would reduce this impact to less than significant.

Avian Collisions with Buildings and Night Lighting. The project site is located within the Pacific Flyway along the western shoreline of San Francisco Bay. The waters of the Bay provide valuable stopover habitat for migratory birds. Open space, even in highly urbanized areas, creates potential bird habitat, and open space such as the open Bay in proximity to the proposed new buildings may increase the risk of bird collisions over that posed by existing structures, particularly from large amounts of reflective or artificially lighted surfaces. Many bird collisions are induced by artificial night lighting. The

tendency of birds to move towards lights at night when migrating, and their reluctance to leave the sphere of light influence for hours or days once encountered, has been well documented.⁵⁰ Development of the proposed project would increase the amount of light and glare generated at the project site and vicinity, including from building facades, internal night lighting sources visible through windows of building exteriors, new streetlights and pedestrian lights within and adjacent to the site, nighttime lighting of building exteriors and signs, potential video screens, and headlights from project-generated traffic.

Similar to the conclusion reached for the Bay Bridge Lighting project,⁵¹ due to the surrounding urban setting, the proposed project is not expected to appreciably increase the overall amount of lighting along the San Francisco waterfront as a whole (considering existing nighttime lighting conditions within Mission Bay, at AT&T Park and other shoreline locations). In addition, the project sponsor proposes to incorporate bird-safe measures that would reduce the potential effects of the project on birds. Nevertheless, given the preliminary nature of the project development, it cannot be concluded at this time that the proposed project building and associated lighting design would not have the potential to negatively affect birds.

The San Francisco Planning Department adopted *Standards for Bird-Safe Buildings* in 2011, adding Planning Code Section 139.⁵² These standards guide the use and types of glass and façade treatments, wind generators and grates, and lighting treatments. The standards include requirements for bird-safe glazing and lighting in structures or at sites that represent a hazard to birds. While development within the Mission Bay plan area, including the project site, is not subject to the *Standards for Bird-Safe Buildings* or Planning Code Section 139, given the preliminary nature of the project design, and the remaining potential for the proposed building and/or lighting design to result in potential bird hazards, implementation of bird safe practices consistent with the City's *Standards for Bird-Safe Buildings* and Planning Code Section 139 is included as mitigation for the proposed project (**Mitigation Measure M-BI-4b, Bird Safe Building Practices**).

With implementation **Mitigation Measures M-BI-4a, Preconstruction Surveys for Nesting Birds, and M-BI-4b, Bird Safe Building Practices**, the project would not result in any new or substantially more severe significant impacts on resident or migratory bird species than those identified in the FSEIR.

Mitigation Measure M-BI-4a: Preconstruction Surveys for Nesting Birds

To the extent practicable, vegetation removal and grading of the site in advance of new site construction shall be performed between September 1 and January 31 in order to avoid breeding and nesting season for birds. If these activities cannot be performed during this period, a preconstruction survey of onsite vegetation for nesting birds shall be conducted by a qualified biologist.

⁵⁰ Gauthreaux, S.A., Belser, C.G., 2006, Effects of Artificial Night Lighting on Migrating Birds, In: Rich, C. and Longcore, T., *Ecological Consequences of Night Lighting*, Island Press, Covelo, CA, pp. 67–93.

⁵¹ H.T. Harvey and Associates. 2012. Final Assessment of the Potential Impacts of the Bay Bridge Lighting Project on Birds and Fish (HTH #3305-01). Letter report to Meryka Plumer, David J. Powers & Associates, Inc., 5 April, 2012.

⁵² San Francisco Planning Department, *Standards for Bird-Safe Buildings*, available: http://www.sf-planning.org/ftp/files/publications_reports/bird_safe_bldgs/Standards%20for%20Bird%20Safe%20Buildings%20-%202011-30-11.pdf, 2011.

In coordination with the OCII or its designated representative, pre-construction surveys of onsite vegetation shall be performed during bird breeding season (February 1 – August 31) no more than 14 days prior to vegetation removal, grading, or initiation of construction in order to locate any active passerine nests within 250 feet of the project site and any active raptor nests within 500 feet of the project site. Surveys shall be performed in accessible areas within 500 feet of the project site and include suitable habitat within line of sight as access is available. If active nests are found on either the project site or within the 500-foot survey buffer surrounding the project site, no-work buffer zones shall be established around the nests. Buffer distances will consider physical and visual barriers between the active nest and project activities, existing noise sources and disturbance, as well as sensitivity of the bird species to disturbance. Modification of standard buffer distances, 250 feet for active passerine nests and 500 feet for active raptor nests, will be determined by a qualified biologist in consultation with the California Department of Fish and Wildlife (CDFW). No vegetation removal or ground-disturbing activities including grading or new construction shall occur within a buffer zone until young have fledged or the nest is otherwise abandoned as determined by the qualified biologist.

If construction work during the nesting season stops for 14 days or more and then resumes, then nesting bird surveys shall be repeated, to ensure that no new birds have begun nesting in the area.

Mitigation Measure M-BI-4b: Bird Safe Building Practices

The project sponsor shall design and implement the project consistent with the San Francisco *Standards for Bird-Safe Buildings* and Planning Code Section 139, as approved by OCII. OCII shall consult with the Planning Department and the Zoning Administrator concerning project consistency with Planning Code Section 139.

Biological Resources Policies or Ordinances

Impact BI-5: The proposed project would not conflict with any applicable local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

The Mission Bay FSEIR did not specifically address potential conflicts or compliance with local policies or ordinance protection biological resources. However, as discussed below, potential impacts associated with this issue would be less than significant, and no mitigation is required. Therefore, there would be no new or substantially more severe significant impacts than those identified in the FSEIR.

The City's Urban Forestry Ordinance protects San Francisco's street trees, significant trees and landmark trees regardless of species. There are no mature trees within the project site, including landmark trees, significant trees, or street trees. Although the Mission Bay FSEIR did not specifically address this issue, this impact would be less than significant because no tree removal is proposed as part of the project. Furthermore, the project would not preclude the ability of the City to plant trees in a sidewalk or public right-of-way along the project site perimeter, and the project would not conflict with this ordinance. There are no other applicable local policies or ordinances that apply to this site.

Thus, the project would not conflict with applicable local policies or ordinances protecting biological resources, and this impact would be less than significant.

Cumulative Impacts

Impact C-BI-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative impacts on biological resources. (Less than Significant)

The geographic scope of potential cumulative impacts on biological resources encompasses the species occurrences, habitats, and sensitive natural communities within the regional vicinity of the project site, including the portion of the Pacific Flyway along the City's Bay shoreline. Cumulative impacts are considered in the context of past, present and reasonably foreseeable project in this area—such as those listed above under Approach to Analysis—that could contribute to impacts on biological resources.

As described above in Impacts BI-1, BI-2, BI-3, and BI-4, the project site currently consists of either paved or undeveloped ruderal areas, with one notable depressed area containing some standing water, and overall habitat supportive of sensitive wildlife and plants is of marginal quality. With the exception of birds, the project, like other projects within the City's urbanized waterfront area, would have little or no potential to affect sensitive plants or wildlife, and therefore would not contribute to cumulative impacts on biological resources in the project area.

The proposed project could potentially result in adverse effects on various bird species through disruption of nests, collisions with buildings, or disorientation from night lighting. These impacts, in combination with other projects along the San Francisco waterfront, could potentially result in cumulative impacts to birds. However, other projects in San Francisco would be subject to the same environmental review requirements to provide mitigation for birds protected under the Migratory Bird Treaty Act and California Department of Fish and Game Code. Implementation of **Mitigation Measures M-BI-4a, Preconstruction Surveys for Nesting Birds, and M-BI-4b, Bird Safe Building Practices**, would not only reduce the project's impacts to less than significant, it would also reduce the project's contribution to any cumulative impact to less than significant.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
14. GEOLOGY AND SOILS—				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Change substantially the topography or any unique geologic or physical features of the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The Mission Bay FSEIR did not specifically address having soils capable of supporting the use of septic tanks or alternative waste disposal systems. However, the proposed event center and other proposed developments would connect to the combined sewer system, and would not use septic tanks or other on-site land disposal systems for sanitary sewage. Therefore, criterion E.14(e) is not applicable to the proposed project.

Summary of Geology and Soils Impacts in Mission Bay FSEIR

The geology and soils significance criteria were addressed in the Mission Bay FSEIR in the Seismicity section and the Initial Study Geology/Topography section. Relevant information from these sections is summarized below.

The Mission Bay FSEIR Seismicity setting section characterized existing soil and geologic conditions in the Mission Bay plan area, and discussed existing seismic and geologic hazards. The Mission Bay FSEIR indicated the Mission Bay plan area is underlain by artificial fill, silty clay (Bay Mud), sandy alluvium, and stiff marine Old Bay Clay that overly the Franciscan bedrock located at depth of 30 to 130 feet below sea level. The Mission Bay FSEIR noted the Mission Bay plan area is not located within an Alquist-Priolo Fault Zone, but is within a Seismic Hazards Zone for liquefaction as defined in the City’s Community Safety Element.

The Mission Bay FSEIR Seismicity impacts section indicates the Mission Bay plan area is susceptible to earthquake-related groundshaking that would be strong enough to damage buildings and infrastructure, and could cause associated ground failure, such as liquefaction, all of which pose risks of injury or loss of life to people in or near the affected structure. The Mission Bay FSEIR noted that the San Francisco Building Code would require seismically-resistant construction in the Mission Bay plan area to reduce risks to people and structures during earthquakes. The Building Code requires that all new development in the Mission Bay plan area be preceded by special site-specific investigations to determine the type and

degree of hazards present, and include site-specific modeling to accurately estimate seismic forces that could act on a structure. In accordance with the Building Code, the resultant measures must be incorporated into the plans and specifications for a building to ensure an appropriate engineering design that would ameliorate the identified seismic hazards. To address the potential for liquefaction-related damage, the Mission Bay FSEIR noted that the major structures within the Mission Bay plan area would be constructed on foundations supported by piles driven into competent geologic materials such as dense sands, stiff clays, or bedrock. The Mission Bay FSEIR concluded that compliance with the Building Code and construction of pile-supported structures would reduce seismic hazards to an acceptable level.

The Mission Bay FSEIR Seismicity impacts section also notes that concrete piles are commonly used to penetrate the artificial fill and Bay Mud and that a sulfate-resistant mix of cement would be used to protect the concrete and reinforcing steel from the corrosive effects of the fill and young Bay Mud. To ensure compliance with this, the FSEIR includes Mitigation Measure H.7 requiring testing of the soil for sulfate and chloride content.

The Mission Bay FSEIR Initial Study Geology/Topography section reported that there are no known unique geologic features in the Mission Bay plan area. The FSEIR Initial Study estimated that up to 300,000 cubic yards of fill would be added to the Mission Bay plan area over the course of construction; this included the proposed addition of between 1 and 1.5 feet of new fill in low spots east of Third Street. The Mission Bay FSEIR Initial Study determined that this additional fill would cause no substantial change in the largely flat character of the site's topography. Given these factors, the Mission Bay FSEIR concluded the Mission Bay plan's effect on changes in topography and unique geologic features would be less than significant.

The Mission Bay FSEIR Initial Study Geology/Topography section concluded that the potential for settlement when a new structure is constructed is high because of the irregular nature of the artificial fill used to create the underlying land and the compressibility of the underlying Bay Mud. The Mission Bay FSEIR reported the alluvium, Old Bay Clay, and Franciscan Bedrock underlying these units are more competent and suitable for foundation support. The Initial Study concluded that utilizing foundations with piles supported in these materials would ameliorate the effects of settlement once the structure is constructed.

Impact Evaluation

Earthquake and Landslide Hazards

Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, seismic groundshaking, seismically-induced ground failure, or landslides. (Less than Significant)

The preliminary geotechnical evaluation for the project⁵³ identified similar geologic materials to those identified in the Mission Bay FSEIR, including artificial fill, young Bay Mud, dense sands of the Colma Formation, and Old Bay Clay that overly the Franciscan Bedrock encountered at a depth of 32 to 130 feet beneath the project site. As analyzed in the Mission Bay FSEIR, no active faults cross the project site so the

⁵³ Langan Treadwell Rollo, *Preliminary Geotechnical Evaluation, Block 29-32 Mission Bay, San Francisco, California*. March 28, 2014.

potential for fault rupture is low. The structures proposed under the project would be subject to strong groundshaking in the event of an earthquake on one of the regional faults, and the site is also located in a liquefaction potential zone identified by the California Department of Conservation under the Seismic Hazards Mapping Act of 1990. However, as determined in the Mission Bay FSEIR, these impacts would be less than significant with implementation of a site-specific geotechnical investigation and seismic analysis, and incorporation of the recommendations in these studies into the building design as required by the California and San Francisco Building Codes. The proposed structures would be supported on piles driven into competent materials beneath the artificial fill and young Bay Mud.

Potential hazards associated with lateral spreading and seismically-induced settlement in the event of a major earthquake were not specifically addressed in the Mission Bay FSEIR. However, for the proposed project, these effects would also be addressed through implementation of site-specific geotechnical studies and adherence to the California and San Francisco Building Codes. On the basis of the preliminary geotechnical evaluation for the project,⁵⁴ recommended measures for addressing these effects include improving the soil to resist liquefaction and lateral spreading as well as use of flexible utility connections, utility hangers, and hinged slabs to address differential settlement. The Mission Bay FSEIR also did not discuss the potential for earthquake-induced landslides. However, the project site is relatively flat and is not located in a landslide-potential zone identified by the California Department of Conservation under the Seismic Hazards Mapping Act of 1990.⁵⁵ Therefore, there is no project impact related to earthquake-induced landslides.

As indicated by the project-specific geotechnical evaluation, no substantial changes have occurred nor has new information become available that would result in new or more severe project impacts related to seismic hazards including fault rupture, seismic groundshaking, seismically induced ground failures, or landslides. No new or different mitigation measures or alternatives would be required to reduce this impact to a less-than-significant level.

Erosion or Loss of Top Soil

Impact GE-2: The project would not result in substantial erosion or loss of top soil. (Topic Partially Analyzed Previously; Less than Significant)

The Mission Bay FSEIR addressed erosion impacts relevant to the project site but not impacts related to loss of top soil. However, both impacts would be less than significant, as described below.

Erosion

Soil movement for foundation excavation could create the potential for wind- and water-borne soil erosion during construction site. However, the project site is relatively flat; therefore, substantial erosion and loss of soil would not be expected to occur during site preparation and construction.

⁵⁴ Langan Treadwell Rollo, *Preliminary Geotechnical Evaluation, Block 29-32 Mission Bay, San Francisco, California*. March 28, 2014.

⁵⁵ California Department of Conservation, Division of Mines and Geology. *State of California Seismic Hazard Zones, City and County of San Francisco, Official Map*, November 17, 2000.

The Mission Bay FSEIR addressed erosion impacts in the Hydrology and Water Quality section under construction activity pollutants. As discussed below in Section E.15, Hydrology and Water Quality, of this Initial Study (Impact HY-1), project construction would be required to comply with the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit). This permit, adopted by the State Water Resources Control Board in 2009 subsequent to publication of the FSEIR, requires implementation of erosion and sedimentation controls for construction activities associated with ground disturbance. Once the project is constructed, the entire project site would be covered with structures, paved areas, or landscaping and the potential for erosion would be low. Therefore, impacts related to soil erosion during and after construction would be less than significant.

The project would not result in new or more severe significant impacts than those identified in the Mission Bay FSEIR. No new or different mitigation would be required.

Loss of Top Soil

Top soil is a fertile soil horizon that typically contains a seed base. The Mission Bay FSEIR did not specifically address loss of top soil. However, the project site was previously built out with commercial and industrial uses which have since been removed, and the site has been subject to subsequent grading, some excavation, and construction of paved surface parking lots, fencing and associated utilities. Prior development and other ground disturbance would have involved removal of any top soil on the project site. Therefore, the proposed project would have no impact related to loss of top soil.

Settlement

Impact GE-3: The project would not be located on a geologic unit or soil that is unstable, or that could become unstable as a result of the project. (Topic Partially Analyzed Previously; Less than Significant)

The Mission Bay FSEIR addressed settlement issues related to differential settlement of the underlying geologic materials that are relevant to the project site, but it did not address impacts related to settlement associated with excavation or dewatering. However, these impacts would all be less than significant, as described below.

Differential Settlement

Similar to the analysis in the Mission Bay FSEIR Initial Study Geology/Topography section, the proposed project could result in settlement once the project is constructed due to differential settlement of the artificial fill and compressibility of the Bay Mud. However, as part of the project and similar to the discussion in the Mission Bay FSEIR, the proposed event center and other proposed buildings and structures would be constructed with a foundation using piles supported in dense sands of the Colma Formation or in bedrock of the Franciscan Complex. The project would be designed in accordance with the recommendations of the site-specific geotechnical investigation that would be required under the California and San Francisco Building Codes. Furthermore, no substantial changes have occurred at the project site or new information become available that would result in new or more severe impacts related to settlement. On the basis of the factors discussed above, the project would not have any new or substantially more severe effects than those

identified in the Mission Bay FSEIR related to settlement, and no new mitigation measures or alternatives are required to reduce this impact to a less-than-significant level.

Settlement due to Excavation or Dewatering

Construction of the proposed project could also induce ground settlement as a result of excavation for construction of subsurface parking, construction dewatering, and heave during installation of piles. As discussed in the Project Description, following completion of construction, permanent, long-term dewatering would not be required. The Mission Bay FSEIR did not specifically address settlement as a result of these activities. Therefore, these potential settlement effects are described below, followed by San Francisco Department of Building Inspection (DBI) established procedures which would ensure that unstable conditions do not result from project construction.

Excavation. Construction of proposed subsurface facilities, including but not limited to, below-grade event center features and underground parking, could require excavation to a depths of up to 30 feet below San Francisco datum, and isolated deeper excavation could be required at the building cores. During excavation, artificial fill and Bay Mud would be removed and the surrounding soils could become unstable, potentially causing settlement of adjacent structures, including buildings, sidewalks, streets, and utilities. However, the project would be required to comply with the California and San Francisco Building Codes' specifications for shoring, such as conventional soldier pile and lagging, a deep soil mixed cutoff wall,⁵⁶ or rigid and water-tight internally braced secant walling.⁵⁷ Implementation of these required measures would prevent this soil from becoming unstable.

Further, the DBI would require a monitoring program utilizing an inclinometer to monitor for movement at the face of the excavation. The monitoring program would include a baseline survey and frequent surveying of the excavation as construction progresses to evaluate the effects of construction and ensure that the soil does not become unstable. DBI would review the final building plans and determine if an excavation monitoring plan would be required.

Construction Dewatering. Groundwater at the project site is relatively shallow (encountered at a depth of about 6½ to 7 feet below ground surface). Therefore, the proposed 30-foot excavation depth would extend up to approximately 23 feet beneath the groundwater table, and there is the potential for substantial water inflow into the excavation during construction, which would require dewatering to maintain dry construction conditions. Dewatering could potentially result in settlement of adjacent structures, including buildings, sidewalks, streets, and utilities. Although a water tight shoring system such as a deep soil mixed cutoff wall or secant walling could be used during excavation for structures, dewatering of excavations for installation of utilities and compaction of soil could be required. To address the potential for settlement as a result of excavation dewatering, DBI could require a site-specific dewatering plan to identify necessary

⁵⁶ A deep mixed soil cutoff wall is constructed by advancing augers or a cutting tool and pumping cement through the tips of the auger or cutting tool during drilling. The cement is mixed with the soil in place, forming a solidified column or panel of soil and cement that provides stability to the excavation sidewall and restricts groundwater inflow to the excavation.

⁵⁷ A secant wall, in simplified form, is built by drilling a series of holes and filling them with concrete, resulting in a continuous series of concrete cylinders that form a water-tight barrier that retains soil behind it.

measures to minimize the risk of settlement. DBI would review the final building plans and determine if a dewatering plan would be required.

Discharge of any groundwater removed during construction dewatering would also be subject to requirements of the City's Sewer Use Ordinance (Article 4.1 of the Public Works Code; added by Ordinance No. 19-92, amended by Ordinance No. 116-97), as supplemented by Department of Public Works Order No. 158170, requiring a permit from the Wastewater Enterprise Collection System Division of the SFPUC. A permit may be issued only if an effective pretreatment system is maintained and operated. The permit for discharge would specify water quality standards and may require the project sponsor to install and maintain meters to measure the volume of the discharge to the combined sewer system.

In addition, if the subsequent project-specific geotechnical investigation determines that dewatering wells would likely be needed to draw the groundwater down below the planned depths of excavation, any dewatering wells would be subject to the requirements of the City's Soil Boring and Well Regulation Ordinance (Article 12B of the Health Code; added by Ordinance No. 113-05), requiring a project sponsor to obtain a permit from the Department of Public Health prior to constructing a dewatering well. A permit may be issued only if the project sponsors use construction practices that would prevent the contamination or pollution of groundwater during the construction or modification of the well or soil boring.

Heave as a Result of Pile Driving. The proposed event center and other proposed buildings and structures would be supported by foundations using piles. The piles may be drilled or driven into place, and the appropriate installation method would be determined on the basis of the site-specific geotechnical investigation implemented in accordance with the California and San Francisco Building Codes. In addition, noise and vibration concerns could limit the use of driven piles.

If driven piles are used, pile driving during project construction may cause the ground to heave up to several inches, and the heave could adversely affect adjacent structures. To address this, the DBI may require a preconstruction survey and monitoring during pile driving. DBI would review the final building plans and determine if a preconstruction survey and subsequent monitoring would be required to address the potential for heave.

DBI Requirements. DBI would require a site-specific geotechnical report for the project prior to issuing a building permit, and would review the report to ensure that the potential settlement effects of excavation, pile driving, and dewatering are appropriately addressed in accordance with Section 1704.15 of the San Francisco Building Code. DBI would also require that the report include a determination as to whether a lateral movement and settlement survey should be done to monitor any movement or settlement of surrounding buildings and adjacent streets during construction. If a monitoring survey were recommended, DBI would require that a Special Inspector be retained by the project sponsor to perform this monitoring. Groundwater observation wells could be required to monitor potential settlement and subsidence during dewatering.

If, in the judgment of the Special Inspector, unacceptable movement were to occur during construction, corrective actions would be used to halt this settlement. Groundwater recharge could be used to halt settlement due to dewatering. Further, DBI would review the final building plans and determine if additional site-specific reports would be required.

With implementation of the recommendations provided in project-specific detailed geotechnical study, subject to review and approval by DBI, and monitoring by a DBI Special Inspector (if required), impacts related to the potential for settlement and subsidence due to construction on soil that is unstable, or could become unstable as a result of such construction, would be less than significant.

Problematic Soils

Impact GE-4: The project would not create substantial risks to life or property as a result of location on expansive soils or other problematic soils. (Topic Partially Analyzed Previously; Less than Significant)

The Mission Bay FSEIR addressed issues related to corrosive soils, but it did not address impacts related to expansive soils. However, these impacts would all be less than significant, as described below.

Corrosive Soils

The event center and other proposed buildings and structures would be constructed with foundations supported on concrete piles driven into competent geologic materials beneath the artificial fill and young Bay Mud. As discussed above, the Mission Bay FSEIR stated that a sulfate-resistant mix of cement would be used to protect the concrete and reinforcing steel from the corrosive effects of the fill and young Bay Mud. To ensure compliance with this, the Mission Bay FSEIR includes Mitigation Measure H.7 requiring testing of the soil for sulfate and chloride content.

However, the site-specific geotechnical investigation conducted in accordance with the California and San Francisco Building Codes would address the potential for corrosion of the concrete piles where they are in contact with the artificial fill and young Bay Mud, and would include specifications for the concrete to ensure that the piles would not be adversely affected by corrosion.

Therefore, this impact is adequately addressed by the existing building code and implementation of Mitigation Measure H.7 of the Mission Bay FSEIR is no longer necessary to reduce impacts related to corrosive soil to a less-than-significant level.

Expansive Soils

Expansive soils are typically very fine grained with a high to very high percentage of clay. They are characterized by their ability to undergo significant volume change (i.e., to shrink and swell) due to variations in soil moisture content which typically result from factors such as rainfall, landscape irrigation, utility leakage, and roof drainage. The Mission Bay FSEIR did not specifically address the effects of expansive soil on newly constructed structures. However, the presence of expansive soils is not an issue at the project site because the artificial fill beneath the site is sandy and would not be expansive, and because the young Bay Mud beneath the site is generally below the groundwater table, and thus is permanently saturated. Further, any backfill materials used for the project would have a low expansion potential in accordance with the recommendations of the geotechnical report for the project, completed in accordance with the California and San Francisco Building Codes. Therefore, impacts related to expansive soils would be less than significant.

Topography or Unique Geologic Features

Impact GE-5: The project would not substantially change the topography or any unique geologic or physical feature of the project site. (Less than Significant)

The Mission Bay FSEIR Initial Study reported that there are no unique geologic features in the Mission Bay plan area and that the addition of limited amounts of new fill in low spots east of Third Street would not result in a substantial change in topography. Similarly, the project site is generally flat and there are no unique topographic, geologic, or physical features within the site. Construction of the proposed project would not involve the placement of fill and would not alter the topography of the site. No changes have occurred at the project site or new information has become available that would affect this impact. Therefore, the project would not result in any new impacts or increase the severity of previously identified impacts related to alteration of topography or damage to unique geologic features and this impact would be less than significant.

Cumulative Impacts

Impact C-GE-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in a considerable contribution to cumulative impacts related to geologic hazards. (Less than Significant)

Geologic impacts are usually restricted to the immediate vicinity, and potential geologic impacts resulting from the proposed project that could contribute to a cumulative impact are limited to seismic effects and the potential for creation of an unstable geologic unit. Seismic effects could occur in the project vicinity, including the south of Market area. Therefore, this area is considered the geographic scope for seismic effects. The creation of unstable geologic units is a local effect; therefore, the geographic scope for this cumulative impact is the project area and immediate vicinity. This analysis is based on past, present, and reasonably foreseeable future projects in this area, including those listed above in Section D, Approach to Analysis.

Seismic Safety. Several cumulative projects would contribute to an increase in the number of persons potentially exposed to seismic risks in the south of Market area, which could result in a potential cumulative impact. However, as noted in Impact GE-1, the project site is not subject to fault rupture because there are no known earthquake faults that cross the site or vicinity. The proposed project and any development within the Mission Bay area would be subject to very strong groundshaking and could experience liquefaction effects in the event of an earthquake on a nearby fault. However, the project and any new buildings would be constructed in accordance with the most current building code requirements for seismic safety, providing for increased life-safety protection of residents and workers. These requirements would reduce potential cumulative impacts to a less-than-significant level, and the proposed project's compliance with these requirements would ensure that it would not make a cumulatively considerable contribution to cumulative impacts related to seismic safety.

Unstable Geologic Unit. As discussed in Impact GE-3, implementation of the proposed project could result in ground settlement from excavation for construction of the below-ground parking, construction dewatering, and pile driving. Any nearby project that could contribute to cumulative impacts related to an unstable geologic unit in the immediate vicinity would be required to implement the DBI procedures

described above, including preparation of a detailed geotechnical report and site-specific reports as needed to address the potential settlement and subsidence impacts of excavation and dewatering; implementation of a lateral movement and settlement survey to monitor any movement or settlement of surrounding buildings and adjacent streets during construction and monitoring by a Special Inspector, if needed; conducting a pre-construction survey and monitoring during pile driving; and implementation of corrective actions, as necessary. With implementation of these requirements under the proposed project and under any nearby projects, cumulative impacts related to ground settlement would be less than significant.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
15. HYDROLOGY AND WATER QUALITY— Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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 that would result in substantial erosion of siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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 that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The Mission Bay FSEIR did not specifically address potential impacts of the Mission Bay plan related to placing housing within a 100-year flood hazard area. However, the project would not include any housing or residential uses. Therefore, criterion E.15(g) does not apply to the proposed project. In addition, the project site is not located in the vicinity of a levee or dam, so criterion E.15(i) with respect to failure of a levee or dam is not applicable to this project. Similarly, the project site is not located on or near slopes that could be subject to mudflow, so criterion E.15(j) with respect to mudflow is not applicable to this project. Thus, these topics are not discussed further in this Initial Study or in the SEIR.

Summary of Hydrology and Water Quality Impacts in Mission Bay FSEIR

The Mission Bay FSEIR addressed potential effect on hydrology and water quality in the Hydrology and Water Quality, Community Services and Utilities, Initial Study Water, and Seismicity sections. Relevant information from these sections is summarized below.

The Mission Bay FSEIR Hydrology and Water Quality setting section characterized existing drainage patterns and municipal sewer treatment facilities serving the Mission Bay plan area at that time. The Mission Bay FSEIR reported that the Mission Bay plan area was located in the City's Bayside drainage basin, in which combined stormwater and sanitary sewage was collected, then conveyed to and treated at the Southeast Water Pollution Control Plant (SEWPCP) near Islais Creek. At that time, the Mission Bay plan area was located in four sub-basins, with the project site draining to two of the sub-basins. The north and east portions of the Blocks 29-32 site were located in the Bay sub-basin which drained directly to the Bay, and the balance of Blocks 29-32 site was located within the Mariposa sub-basin portion of the Bayside drainage basin. Stormwater collected in the Mariposa sub-basin was directed to the Mariposa pump station, and from there, to the SEWPCP. Stormwater occurring within the Bay sub-basin at that time drained directly to the Bay, and not the combined sewer system.

As reported in the Mission Bay FSEIR, the annual average dry weather flows at the SEWPCP at that time were estimated at 67 mgd. During wet weather, the SEWPCP could treat up to 150 mgd to a secondary level, and an additional 100 mgd to a primary level.⁵⁸ In addition, up to an additional 150 mgd of wet weather flows received primary treatment at the North Point Water Pollution Control Plant, increasing total wet weather treatment capacity for the Bayside drainage basin to 400 mgd. As also reported in the Mission Bay FSEIR, if rainfall exceeded the total capacity of the SEWPCP, the North Point facility, and storage/transport facilities, then excess flows are directed to sewer discharge structures located along the City's bayside. These flows receive flow-through treatment (similar to primary treatment) and are discharged to the Bay under the City's National Pollutant Discharge Elimination System (NPDES) permit issued by the Regional Water Quality Control Board (RWQCB).

Mission Bay Plan Area Drainage Plan

The Mission Bay FSEIR Hydrology and Water Quality impacts section described the proposed Mission Bay plan's drainage plan, which proposed a new separate storm sewer system for a portion of the Mission Bay plan area. Under the Mission Bay plan, stormwater within the Bay sub-basin (which

⁵⁸ Secondary treatment is the treatment of wastewater or sewage involving removal of organic matter using biological and chemical processes. This is a higher level of treatment than primary treatment, which is removal of floating and settleable solids using physical operations such as screening and sedimentation.

included the eastern portion of Blocks 29-32 under 1998 conditions) would drain into new infrastructure and no longer directly to the Bay. The Mission Bay plan proposed a reconfigured Central/Bay sub-basin (that would include the northern portion of the Blocks 29-32 site) that would be served by separate sewer and storm drain systems. The sanitary-only sewers from the Central/Bay sub-basin would connect to the existing combined sewer system for treatment at the SEWCP. The separate storm drainage system proposed within the Central/Bay sub-basin would divert an initial portion of the stormwater flow (approximately 80 percent of the average annual flow) to the City's combined system for treatment. Stormwater volumes greater than the initial flows and up to a 5-year storm would be discharged directly to four new stormwater outfalls (two to China Basin Channel and two to the Bay). Volumes greater than a 5-year event would pond or flow overland to the Bay. The Mission Bay plan also proposed a reconfigured Mariposa sub-basin (that would include the southern portion Blocks 29-32), and would be served by the City's existing combined sewer system.

Project Operational Effects on Water Quality

The Mission Bay FSEIR indicated that the Mission Bay plan would contribute pollutants to the Bay through 1) the discharge to municipal wastewater effluent from the SEWPCP, 2) the discharge of treated combined sewer overflows (CSOs) (these events are now referred to as combined sewer discharges or CSDs), and 3) the discharge of untreated stormwater, as described below.

Mission Bay Plan Effects of Volume and Quality of Municipal Wastewater Effluent

The Mission Bay FSEIR estimated that the Mission Bay plan would generate municipal wastewater and increase the total effluent from the SEWPCP by about 3 percent, and result in an approximate 3 percent increase in the pollutant loading to the Bay from municipal wastewater effluent. The Mission Bay FSEIR reported that the quality of municipal wastewater from the Mission Bay plan area would not differ substantially from the quality of other City wastewater flowing to the SEWPCP, and would not materially change the concentrations of pollutants in the effluent. The Mission Bay FSEIR determined that the effluent increases would be well within the City's treatment plant capacity, and would not cause a violation of the City's National Pollutant Discharge Elimination System (NPDES) permit requirements regarding its discharge from the SEWPCP. The Mission Bay FSEIR also determined that the plan pollutant concentrations were within water quality screening values, including Water Quality Objectives adopted by the RWQCB. Given these factors, the Mission Bay FSEIR concluded that Mission Bay plan effects of municipal wastewater effluent on water quality would be less than significant.

Mission Bay Plan Effects of Volume and Quality of Combined Sewer Discharges

The Mission Bay FSEIR estimated that the Mission Bay plan would increase the average annual volume of CSDs (formerly referred to as combined sewer overflows, or CSOs) by approximately 0.2 percent, and increase the duration of each overflow event by a few minutes. The Mission Bay FSEIR reported that the Mission Bay plan would not change the concentrations of pollutants in the treated CSDs. In addition, this slight increase in CSD volumes and duration would not cause a violation of the City's NPDES permit requirements for the CSDs, and thus, would not adversely affect existing near-shore aquatic biota or water-contact recreation in the Bay. Given these factors, the Mission Bay FSEIR concluded that Mission Bay plan effects of CSDs on water quality would be less than significant.

Mission Bay Plan Effects of Volume and Quality of Direct Stormwater Discharge

The Mission Bay FSEIR reported that the Mission Bay plan would increase the volume of stormwater directly discharged to the Bay by approximately 2 percent and would also change the concentration of pollutants in the stormwater discharge due to the intensification of land uses proposed in the Mission Bay plan area. However, the FSEIR concluded that any potential increase in pollutants would be very small relative to those associated with municipal wastewater and treated CSDs. The Mission Bay FSEIR determined that this increase in volumes and change in pollutant concentrations would not adversely affect existing aquatic biota in the Bay. Given these factors, the Mission Bay FSEIR concluded that Mission Bay plan effects of direct stormwater discharge on water quality would be less than significant.

Mission Bay Plan Effects of Sediment Quality

The Mission Bay FSEIR reported that the RWQCB identified China Basin Channel and Islais Creek as candidate toxic hot spots for sediment quality. The Mission Bay FSEIR indicated the Mission Bay plan would slightly decrease volumes of CSDs to China Basin Channel, however would increase flows elsewhere, most notably to Islais Creek. The Mission Bay FSEIR indicated that increased volumes of CSDs to Islais Creek with the Mission Bay plan would cause a corresponding increase in sediment deposition at that location. The Mission Bay FSEIR determined that the plan would not, however, measurably change the physical or chemical composition of the sediment layer, nor affect any determination by the RWQCB to designate China Basin Channel or Islais Creek as toxic hot spots. Given these factors, the Mission Bay FSEIR concluded that Mission Bay plan effects on sediment quality in Islais Creek and China Basin Channel would be less than significant.

Mission Bay Plan Contribution to Cumulative Effects

The FSEIR reported that there were no significant cumulative impacts identified from the estimated increased volume and pollutant load of treated municipal wastewater effluent, treated CSDs, and direct stormwater discharges, because there would not be substantial degradation in water quality of the Bay or near-shore waters, no toxic effect on aquatic biota, and no substantial change sediment quality or beneficial uses.

However, the FSEIR determined that due to the lack of conclusive evidence refuting a causal relationship between treated CSDs, stormwater discharges, and sediment quality, the Mission Bay plan could contribute to a potentially significant cumulative impact on near-shore waters of the Bay from multiple sources of CSDs and direct stormwater discharges to China Basin Channel. The FSEIR concluded that the estimated plan contribution (0.2 percent) to the potential cumulative increase (11 percent) in Bayside CSD volumes, and the contribution of plan-related stormwater discharges to possible cumulative impacts would be reduced to less than significant with the implementation of Mitigation Measures K.3 and K.4 regarding CSD volumes and alternative treatment technologies.

Mission Bay Phased Development Effects on Water Quality from Stormwater

The Mission Bay FSEIR discussed U.S. EPA Phase II stormwater regulations that had been proposed but not finalized at the time of preparation of the FSEIR. These proposed regulations would require the City to develop and implement a stormwater management program to reduce the discharge of pollutants to the maximum extent practicable and protect water quality. The Mission Bay FSEIR indicated that the lack

of adopted regulatory requirements for a stormwater management program that addressed Mission Bay stormwater quality, and a failure to implement other BMPs to minimize stormwater pollution, could potentially conflict with the intent of the proposed stormwater permit requirements and result in a significant impact.

Mitigation Measure M.5 in the Mission Bay FSEIR Community Services and Utilities section (see Utilities and Services section in this Initial Study, above) required conveying all stormwater runoff from newly developed areas in the Bay Basin to the combined sewer system prior to completion of the initial-flow diversion system. Mitigation Measure K.5 in the Mission Bay FSEIR Hydrology and Water Quality section identified implementation of an individual stormwater management program that utilizes BMPs for Mission Bay until the Phase II regulations become final and Mission Bay is included in the City's stormwater management program. The FSEIR also identified Mitigation Measure K.2 in the Mission Bay FSEIR Hydrology and Water Quality section that required mandatory participation in the City's existing Water Pollution Prevention Program.

Mission Bay Plan Construction Effects on Water Quality

The Mission Bay FSEIR Hydrology and Water Quality section reported that construction activities would cause ground disturbance that would result in the potential for erosion, and potential for construction sedimentation and other pollutants in China Basin Channel and the Bay. The Mission Bay FSEIR indicated that construction activities proposed under the plan would be required to comply with the NPDES General Construction Activity Storm Water Permit, as administered by the RWQCB, which requires preparation and implementation of a Storm Water Pollution and Prevention Plan (SWPPP). The Mission Bay FSEIR also identified a number of best management practices (BMPs) that should be incorporated into the SWPPP as part of the plan, and included implementation of these BMPs as Mitigation Measures K.1a through K.1i. Regarding discharges of groundwater produced during construction-related dewatering, the FSEIR concluded that water quality effects related to these discharges would not be significant because the discharge would need to comply with the requirements of the City's Industrial Waste Ordinance, adopted in 1992. Based on these factors, the Mission Bay FSEIR concluded that construction-related impacts to water quality would be less than significant.

Mission Bay Plan Effects on Flooding

The Mission Bay FSEIR Initial Study Water section summarized relevant information from the 1990 Mission Bay FEIR regarding the issue of potential flooding. The 1990 Mission Bay FEIR indicated the existing elevation of the Mission Bay plan area ranged from approximately +6.0 to -2.0 feet San Francisco City Datum (SFD).⁵⁹ Groundwater in the Mission Bay plan area was reported at 3.5 to 9 feet below ground surface, and contiguous with the mean sea level in the adjacent Bay. As referenced in the Mission Bay FSEIR Initial Study, the 1990 Mission Bay FEIR determined that proposed structures or roadways in Mission Bay placed at elevations at or below -2.0 feet SFD, after settling on the site, could be subject to tidal flooding during a 100-year flood event, and that if sea level were to rise, groundwater levels in Mission Bay could rise similarly.

⁵⁹ San Francisco City Datum (SFD) establishes the City's zero point for surveying purposes at approximately 8.6 feet above the mean sea level established by 1929 U.S. Geological Survey datum, and approximately 11.3 feet above the current 1988 North American Vertical Datum.

The Mission Bay FSEIR Initial Study included Mitigation Measures K.6a through K.6f, adapted from the 1990 Mission Bay FEIR that required structures in the Mission Bay area to be designed and located in a way to protect low-lying shoreline areas from the dangers of tidal flooding, including consideration of a rise in relative sea level. The mitigation specified that to address effects of sea level rise, specific flood protection and engineering and building analyses must be conducted by a licensed engineer where structures are proposed below an elevation of -1.0 foot SFD. Potential measures identified by the mitigation included setback from the water's edge, installation of seawalls, dikes and/or berms during construction of infrastructure; reducing the amount of excavation for utilities or basements; and use of fill to raise the grade of public open spaces. With implementation of these mitigation measures, the Mission Bay FSEIR determined that plan effects related to flooding and sea level rise would be less than significant.

Mission Bay Plan Effects on Groundwater Depletion and Recharge

The Mission Bay FSEIR Initial Study Water section determined that the Mission Bay plan would have a less than significant impact on depletion of groundwater resources and groundwater recharge, primarily because the plan does not propose to extract groundwater. The FSEIR Initial Study indicated that the Mission Bay plan would supply non-potable water uses by either recycled water, groundwater, or potentially a blend of imported groundwater and recycled water. However, the effects of groundwater extraction for this purpose were analyzed in a separate environmental review document for the recycled water project, which determined that the recycled water project would not adversely affect groundwater resources or groundwater recharge.

The Mission Bay FSEIR Initial Study also determined that groundwater dewatering during construction would be subject to approval either by the City for discharge to the sewer system or at an off-site disposal facility. Therefore, impacts on groundwater depletion and recharge were determined to be less than significant.

Mission Bay Plan Effects Related to Tsunami and Seiche

The Mission Bay FSEIR Seismicity impact section estimated that based on evaluations conducted by the U.S. Army Corps of Engineers, the plan area would be subject to as much as 4.7 feet of wave run-up during the 100-year tsunami event, and 7.8 feet of wave run-up during the 500-year tsunami event. Based on this, the maximum flooding level would be -1 feet SFD for the 100-year event and 2 feet SFD for the 500-year event. The FSEIR stated that the U.S. Army Corps of Engineers model estimated the height of "worst case" flooding during extreme high tide crest conditions, which occur about 30 times each year, and last for less than 2 hours each time and the likelihood of a 100-year tsunami occurring within that window is less than one hundredth of one percent. Thus, even during these rare events, only the lowest portions of the plan area would be inundated as a result of a tsunami. Given the fact that the likelihood of such events is less than one hundredth of one percent, the FSEIR determined that impacts would be less than significant.

Impact Evaluation

Water Quality

Impact HY-1: The project would not violate water quality standards or otherwise substantially degrade water quality with respect to construction activities, including construction dewatering. (Less than Significant)

The project would not result in water quality impacts as a result of construction-related stormwater discharges, including construction-related dewatering because these discharges would be required to be managed in accordance with existing San Francisco regulations, described below.

Water Quality Effects of Construction Activities

During construction, stormwater from the project site would drain to a separate storm drainage system that includes existing storm drain lines located along South Street, Third Street, and 16th Street (which have been built subsequent to the FSEIR consistent with the Mission Bay South Infrastructure Plan). As described above for the Mission Bay FSEIR, stormwater discharges during construction would require NPDES coverage under the General Construction Activity Storm Water Permit, as administered by the RWQCB. At the time the FSEIR was prepared, this general permit required preparation and implementation of a Storm Water Pollution and Prevention Plan (SWPPP), but did not include specific BMPs to be implemented to avoid water quality effects associated with construction-related stormwater discharges. To address this, the Mission Bay FSEIR also identified a number of best management practices (BMPs) that should be incorporated into the SWPPP as part of the plan, and included as Mitigation Measures K.1a through K.1i.

However, the State Water Resources Control Board subsequently adopted the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit) in 2009 and this permit supersedes the permit in effect at the time of FSEIR publication. Construction activities subject to this permit include ground disturbance such as clearing, grading, and excavating, as well as soil stockpiling. Under the Construction General Stormwater Permit, construction projects are characterized by the level of risk to water quality. This is determined using a combination of the sediment risk of the project and the receiving water quality risk. Projects can be characterized as Level 1, Level 2, or Level 3, and the minimum Best Management Practices (BMPs) and monitoring that must be implemented during construction are based on the risk level. The BMPs are designed to prevent pollutants from coming in contact with stormwater and to keep all products of erosion and stormwater pollutants from moving offsite into receiving waters. They are specified in a SWPPP that must be prepared by a Qualified SWPPP Developer (QSD) and submitted to the San Francisco RWQCB before construction begins.

For construction activities characterized as Level 1, the Construction General Stormwater Permit specifies minimum BMPs to be implemented that address good housekeeping practices (including those for managing hazardous materials used during construction, non-stormwater management, erosion and sediment control, and run-on and runoff control). A qualified professional must inspect the required BMPs weekly when there is no rain and daily during a qualifying rainstorm. For construction activities characterized as Level 2 and 3, the minimum requirements identified for Level 1 apply, as well as some more stringent requirements. For instance, erosion controls must be implemented in conjunction with

sediment controls in active construction areas, and linear sediment controls must be used along slopes. In addition, a QSD must prepare a rain event action plan for Level 2 and 3 construction activities. This plan would identify the designated site stormwater manager, the provider of erosion and sediment controls, and the stormwater sampling agent, as well as the trades active at the site during all construction phases. The plan would include suggested actions for each construction phase.

Compliance with the current General Construction NPDES Permit would ensure that construction-related stormwater discharges would not violate water quality standards or otherwise substantially degrade water quality. Therefore, this impact would be less than significant with implementation of regulatory requirements and FSEIR Mitigation Measures K.1a through K.1i. would be superseded by the specified regulatory requirements. No new mitigation measures are required, and the project would not result in any new significant impacts or substantially more severe impacts on water quality from construction activities than were disclosed in the Mission Bay FSEIR.

Water Quality Effects of Groundwater Dewatering

As noted in the Geology and Soils section of this Initial Study, the groundwater level at the project site is about 6½ to 7 feet below ground surface. Given that the estimated depth of excavation on the site would be up to 30 feet below San Francisco datum deep, construction-related groundwater dewatering would likely be required. However, the sponsor indicates that the project would be designed such that permanent dewatering would not be required.

As discussed above, the Mission Bay FSEIR Initial Study concluded that water quality impacts associated with discharge of groundwater during construction-related dewatering would be less than significant with implementation of the City's Industrial Waste Ordinance, adopted in 1992. This ordinance is found in Article 4.1 of the *Public Works Code*, as supplemented by Order No. 158170, which regulates the quantity and quality of discharges to the combined sewer system. In accordance with Article 4.1 and Order No. 158170, the discharge permit would contain appropriate discharge standards and may require installation of meters to measure the volume of the discharge. Although the groundwater could contain contaminants related to past site activities, as discussed in, the Hazards and Hazardous Materials section of this Initial Study, as well as sediment and suspended solids, the groundwater would be treated as necessary to meet permit requirements prior to discharge.

With discharge to the combined sewer system in accordance with regulatory requirements, water quality impacts related to a violation of water quality standards or degradation of water quality due to discharge of groundwater produced during construction-related dewatering would be less than significant.

The FSEIR did not address water quality impacts associated with discharge of groundwater produced during long-term dewatering once the development projects were constructed. However, the sponsor indicates that no long-term dewatering of the project site is proposed during operation of the project. Therefore, the project would not result in any new significant impacts or substantially more severe impacts on water quality from dewatering activities than previously identified in the FSEIR.

Groundwater

Impact HY-2: The project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (Less than Significant)

As discussed above, the Initial Study for the Mission Bay FSEIR stated that non-potable water supply for development projects within the plan area would use recycled water that would potentially be a blend of imported groundwater and recycled water. As stated in the Initial Study for the Mission Bay FSEIR, the effects of groundwater extraction for this purpose were analyzed in a separate environmental review document for the recycled water project which determined that the recycled water project would not adversely affect groundwater resources or groundwater recharge. However, the San Francisco Public Utilities Commission (SFPUC) has not yet constructed the planned recycled water system for the eastside of the City, and currently, does not intend to blend groundwater with recycled water. Although the project would be required to install dual plumbing for use of recycled water in accordance with the Recycled Water Ordinance found in Article 22 of the San Francisco Public Works Code, the project would not use recycled water until it becomes available.

Further, implementation of the project would not result in depletion of groundwater resources because, other than potential pumping of groundwater during construction dewatering, the project would not involve the use or extraction of groundwater. Rather, potable water for the project would be provided by the SFPUC regional water system. If and when a supply of recycled water becomes available through the Eastside Recycled Water Project,⁶⁰ the project would also use recycled water for non-potable uses. Although groundwater dewatering could be required during construction of the project, this dewatering would not deplete groundwater resources because the Downtown San Francisco Groundwater Basin is not used as a drinking water supply and there are no plans for development of this basin for groundwater production.

Project implementation would not interfere with groundwater recharge because although the project would replace the great majority of the currently unpaved portions of the site with impervious surfaces, the new impervious surfaces comprise a negligible portion of the total area of the Downtown Groundwater basin. Impacts related to depletion of groundwater resources and interference with groundwater recharge would be less than significant because the project would not include groundwater pumping other than for dewatering, the Downtown San Francisco Groundwater Basin is not used as a potable water supply, there are no plans for development of the basin for groundwater production, and there would be only a minor increase in impervious surfaces. Therefore, the project's impacts on groundwater supplies and recharge would be less than significant, and the project would not result in any new significant impacts or substantially more severe impacts from those previously identified in the FSEIR.

⁶⁰ The SFPUC plans to provide 2 million gallons per day of high quality recycled water to the customers in the east side of the City through the Eastside Recycled Water Project for non-potable uses such as irrigation and toilet flushing. This project is still in the planning stages, and the implementation date is uncertain.

Drainage Patterns

Impact HY-3: The project would not alter the existing drainage pattern of the area in a manner that would result in substantial erosion, siltation, or flooding on- or off-site, and the project would not substantially increase the rate or amount of surface runoff that would result in flooding on- or off-site. (Less than Significant)

The project site does not include any existing streams or water courses that could be altered or diverted. Therefore, the project would have no impact related to alteration of drainage patterns by altering the course of a stream in a manner that would cause erosion or flooding on or off-site.

At the time of preparation of the Mission Bay FSEIR, drainage at the project site was directed either to the combined sewer system in the Central sub-basin or Mariposa sub-basin or directly to the Bay. Since that time, a separate storm drainage system has been constructed along South Street, Third Street, and 16th Street, as part of implementation of the Mission Bay South Infrastructure Plan, so that portions of the site previously draining directly to the Bay now drain to a separate storm drain system. The remainder of the site continues to drain to the combined sewer system.

Under the proposed project, the stormwater would be routed to a separate storm sewer system. Construction of the on-site project components would be required to comply with applicable stormwater design guidelines, which would ensure that no substantial erosion or siltation on-or off-site would occur.

Currently, the project site is comprised of open ground and paved areas. Once constructed, the project would change the quantity of stormwater runoff from the site. However, in accordance with the Stormwater Design Guidelines, stormwater controls would be designed to treat 90 percent of the annual stormwater runoff to the separate storm sewer system. Compliance with these design guidelines would ensure that no on- or off-site flooding would occur.

Therefore, neither alteration of existing drainage patterns at the project site nor changes in stormwater runoff volumes would result in substantial erosion, siltation, or flooding on- or off-site, and this impact would be less than significant. The project would not result in any new significant impacts or substantially more severe impacts related to alteration of drainage patterns from those previously identified in the FSEIR, and no new mitigation measures would be required.

Flooding

Impact HY-4: The project would not expose people, housing, or structures, to substantial risk of loss due to existing flooding risks and would not redirect or impede flood flows. (Less than Significant)

As discussed above, the Mission Bay FSEIR concluded that structures and roadways placed at elevations at or below -2.0 feet SFD could be subject to tidal flooding during a 100-year flood event and specified mitigation measures to address flooding issues. Elevations at the project site range from approximately -1 foot SFD to +3 feet SFD,⁶¹ therefore the project site would not be subject to tidal flooding during a

⁶¹ Langan Treadwell Rollo, Preliminary Geotechnical Evaluation, Block 29-32 Mission Bay, San Francisco, California. March 28, 2014.

100-year flood event. In addition, since publication of the FSEIR, the CCSF published interim flood maps in 2008 that show 100-year flooding zones within the City and County of San Francisco and the project site is not located within an identified 100-year flood zone.⁶²

Also subsequent to publication of the FSEIR in 1998, the SFPUC has specifically identified potential flooding hazards related to the depth of sewer lines relative to properties they serve. The SFPUC identified a potential flood zone south of Market Street but the proposed project is not within this zone.⁶³ However, the proposed project site is within an area located on fill, and the SFPUC notes that subsidence in areas located on fill or Bay Mud could subside to a point where the sewers do not drain freely during a storm (and sometimes during dry weather), and the resulting sewer backups could result in localized flooding. Accordingly, the project sponsor would be referred to the SFPUC at the beginning of the building permit process to determine whether the project would result in ground level flooding during storms. If so, the applicant would be required to comply with SFPUC requirements for projects in flood-prone zones as part of the permit approval process. These measures could include providing a pump station for the sewage flow, raising the elevation of entryways, providing special sidewalk construction, and constructing deep gutters, among others.

Therefore, impacts associated with exposure of people or structures to substantial risk of loss due to existing flooding risks and impedance of flood flows would be less than significant. Because the project would result in less than significant impacts related to flooding based on current flood hazard mapping by the CCSF and would be subject to SFPUC requirements for projects in flood zones that could result from sewer backups as part of the permit approval process (if needed), the project would result in less severe flooding impacts than those analyzed in the FSEIR. Therefore, compliance with SFPUC requirements for project in flood zones would obviate the need for Mitigation Measures K.6a through K.6f to mitigate existing flooding hazards, and these measures previously identified in the Mission Bay FSEIR would not be necessary to reduce this impact to a less than significant level. As stated below, potential future flood risks due to projected sea level rise and the applicability of these mitigation measures related to flooding as a result of sea level rise will be addressed in the SEIR.

Inundation by Seiche or Tsunami

Impact HY-5: The project would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche or tsunami. (Less than Significant)

As discussed above, the FSEIR estimated that the maximum flooding level in the Mission Bay plan area would be -1 feet SFD for the 100-year tsunami event and 2 feet SFD for the 500-year tsunami event. In addition, based on the state's official tsunami inundation maps published subsequent to publication of the FSEIR, the eastern portion of the project site is within a tsunami inundation zone.⁶⁴Based on modeling

⁶² City and County of San Francisco, San Francisco Interim Floodplain Map, Northeast, Final Draft. July, 2008.

⁶³ San Francisco Planning Department, Planning Director Bulletin No. 4, Review of Project Identified in Areas Prone to Flooding.

⁶⁴ California Emergency Management Agency, California Geological Survey, University of Southern California. Tsunami Inundation Map for Emergency Planning, San Francisco North Quadrangle/San Francisco South Quadrangle (SF Bay). June 15, 2009.

provided in the Tsunami Response Annex of the CCSF Emergency Response Plan, the potential tsunami and seiche run-up at the project site would be approximately 6 feet.⁶⁵

Although extremely rare, a tsunami or seiche could damage the proposed structures. Visitors and staff of the event center and other uses could also be endangered. However, as described below, the project is set back from the Bay which would provide a buffer between the Bay shoreline and the proposed project, and the project would also raise most occupied portions of the event center and mixed use development above the inundation depth. Further, San Francisco has a well-established Tsunami Warning System that would be activated and would protect people from harm, as also discussed below.

Structures. The proposed event center and other proposed structures would be constructed to current building standards. Although some damage to the structures could occur, the improvements constructed under the proposed project would be resilient to tsunamis or seiches. Therefore, impacts related to damage to structures from inundation by seiche and tsunami are considered less than significant and would not be a new significant impact or substantially more severe than impacts identified in the Mission Bay FSEIR.

People. The proposed project would increase the number of people at Blocks 29-32, and would therefore expose more people to tsunami or seiche hazards than under existing conditions. However, the project would include design features that would raise most occupied portions of the event center and mixed use development above the inundation depth. Proposed design features would include:

- Raising certain pedestrian access and outdoor areas, including the main plaza, the main pedestrian path providing access around the event center, and the Bayfront Overlook, Bayfront Terrace, and food hall roof
- Providing certain above-grade entry/exits to proposed buildings, including the main and secondary entries to the event center, to the office and retail buildings, and the upper floors of the proposed food hall

In the event that an earthquake occurred that would be capable of producing a seiche or tsunami that could affect San Francisco, the National Warning System would also provide warning to the City. The San Francisco outdoor warning system (sirens and loudspeakers, tested each Tuesday at 12:00 noon) would then be initiated which would sound an alarm alerting the public to tune into local TV, cable TV, or radio stations, which would carry instructions for appropriate actions to be taken as part of the Emergency Alert System. Police would also canvas the neighborhoods sounding sirens and bullhorns, as well as knocking on doors as needed, to provide emergency instructions. Evacuation centers would be set up if required. The advance warning system would allow for evacuation of people prior to a seiche or tsunami and would provide a high level of protection to public safety.

⁶⁵ City and County of San Francisco, Emergency Response Plan, an Element of the CCSF Emergency Management Program, Tsunami Response Annex, March 2011, <http://www.sfdem.org/ftp/uploadedfiles/DEM/PlansReports/TsunamiAnnex-2008.pdf>, accessed on September 10, 2014.

Therefore, impacts related to exposure of people to risk from inundation by seiche and tsunami are considered less than significant. This would not be a new or more significant impact than identified in the Mission Bay FSEIR.

Cumulative Impacts

Impact C-HY-1: The project, in combination with past, present, and reasonably foreseeable future projects in the site vicinity, would not result in a considerable contribution to cumulative impacts on hydrology and water quality with respect to construction activities, dewatering, groundwater supplies, drainage pattern, flooding, seiche or tsunami. (Less than Significant)

The geographic scope of potential cumulative impacts on water quality encompasses central San Francisco Bay and the Downtown Groundwater Basin. The geographic scope of effects on drainage and flooding consists of Bayside Drainage Basin. Impacts related to inundation by tsunami could occur along the entire San Francisco Waterfront; therefore the geographical scope for this impact includes the entire waterfront. This analysis is based on past, present, and reasonably foreseeable future projects in this area, including those listed above in Section D, Approach to Analysis.

As discussed in Impacts HY-1 and HY-2, implementation of appropriate regulatory requirements would ensure that the proposed project would result in less than significant impacts related to erosion and discharges of groundwater during dewatering. Other projects that could potentially contribute to a cumulative impact would be subject to the same or similar regulatory requirements including the Construction General NPDES permit and Article 4.1 of the Public Works Code as supplemented by DPW Order No. 158170 (including implementation of an erosion control plan). Implementation of these requirements under each individual project would ensure that all discharges comply with regulatory standards and would not result in a violation of water quality standards. Therefore, cumulative impacts related to these topics would be less than significant.

As discussed in Impacts HY-3 and HY-4, project elements affecting drainage and flooding issues at the project site would be subject to compliance with established guidelines for the separate storm drainage system and/or the combined sewer system, which would reduce these impacts to less than significant. Other past, present, and reasonably foreseeable future projects within the Bayside Drainage Basin would also be subject to these regulations. Therefore, based on the City's established regulations and guidelines for the separate and combined sewer system, which are designed to serve the City as a whole, cumulative impacts would also be less than significant.

As discussed in Impact HY-5, a tsunami or seiche would not significantly damage the proposed structures and visitors and staff of the event center and other uses would not be exposed to substantial risks related to tsunami or seiche because the occupied portions of the event center and mixed use development would be constructed above the 500-year tsunami inundation elevation. San Francisco also has a well-established Tsunami Warning System that would be activated and would protect people from harm and the new structures would be constructed in accordance with the current building code which would make them resilient to damage by tsunamis. Because other projects would be built to current building codes, and the Tsunami Warning System would also protect other people in the project vicinity from harm due to tsunamis, cumulative impacts related to inundation by tsunami or seiche would be less than significant.

Issues to be Analyzed in the SEIR

The impact evaluation above explains why the proposed project would not result in new significant impacts or substantially increase the severity of impacts on hydrology and water quality with respect to criteria E.15 (b), (c), (d), (f), (g), (h), or (j), and no further analysis is required on these subjects. However, with respect to criteria E.15(a), (e) and (i), additional evaluation of the proposed project is necessary for both direct and cumulative impacts related to certain aspects of these criteria. The SEIR will include a detailed analysis of:

- The potential for changes in stormwater runoff from the site and wastewater discharged to the combined sewer to affect the frequency or duration of combined sewer discharges. This analysis will also discuss the applicability of FSEIR Mitigation Measures K.2, K.5, and M.5, which all pertain to stormwater management measures.
- The potential for changes in runoff patterns due to the proposed project and to cumulative development to affect the capacity of the combined sewer system. This analysis will also discuss the applicability of FSEIR Mitigation Measures K.3 and K.4, which pertain to cumulative impacts on the combined sewer system.
- The potential for the project to expose people or structures to a significant risk of loss or injury due to future flooding from sea level rise and the applicability of Mission Bay FSEIR Mitigation Measure K.6, which pertains to flooding.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
16. HAZARDS AND HAZARDOUS MATERIALS— Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving fires?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The project site is not located within one-quarter mile of an existing or proposed school. Therefore, criterion E.16(c) is not applicable to the proposed project. Similarly, the project site is not located within an airport land use plan area or in the vicinity of a private airstrip. Therefore, criteria E.16(e) and E.16(f) are also not applicable. Thus, these topics are not discussed further in this Initial Study or in the SEIR.

Summary of Hazards and Hazardous Materials Impacts in Mission Bay FSEIR

The Mission Bay FSEIR addressed issues of hazards and hazardous materials in multiple sections: Health and Safety which addressed the proposed use, storage and disposal of hazardous materials during operation of the Mission Bay plan and emergency response; Contaminated Soil and Groundwater, which addressed issues related to potential soil and groundwater contamination in the Mission Bay plan area; Seismicity, which addressed issues related to emergency access and response; and Community Services and Utilities, which addressed public safety risks. Relevant information on hazards and hazardous materials from these sections is summarized below.

Mission Bay Plan Hazardous Materials Use, Waste Generation and Risk of Upset

Mission Bay Plan Hazardous Materials Use

The Mission Bay FSEIR Health and Safety impacts section indicated that businesses within the Commercial Industrial, Commercial Industrial/Retail and UCSF portions of the Mission Bay plan area would use substantial quantities of hazardous materials. The Mission Bay FSEIR reported that legal and regulatory requirements applicable to hazardous materials operations would require businesses to meet a range of health and safety laws and regulations, and that the implementation of these legally required health and safety measures would adequately address typical health and safety issues related to use and disposal of hazardous materials.

However, the FSEIR acknowledged laws and regulations do not address certain health and safety concerns related to the use of biohazardous materials that could be used by some of the businesses such as UCSF and surrounding businesses that would engage in research and development activities complimentary to UCSF activities. To address the lack of enforceable guidelines as it relates to aerosol transmission of biohazardous materials, the FSEIR identified Mitigation Measures I.1, I.2, and I.3 requiring implementation of appropriate guidelines, filtration of exhausts for Biosafety Level 3 laboratories or equivalent measures to avoid substantial health risks to individuals in the vicinity of the exhaust, and restrictions on the types biohazardous materials that could be used by businesses in the plan area. The FSEIR concluded that with implementation of this mitigation, potential health related to handling of biohazardous materials would be less than significant.

Mission Bay Plan Risk of Upset / Accidents

The Mission Bay FSEIR Health and Safety impacts section described potential safety concerns related to possible hazardous materials accidents and concluded that most accident risks would be adequately addressed by implementing required health and safety plans, providing emergency response training, and providing emergency response services. The Mission Bay FSEIR also stated that releases of highly toxic materials subject to the federal and state Accidental Release Programs could present more of a risk. However, existing regulations require the implementation of appropriate operational measures in accordance with required Risk Management Plans to reduce the possibility and consequences of potential accidents that could pose potential risks to neighboring residents, schools, or other off-site receptors (this is a plan required under state and federal regulations to specify operating and emergency response procedures to prevent a release of highly toxic materials, and is different from the risk management plan for exposure to hazardous materials required by Mission Bay FSEIR Mitigation Measure J.1, as discussed below). The Mission Bay FSEIR concluded that implementation of Risk Management Plans required under the Accidental Release Programs for the use of these toxic materials and compliance with school siting criteria outlined in the California Health and Safety Code, Education Code, and California Code of Regulations would ensure the impacts of accidents involving highly toxic materials would be less than significant.

Mission Bay Contaminated Soil and Groundwater

Setting

The Mission Bay FSEIR Contaminated Soil and Groundwater setting section described historic and current land uses in the Mission Bay plan area. The FSEIR reported that the Mission Bay plan area was filled beginning in 1859 and continuing for approximately 50 years, with the fill consisting primarily of earthquake rubble, municipal garbage, and rock and soil from other locations in the City. The FSEIR reported that uses previously and/or presently on Blocks 29-32 at that time included a range of commercial and industrial uses including, but not limited to, crude oil storage, offices, railroad tracks, trucking-related activities, maintenance and repair facilities, junk yard, stock corral, sand and gravel mixing, and open space. The Mission Bay FSEIR also reported that existing uses at the time of preparation of the FSEIR included a gravel plant, bus company facility, equipment rental, storage yard, railroad tracks, auto body shop, warehouse and parking.

The Mission Bay FSEIR Contaminated Soil and Groundwater setting section also summarized the results of soil and groundwater studies conducted in Mission Bay, including a comprehensive investigation conducted by ENVIRON in 1997 of the entire Mission Bay plan area. The 1997 investigation detected chemicals of various types and concentrations in the soil and groundwater throughout the Mission Bay plan area. The 1997 investigation identified petroleum hydrocarbons in soil, groundwater, and floating on groundwater (called "petroleum free product") in the vicinity of Illinois and 16th Streets (including within Blocks 31 and 32), and attributed the free product to former petroleum bulk storage, pipelines and transfer facilities in the vicinity. The FSEIR determined that concentrations of contaminants in soil or groundwater in the Mission Bay plan area, with the exception of the identified petroleum free product area, did not present a human health or ecological risk under existing conditions. The FSEIR reported that potential effects on near-shore and aquatic organisms associated with the free product were being investigated and if necessary would be remediated by the oil companies responsible for the contamination.

Mission Bay Plan Development (Construction) Effects

The Mission Bay FSEIR Contaminated Soil and Groundwater impact section reported that the proposed development of the Mission Bay plan area could result in potential exposure of workers and the public (including residents, employees and visitors) in the Mission Bay plan area to chemicals in soil and groundwater that could be released during construction. The Mission Bay FSEIR indicated that vacant sites within the Mission Bay plan area could be a source of exposed soils during part or most of the approximately 20-year development period. In addition, the Mission Bay FSEIR indicated construction activities within the Mission Bay plan area that would involve the disturbance of contaminated soil or groundwater would affect increasingly greater number of persons during the later phases of development.

The Mission Bay FSEIR discussed various types of construction activities, including excavation, grading, trenching, soil movement/transport, pile installation, building demolition and removal of underground storage tanks that would potentially expose workers and the public to contaminated soils, dust, soil gases and other hazards. The Mission Bay FSEIR also noted the potential for construction dust-related effects on the aquatic and terrestrial environment. In addition, the FSEIR indicated that construction activities that would have the potential to affect groundwater, including pile driving activities (to potentially contaminate deeper groundwater zones), trenching activities (to result in potential horizontal migration of contaminants in groundwater and soil vapor), and construction dewatering (to potentially influence localized groundwater gradients and spread contaminated groundwater, particularly in and near the area discussed above that was identified with the petroleum free product on the groundwater).

The Mission Bay FSEIR Contaminated Soil and Groundwater section included Mitigation Measures J.1a through J.1k requiring preparation of a Risk Management Plan or Plans (RMP) incorporating specific measures that would provide for the management of risks associated with exposure to contaminated soil and groundwater and would be protective of human health and the aquatic environment. The Mission Bay FSEIR specified that the human health standard to be applied to the Mission Bay plan, as approved by the San Francisco Bay Regional Water Quality Control Board (RWQCB), would be a cumulative cancer risk of 10 in 1 million and a Hazard Index of 1 for non-cancer risks. Mitigation identified in the Mission Bay FSEIR specified minimum parameters to be included in the RMP for the addressing contaminated soils and groundwater prior to and during construction of individual development projects. The mitigation also provided measures for enforcement of the RMP. The Mission Bay FSEIR concluded that implementation of the RMP under the regulatory oversight, jurisdiction, and responsibility of the RWQCB would ensure any effects associated with contaminated soils and groundwater would be less than significant.

Mission Bay Plan Contaminated Soil and Groundwater — Long-Term Occupancy (Post Development) Effects

The 1997 ENVIRON investigation summarized in the Mission Bay FSEIR Contaminated Soil and Groundwater impact section included a quantitative human health and ecological risk assessment to evaluate potential effects on human and aquatic populations upon plan completion. The risk evaluation showed that the potential risks posed by residual contaminants would remain after plan completion would be below applicable human health and aquatic ecological risk criteria. The Mission Bay FSEIR indicated that currently exposed soils would be covered by proposed buildings, pavement, or with open space areas using approved fill materials, that would create a protective barrier, or cap, between residual contaminants in soil and human or ecological populations and required establishment and maintenance of this cap as mitigation. Additional mitigation addressed the re-use of soil and prohibited the use of

shallow groundwater for domestic, industrial, or irrigation purposes unless found acceptable using established risk assessment methodology.

The FSEIR also noted that deed restrictions required for each property within the Mission Bay plan area would place limits on future uses within Mission Bay consistent with the provisions of the RMP, and accordingly, property owners would be required to comply with applicable provisions of the RMP. These proposed RMP measures were included as Mitigation Measures J.1l through J.1o in the Mission Bay FSEIR.

The FSEIR also provided Mitigation Measure J.2 requiring the RMP to include a process for investigating sites proposed for school or child-care center uses within the Mission Bay plan area to ensure these facilities would be properly sited. The Mission Bay FSEIR concluded that the implementation of the RMP would ensure any potential post-development effects on human and aquatic populations would remain less than significant.

Mission Bay Emergency Response

The Mission Bay FSEIR Seismicity impacts section discussed impacts related to exposure of the concentrated population within the Mission Bay plan area to seismic hazards. Although the Mission Bay FSEIR noted that new fire station proposed at that time in Mission Bay South would improve emergency response to the area, the FSEIR also indicated potential difficulties in providing emergency access to the Mission Bay South plan area in the event of a major earthquake. This was determined to be a potentially significant impact. The FSEIR concluded that impacts associated with emergency access in the event of a major earthquake would be less than significant with implementation of Mitigation Measures H.1, H.2, H.3b, and H.5 requiring the project sponsor to store heavy construction equipment capable of negotiating roads damaged by an earthquake, coordinate emergency response plans with the City, and prepare a project-specific emergency response plan, and construct a new fire station.

The Mission Bay FSEIR Health and Safety impacts section also described the potential for a catastrophic event (e.g., an earthquake) to result in accidents involving hazardous materials and causing fires or explosions, requiring emergency response. The Mission Bay FSEIR Health and Safety impacts section determined that with mitigation identified in the FSEIR Seismicity section requiring preparation and implementation of comprehensive emergency preparedness and emergency response plan for the entire Mission Bay plan area, potential impacts to the public from hazardous materials accidents during a catastrophic event would be less than significant.

Mission Bay Plan Interim/Temporary Stormwater Collection Facility Safety Risks

The Mission Bay FSEIR Community Services and Utilities impacts section reported that interim detention basins would be created within the Mission Bay plan area to allow for temporary surface storage of rainwater associated with interim uses within Mission Bay (e.g., paved parking areas). The Mission Bay FSEIR indicated that construction of fencing around any interim detention basins, included as part of the Mission Bay plan and specified in Mitigation Measure M.4 would prevent potential safety impacts associated with humans entering the detention basins.

Impact Evaluation

Risk of Upset

Impact HZ-1: The project could create a significant hazard through routine transport, use, or disposal of hazardous materials or result in a substantial risk of upset involving the release of hazardous materials. (Less than Significant with Mitigation)

Transport, Use, and Disposal of Hazardous Materials

During operation, the proposed event center and other development would use common types of hazardous materials, such as cleaners, disinfectants, and chemical agents required to maintain the sanitation of the public use areas as well as the commercial bathrooms and food preparation areas. These commercial products are labeled to inform users of potential risks and to instruct them in appropriate handling procedures. In addition, the project anticipates installing on-site generators to provide a source of electricity in the event of an outage. These generators would require diesel for operation. Operations may also result in the production of minor amounts of hazardous waste associated with maintenance and cleaning that would require offsite disposition such as disposal or recycling.

As discussed above, the Mission Bay FSEIR Health and Safety impacts section concluded that legally required health and safety measures would adequately address most common health and safety issues related to the use, disposal, and accidental release of common hazardous materials. In San Francisco, the specific regulatory requirements are specified in Articles 21 and 22 of the San Francisco Health Code which provide for the safe handling of hazardous materials and waste in the City. These articles are implemented by the San Francisco Department of Public Health (DPH), which also implements the requirements of state and federal hazardous materials regulations. In accordance with Article 21, any facility that handles hazardous materials in excess of specified quantities would be required to obtain a Certificate of Registration from the DPH and to implement a Hazardous Materials Business Plan (HMBP) that includes inventories, a program for reducing the use of hazardous materials and generation of hazardous wastes, site layouts, a program and implementation plan for training all new employees and annual training for all employees, and emergency response procedures and plans. The proposed event center and individual site uses may also elect to participate in the San Francisco Green Business Program which would promote a reduction in the use of hazardous materials. Article 22 authorizes the DPH to implement the state hazardous waste regulations, including authority to conduct inspections and document compliance. Similarly, the transport of hazardous materials and wastes would be subject to the legal requirements discussed above and in the Mission Bay FSEIR.

As discussed in the Mission Bay FSEIR, use of highly toxic materials, referred to as regulated substances, would be subject to the federal and state Accidental Release Programs. None of the materials anticipated to be used at the arena and other developments would be classified as regulated substances under these programs. However, in the event that regulated substances could be needed for use at the event center (such as refrigerants or other chemicals to support the ice rink), a Risk Management Plan, specifying operational strategies to prevent a release and emergency procedures to be address a release should one occur, would be required in accordance with the California Accidental Release Program as implemented through Article 21A of the San Francisco Health Code as discussed in the FSEIR (this is different than the risk management plan for exposure to hazardous materials in soil and groundwater discussed below in

Impact HZ-2). In addition, none of the materials used would be classified as radioactive, and regulations pertaining to the management of these materials would not apply.

At this time, it is not known specifically what uses might occupy the proposed office development, and the possibility of uses that would handle biohazardous materials cannot be precluded. Thus, as identified in the Mission Bay FSEIR, in the event that there could be future activities that handle biohazardous materials, implementation of FSEIR Mitigation Measures I.1, I.2, and I.3 would reduce potential health and safety impacts to less than significant.

As also discussed above, the Mission Bay FSEIR concluded that the generation of household hazardous wastes from residential uses implemented under the Mission Bay Plan would be less than significant with implementation of appropriate City programs. However, this impact would not apply to the proposed project because it does not include any residential uses.

Implementation of the requirements of Articles 21, 21a and 22 also include implementation of emergency response procedures which would specify methods to prevent a release of hazardous materials, and control a release if one were to occur; this would ensure that impacts related to risk of upset involving a release of hazardous materials would be less than significant.

Given that the project would be required to implement all measures in compliance with all applicable hazardous materials and hazardous waste regulations, operation of the project would not result in any new significant impacts, or increase the severity of previously identified impacts related to the routine use, transport, and disposal of hazardous materials during operation. No new or different mitigation measures are required. With implementation of measures specified in the Mission Bay FSEIR, impacts associated with the routine transport, use, or disposal of hazardous materials or associated with risk of upset involving the release of hazardous materials would be less than significant.

Mitigation Measure M-HZ-1a. Guidelines for Handling Biohazardous Materials

Mission Bay FSEIR Mitigation Measure I.1. Require businesses that handle biohazardous materials and do not receive federal funding to certify that they follow the guidelines published by the National Research Council and the United States Department of Health and Human Services Public Health Service, National Institutes of Health, and Centers for Disease Control, as set forth in Biosafety in Microbiological and Biomedical Laboratories, Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines), and Guide for the Care and Use of Laboratory Animals, or their successors, as applicable.

Mission Bay FSEIR Mitigation Measure I.2. Require businesses handling biohazardous materials to certify that they use high efficiency particulate air (HEPA) filters or substantially equivalent devices on all exhaust from Biosafety Level 3 laboratories unless they demonstrate that exhaust from their Biosafety Level 3 laboratories would not pose substantial health or safety hazards to the public or the environment. Require such businesses to certify that they inspect or monitor the filters regularly to ensure proper functioning.

Mission Bay FSEIR Mitigation Measure I.3. Require businesses handling biohazardous materials to certify that they do not handle or use biohazardous materials requiring Biosafety Level 4

containment (i.e., dangerous or exotic materials that pose high risks of life-threatening diseases or aerosol-transmitted infections, or unknown risks of transmission) in the Project Area.

Safety Hazards Associated with Stormwater Detention Basins

As discussed above, the Mission Bay FSEIR Community Services and Utilities impacts section reported that interim detention basins constructed within the Mission Bay plan area to allow for temporary surface storage of rainwater associated with interim uses would present a safety hazard. The FSEIR included mitigation requiring construction of fencing around any interim detention basins. However, there would be no interim stormwater detention ponds constructed on the site under the proposed project. Therefore this impact would not be applicable to the proposed project, and the project would not result in any new or more severe impacts relative to those analyzed in the Mission Bay FSEIR. Mitigation Measure M.4 does not apply to the project, and no new or different mitigation measures are required.

Risk of Upset Involving Exposure to Naturally Occurring Asbestos

Naturally occurring asbestos was identified as a Toxic Air Contaminant (TAC) in 1986 by the California Air Resources Board (CARB) and is present in many parts of California. It is commonly associated with serpentine⁶⁶ and ultramafic⁶⁷ rock types such as Franciscan Complex mélange. Chrysotile (a form of asbestos from the serpentine mineral group) and amphibole asbestos (including crocidolite) are naturally occurring asbestos minerals that may present a human health hazard, if they become airborne.

The Mission Bay FEIR and FSEIR did not specifically address impacts associated with exposure to naturally occurring asbestos during construction of development projects under the Mission Bay Plan. However, the preliminary geotechnical evaluation completed for the project notes that the artificial fill at the site contains cobble and boulder sized pieces of serpentinite.⁶⁸ Therefore, if naturally occurring asbestos is present in the serpentinite within the artificial fill to be excavated, the workers and the public could be exposed to naturally occurring asbestos during excavation activities.

In 2001, the CARB adopted the Asbestos Airborne Toxic Control Measure (Asbestos ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations in areas of serpentine and other ultramafic rocks (17 CCR Section 93105), which became effective in July 2002. The ATCM protects public health and the environment by requiring the use of best available dust mitigation measures to prevent off-site migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock, serpentine, or asbestos. The Bay Area Air Quality Management District (BAAQMD) implements the regulation.

⁶⁶ Serpentinite is a rock consisting of one or more serpentine minerals formed when ultramafic rocks have been metamorphosed (ultramafic rocks are formed in high-temperature environments well below the surface of the earth), and is commonly associated with ultramafic rock along faults such as the San Andreas fault. Serpentinite commonly contains chrysotile, an asbestiform variety of the serpentine minerals. Amphibole asbestos is also found in some forms of Franciscan Complex bedrock such as blueschist.

⁶⁷ Ultramafic rocks are one type of igneous rock (formed at high temperatures well below the surface of the earth) that is rich in iron and magnesium.

⁶⁸ Langan Treadwell Rollo, 2014. *Preliminary Geotechnical Investigation, Block 29-32 Mission Bay, San Francisco, California*. March 28.

For construction activities that would disturb more than 1 acre of land such as the proposed project, construction contractors are required to prepare an asbestos dust mitigation plan specifying measures that will be taken to ensure that no visible dust crosses the property boundary during construction. The asbestos dust mitigation plan must be submitted to and approved by the BAAQMD prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust mitigation measures throughout the construction project. In addition, the BAAQMD may require air monitoring for off-site migration of asbestos dust during construction activities and may change the plan on the basis of the air monitoring results. Title 17 CCR Section 93105(h)(9) defines asbestos containing material as any material that has an asbestos content of 0.25 percent or greater.

While there is a well-established regulatory framework for managing naturally occurring asbestos during construction, this impact would be potentially significant because no sampling has been conducted to establish the asbestos content in the fill materials that would be excavated during construction. This impact would be reduced to a less-than-significant level with implementation of Mitigation Measure M-HZ-1b, identified in this Initial Study, requiring the project sponsor to implement a geologic investigation to assess the naturally occurring asbestos content of the fill materials. This mitigation also requires the project sponsor to implement the requirements of the asbestos ATCM, including implementation of a Dust Mitigation Plan for naturally-occurring asbestos, if the investigation determines that the asbestos content of the fill is 0.25 percent or greater. Implementation of this measure would ensure that if naturally occurring asbestos is present, no visible dust crosses the project boundaries, and could also require air monitoring to demonstrate compliance with this criterion if deemed necessary by the BAAQMD. Rock containing naturally occurring asbestos that would be disposed of off-site would not be considered a hazardous waste under California regulations.⁶⁹

Mitigation Measure M-HZ-1b: Geologic Investigation and Dust Mitigation Plan for Naturally Occurring Asbestos

The project sponsor shall conduct a geologic investigation in accordance with the guidelines of the California Geologic Survey⁷⁰ to determine the naturally occurring asbestos content of fill materials to be excavated at the project site. If the investigation determines that the naturally occurring asbestos content of the fill materials is 0.25 percent or greater, the project sponsor or its construction contractor shall submit the appropriate notification forms and prepare an asbestos dust mitigation plan in accordance with the Asbestos ATCM. The plan shall specify measures that will be taken to ensure that no visible dust crosses the property boundary during construction. The plan must specify the following measures:

- Prevent and control visible track-out from the property
- Ensure adequate wetting or covering of active storage piles
- Control disturbed surface areas and storage piles that would remain inactive for 7 days

⁶⁹ Department of Toxic Substances Control, 2000. *Letter to Jon A. Morgan, Director, Environmental Management Department, County of El Dorado. Naturally Occurring Asbestos*. January 20.

⁷⁰ California Geologic Survey, 2002. *Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California. Special Publication 124*.

- Control traffic on on-site unpaved roads, parking lots, and staging areas, including a maximum vehicle speed of 15 miles per hour
- Control earthmoving activities
- Control offsite transport of dust emissions that contain naturally-occurring asbestos-containing materials
- Stabilize disturbed areas following construction

The asbestos dust mitigation plan shall be submitted to and approved by the Bay Area Air Quality Management District (BAAQMD) prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust mitigation measures throughout the construction project. In addition, if required by the BAAQMD, the project sponsor or a qualified third party consultant shall conduct air monitoring for offsite migration of asbestos dust during construction activities and shall modify the dust mitigation plan on the basis of the air monitoring results if necessary.

Implementation of Mitigation Measure M-HZ-1b, above, would reduce impacts associated with potential exposure to naturally occurring asbestos during construction to less than significant.

Contaminated Soil and Groundwater

Impact HZ-2: The project would be located on a site identified on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Excavation could also require the handling of potentially contaminated soil and groundwater, potentially exposing workers and the public to hazardous materials, or resulting in a release into the environment during construction. (Less than Significant with Mitigation)

As discussed above, the Mission Bay FSEIR Contaminated Soil and Groundwater setting section states that Blocks 29-32 were historically used for a variety of industrial and commercial uses. A Phase I Environmental Site Assessment⁷¹ conducted in support of the proposed project also notes specific former uses on the site (between 1902 and 2010) included bulk fuel storage and distribution; railroad operations; a machine shop; boiler house; steel mill; well casing manufacturer; warehousing, shipping and receiving operations for a variety of products; fruit cannery, junk yards, vehicle parking and maintenance facilities and a ready-mix concrete facility.

As summarized in the Mission Bay FSEIR, a 1997 investigation conducted to evaluate soil and groundwater quality throughout the Mission Bay plan area identified petroleum hydrocarbons in soil, groundwater, and floating on groundwater (petroleum free product) in the vicinity of Illinois and 16th Streets (including within Blocks 31 and 32), and attributed the free product to former petroleum bulk storage as well as pipelines and transfer facilities in the vicinity. This area is collectively referred to as the Pier 64 area. As summarized in the FSEIR, the concentrations of contaminants in soil or groundwater in the Mission Bay

⁷¹ Langan Treadwell Rollo, 2014. Updated Phase I Environmental Site Assessment, Site X, Mission Bay Blocks 29-32, San Francisco, California. April 11.

plan area, with the exception of the identified petroleum free product area, did not present a human health or ecological risk under existing conditions.

Actions Completed Since Publication of the Mission Bay FSEIR

Risk Management Plan. Subsequent to publication of the Mission Bay FSEIR, a RMP was prepared and approved by the RWQCB in 1999 to address risk management measures to be implemented prior to development, during development (during construction), after development of specific parcels within the Mission Bay plan area.⁷² All risk management measures in the RMP are deemed to be protective of human health and the environment under the conditions specific to each phase of development.

Measures to be implemented prior to development are intended to manage risks associated with exposed soil before a site is developed and are protective of populations at and adjacent to the undeveloped parcel. Measures to be implemented during development are intended to manage risks during construction and are protective of construction site workers and the surrounding public. They include dust control measures, soil management protocols, stormwater pollution plan requirements, worker health and safety planning requirements, contingency requirements in the event that previously unidentified underground structures or contamination are identified, protocols for dewatering activities, and a framework for complying with the requirements of Article 20 of the San Francisco Health Code, commonly referred to as the Maher Ordinance (note that this ordinance was subsequently revised in 2013, and is now codified in Article 22A of the San Francisco Health Code). Several of the measures apply specifically to the free product area where the project site is located; these measures are intended to control the release and migration of free product during project construction.

Risk management measures to be implemented after development are intended to manage risks to site occupants and ensure that they would have no contact with site soils and groundwater as well as risks to maintenance and utility workers that may contact soil left in place during their normal work activities. They include covering of exposed areas; limiting future residential development within the Mission Bay plan area to preclude single family homes with private front or back yards; restricting the future use of groundwater for domestic, industrial, or irrigation purposes; providing protocols for future subsurface activities; and implementing a long-term groundwater monitoring program.

In addition, the RMP specifies the process to ensure regulatory oversight of development activities within the Mission Bay plan area. Owners must specifically notify the RWQCB in advance of initiating construction and must also submit a dust monitoring notification to the RWQCB and DPH. In addition, the owner must document compliance with specified measures to the RWQCB and must also notify the RWQCB of any unanticipated structures or contamination encountered during construction, as well as any unanticipated environmental conditions not covered by the RMP. The owner must also submit quarterly reports to the RWQCB during construction and a completion letter once construction is complete.

As stated in the RMP, completion of this RMP satisfies the requirements of Mission Bay FSEIR Mitigation Measure J.1 and provides guidelines for implementing Mitigation Measure J.2, described above. The requirements of the RMP are enforced through an environmental covenant recorded against each parcel in

⁷² Environ Corporation, 1999. *Risk Management Plan, Mission Bay Area, San Francisco, California*. May 11.

the Mission Bay plan area. The environmental covenant requires compliance with the RMP and runs with the property, binding future site owners to also comply with the requirements of the RMP.

Site Investigations and Remediation, and Regulatory Actions. As summarized in the Phase I Environmental Site Assessment completed for the project, the RWQCB adopted Order No. R2-2005-0028 in 2005 which established cleanup requirements for the Pier 64 area. The order divided the Pier 64 area into six operable units; portions of the Blocks 29-32 are located within the "North Terminal Operable Unit." The site has been subject to several site investigations, underground tank removals, and remedial actions to address contaminants in the soil and groundwater prior to and pursuant to this order. As reported in the Phase I Environmental Site Assessment, the underground storage tank removals and remedial actions completed include:

Removal of a 13,500 gallon diesel underground storage tank from Block 31 in 1987 and a 1,000 gallon gasoline underground storage tank from Block 32 in 1997. These underground storage tanks were located with the area of the free petroleum product plume and free product in this area was removed during the remediation conducted in 2005 (discussed below);

Removal of a 4,000 gallon diesel underground storage tank, a 10,000 gallon underground tank, and a 5,000 gallon gasoline underground storage tank occurred in 1995. These tanks were located in portions of Blocks 29 and 31 that are outside of the North Terminal Operable Unit. Localized soil and groundwater affected by petroleum hydrocarbons were addressed at the time of tank removal. These tanks were removed under the oversight and authority of the DPH Local Oversight Program and RWQCB, and case closure was granted in February 1995.

The Phase I soil remediation conducted in 2001 included the removal of approximately 14,020 tons of visibly stained soil to a depth of approximately 2 feet below the groundwater table (a total depth of approximately 9 feet below ground surface) as well as petroleum pipelines encountered during excavation. During this remediation, free petroleum product accumulated on the groundwater surface was removed from the excavated area, and the excavation was backfilled.

The Phase II remediation conducted in 2005 which included demolition of the existing site structures and removal of approximately 90,000 tons of soil containing petroleum hydrocarbons from the North Terminal Operable Unit and adjacent areas. This excavation also extended to approximately two feet below the groundwater table, or nine feet below ground surface. During this remediation, free petroleum product accumulated on the groundwater surface was removed from the excavated area, and the excavation was backfilled. The revised RMP (described below) indicates that the site was not returned to original grade at this time, but that it would be the property owner's responsibility.

On December 22, 2006, the RWQCB issued a no further action letter stating that no further soil remediation was required. With completion of the above activities, and based on the results of a groundwater monitoring program required by the RWQCB, twenty groundwater monitoring wells installed in the Pier 64 area as part of the groundwater monitoring program were properly abandoned in June, 2013.

A Revised Risk Management Plan (RRMP) was prepared in 2006 in accordance with Order R2-2005-028 to reflect remedial actions conducted within the Pier 64 area in 2001 and 2005.⁷³ The RRMP determined that based on completion of the above described remedial actions, the risk management measures required prior to development no longer applied to the North Terminal Operable Unit where the proposed project is located. All of the RMP risk management measures applicable during development and after development would still apply, with the exception of those measures specific to development in the free product area (because the previous remediations in the North Terminal Operable Unit successfully removed from product within this area).

As stated in the RRMP, Catellus (the then owner of the North Terminal Operable Unit) and the City and County of San Francisco each recorded a Covenant and Environmental Restriction (deed restriction) on the property that, among other things, required property owners to comply with the terms of the Mission Bay RMP. Because this Covenant and Environmental Restriction will run with the property as discussed in the RMP, future site owners (including the project sponsor) will be subject to the requirements of the RMP. In 2014, the RWQCB issued order R2-2014-022 rescinding Order R2-2005-2008 because the above-described remediations and groundwater monitoring satisfied the requirements of that order. Order R2-2014-022 states that any residual contamination in the Pier 64 area poses acceptable risks to human health and the environment and can be effectively managed using the existing Mission Bay RMP.

While the completion of remedial actions described above would be considered substantial changes that have occurred at the project site, implementation of these actions has effectively removed free petroleum products in the Pier 64 area and reduced risks to human health and the environment in this area compared to conditions described in the FSEIR. With implementation of the Mission Bay RMP, prepared in accordance with Mission Bay FSEIR Mitigation Measure J.1, human health and environmental health risks would remain within acceptable levels, and the proposed project would not result in new or more severe impacts relative to the Mission Bay FSEIR.

Preparation of the Mission Bay RMP satisfies the requirements of Mission Bay FSEIR Mitigation Measure J.1; therefore this mitigation does not apply to the proposed project. In addition, compliance with the RMP as required by the deed restriction would ensure that human health and environmental risks during and after development of the proposed project would be within acceptable levels and no new or different mitigation would be required.

As stated above, the RWQCB has determined that the Mission Bay RMP, completed in accordance with Mission Bay FSEIR Mitigation Measure J.1, adequately addresses human health and environmental risks during and after development of the proposed project. Therefore, Mitigation Measure J.1, already implemented, adequately addresses impacts associated with contaminated soil and groundwater. Compliance with the RMP, as required by the deed restriction, would ensure that human health and environmental risks during and after development of the proposed project would be within acceptable levels and no new or different mitigation would be required. Furthermore, in the event that child care facilities were to occur under the proposed project, implementation of FSEIR Mitigation Measure J.2 would reduce this impact to less than significant.

⁷³ BBL Environmental Services, Inc., 2006. *Revised Risk Management Plan, Former Petroleum Terminals and Related Pipelines Located at Pier 64 and Vicinity, City and County of San Francisco, California*. August.

Mitigation Measure M-HZ-2: RMP Provisions for Child Care Facilities

Mission Bay FSEIR Mitigation Measure J.2. Carry out a site-specific risk evaluation for each site in a non-residential area proposed to be used for a public school or child care facility; submit to RWQCB for review and approval. If cancer risks exceed 1×10^{-5} and/or noncancer risk exceeds a Hazard Index of 1, carry out remediation designed to reduce risks to meet these standards or select another site that is shown to meet these standards.

Emergency Response

Impact HZ-3: The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan or expose people or structures to a significant risk of loss, injury or death involving fires. (Less than Significant)

The proposed project would increase the number of employees and visitors in the Mission Bay South area. There would be an additional 2,728 new full-time equivalent (FTE) employees associated with the team operations and event center management, retail and office uses, and additional 1,000 day-of-game staff during a game/event at the event center. Depending on the game/event up to 18,500 patrons could be attendance at the event center, and there would be additional visitors associated with the retail uses. The project employees and visitors could contribute to congestion if an emergency evacuation of the Mission Bay plan area were required. As discussed above, the Mission Bay FSEIR Seismicity impact section concluded that with implementation of mitigation requiring the project sponsor to store heavy construction equipment capable of negotiating roads damaged by an earthquake, coordinate emergency response plans with the City, prepare a project-specific emergency response plan, and construct a new fire station, impacts associated with emergency access in the event of a major earthquake would be less than significant.

Section 12.202(e)(1) of the San Francisco Fire Code currently requires that all owners of high-rise buildings (taller than 75 feet), such as the event center and office buildings, “shall establish or cause to be established procedures to be followed in case of fire or other emergencies. All such procedures shall be reviewed and approved by the chief of division.” Additionally, project construction would have to conform to the provisions of the Building Code and Fire Code, which require additional life-safety protections for high-rise buildings and the final building plans for the new facilities would be reviewed by the San Francisco Fire Department (as well as DBI) to ensure conformance with the applicable provisions, including development of an emergency procedure manual and an exit drill plan. This regulatory requirement fulfills the intent of Mitigation Measure H.3b.

Although not “adopted” by legislative action, the City has a published Emergency Response Plan dated 2009 and prepared by the Department of Emergency Management as part of the City’s Emergency Management Program.⁷⁴ This plan includes plans for hazard mitigation and disaster preparedness and recovery, and identifies hazards to which San Francisco is particularly susceptible such as earthquake, hurricane, tsunami, flood, winter storm, and act of terrorism, including use of chemical, biological, radiological, nuclear, and explosive weapons. The Emergency Response Plan complies with several relevant

⁷⁴ San Francisco Department of Emergency Management, City and County of San Francisco Emergency Response Plan, December 2010. Available at: <http://www.sfdem.org/Modules/ShowDocument.aspx?documentid=1154>. Reviewed September 9, 2011.

state and federal directives for emergency planning, including the California Standardized Emergency Management System and the Incident Command System. The Plan includes sections on operations, including management and procedures; staffing, operations, and logistics regarding the City's emergency operations center; and mutual aid involving other agencies. The Emergency Response Plan assigns responsibilities for disaster planning, operations (including fire and rescue, law enforcement, human services, infrastructure, transportation, communications, and community support), and logistics, as well as finance and administration, to City agencies and departments. The Emergency Response Plan also identifies volunteer agencies, such as the American Red Cross, that are integral to disaster response efforts.

The Emergency Response Plan contains 16 "annexes" (similar to appendices), consistent with a federally established framework, that cover topics including firefighting, public works and engineering, mass casualty care, and earthquakes, among numerous others. The Earthquake Annex, in particular, sets forth planning assumptions for a series of earthquakes of varying magnitudes on different faults, and sets forth procedures for assessment of damage and injuries, and operational response and strategies in the event of a major earthquake.

Implementation of the project would increase the number of on-site employees and also the number of visitors that would be subject to a potential disaster, including a major earthquake or any of the other hazards identified in the Emergency Response Plan. However, in the event of such a disaster, implementation of the San Francisco Emergency Response Plan, prepared in 2008 (subsequent to publication of the Mission Bay FSEIR) would ensure that adequate city resources are available for response. Implementation of the site-specific emergency response plan required under the Fire Code, and life safety requirements of the Building and Fire Codes as described above would ensure that the proposed project would not obstruct implementation of the City's Emergency Response Plan, nor would it necessarily interfere with emergency evacuation planning. Preparation of the Emergency Response Plan, and implementation of these regulatory requirements fulfill the intent of Mission Bay FSEIR Mitigation Measures H.1 and H.2, therefore these measures do not apply to the proposed project.

In addition, the project site is located adjacent to Third Street, a primary evacuation route identified in the Emergency Response Plan. In addition, Terry A. François Boulevard is a designated Tsunami Evacuation Route. Project construction could interfere with implementation of the Emergency Response Plan if construction activities restricted access for emergency response vehicles or evacuating vehicles. However, any construction activities that could restrict access would be of a temporary nature. The Construction Management Plan required as part of the San Francisco Municipal Transportation Agency's Transportation Advisory Staff Committee would address localized construction effects (such as increased traffic and the need for coordination with emergency response providers) prior to construction. The plan would include measures to minimize construction-related disruptions and would be reviewed by the multi-agency Transportation Advisory Staff Committee. Due to the short duration of disruption and required coordination and review of the project's construction management plan, construction would not likely interfere with the Emergency Response Plan. Issues related to long-term emergency access will be discussed in the SEIR under the Transportation section.

Although not discussed in the Mission Bay FSEIR, the project would be constructed in a developed area of San Francisco, which lacks an "urban-wildland interface" and where fire, medical, and police services are available and provided. The street grid provides ample access for emergency responders and egress for

event attendees and workers, and the proposed project would neither directly nor indirectly alter that situation. Therefore, the proposed project would not directly or indirectly result in the additional exposure of persons to fire risk.

Construction of the new Public Safety Building at Third Street and Mission Rock was completed in the summer of 2014, and satisfies the requirements of Mission Bay FSEIR Mitigation Measure H.5. Therefore, this mitigation measure is no longer applicable to the proposed project.

As discussed above, implementation of the city's Emergency Response Plan, the site-specific emergency response plan required under the Fire Code, and life safety requirements of the Building and Fire Codes would ensure that the proposed project would not obstruct implementation of the City's Emergency Response Plan, nor would it necessarily interfere with emergency evacuation. These regulatory requirements fulfill the requirements of mitigation specified in the Mission Bay FSEIR for this impact, and no additional mitigation is required.

Cumulative Impacts

Impact C-HZ-1: The project, in combination with past, present, and reasonably foreseeable future projects in the site vicinity, would not result in a considerable contribution to cumulative impacts related to hazardous materials. (Less than Significant)

Hazardous materials impacts related to implementation of the proposed project could result from use of hazardous materials (Impact HZ-1), excavation within materials containing naturally occurring asbestos (Impact HZ-1), and conducting construction activities within potentially contaminated soil and groundwater and subsequent use of the site (Impact HZ-2). These impacts would be primarily restricted to the project site and immediate vicinity; therefore, the geographic scope for cumulative impacts related to hazards includes the project site and immediate vicinity.

As discussed above, the project would not result in any significant impacts with respect to hazards or hazardous materials that could not be mitigated to a less-than-significant level. All cumulative development in San Francisco would be subject to the same regulatory framework as would the project for the transport use, and storage of hazardous materials (Impact HZ-1) and compliance with these existing regulations would serve to minimize any cumulative impacts.

The project could result in exposure to naturally occurring asbestos during construction (Impact HZ-1), and cumulative projects in the area could also encounter these materials potentially resulting in a significant cumulative impact. However, implementation of Mitigation Measure M-HZ-1a requiring a geologic investigation, and compliance with the Asbestos ATCM would ensure that the project's contribution to this cumulative impact is less than significant with mitigation.

With implementation of the RMP for the entire Mission Bay Plan area, cumulative impacts related to soil and groundwater contamination would be less than significant as discussed in Impact HZ-2. Similarly, other projects within the Plan area would be required to investigate and, as necessary, abate soil and groundwater contamination on a project-by-project basis in accordance with Article 22A of the San Francisco Health Code. Therefore, cumulative impacts related to soil and groundwater contamination would be less than significant.

The Mission Bay FSEIR concluded that the effort to address cumulative hazardous waste generation and disposal impacts related to large quantity hazardous waste generators would require additional commitment of federal, State, and other local agencies. Therefore, efforts to offset the plan contribution to cumulative hazardous waste generation and disposal effects may not be successful, resulting in a residual impact that may be significant and unavoidable. However, as discussed in impact HZ-1, the project would only generate small quantities of hazardous wastes associated with maintenance and cleaning. Therefore, the project would not have a cumulatively considerable contribution to this cumulative impact, such that there would be no new or substantially more severe impact than what was identified in the Mission Bay FSEIR.

Issues related to long term emergency access will be discussed in the SEIR under the Transportation section.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
17. MINERAL AND ENERGY RESOURCES—Would the project:				
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The Mission Bay FSEIR did not specifically address potential impacts of the Mission Bay plan on mineral resources. However, the project site at Blocks 29-32 does not contain any known mineral resources delineated in the San Francisco General Plan or any other land use plans and does not include mineral resources that are of value to the region and the residents of the state.⁷⁵ Therefore, criteria E.17(a) and E.17(b) do not apply to the proposed project, and these topics are not discussed further in this Initial Study or in the SEIR.

Summary of Energy Resource Impacts in Mission Bay FSEIR

The Mission Bay FSEIR Initial Study Energy/Natural Resources section estimated that existing operational energy consumption within Mission Bay in 1998 was approximately 160 billion Btu⁷⁶ annually for electricity and natural gas sources, and approximately 420 billion Btu annually for transportation sources.

⁷⁵ California Department of Conservation, Division of Mines and Geology, 1996. Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Zone, Open File Report 96-03.

⁷⁶ Electric energy is usually measured in kilowatt hours (kWh), and natural gas in million cubic feet (MMcf). Both may be converted to British thermal units (Btu); 1 Btu is the quantity of heat necessary to raise the temperature of 1 pound of water 1 degree Fahrenheit.

The Mission Bay FSEIR Initial Study estimated that at buildout, operational energy consumption from the Mission Bay plan would be about 2,109 billion Btu annually for electricity and natural gas sources, and 3,212 billion Btu annually for transportation sources. However, impacts associated with this increase in energy use were considered less than significant because compliance with Title 24 Energy Conservation Standards would ensure that electricity and natural gas would not be used in a wasteful manner. The Mission Bay FSEIR Initial Study Energy/Natural Resources section estimated that construction of projects under the Mission Bay plan would consume approximately 20,645 billion Btu. As such, the Mission Bay FSEIR identified no significant impacts to energy resources from the Mission Bay plan, and accordingly, did not require any mitigation measures related to energy resources.

The Mission Bay FSEIR Community Services and Utilities impacts section estimated the Mission Bay plan would require approximately 2.9 million gallons per day (mgd) of water at build-out. The FSEIR specified water conservation measures, proposed as part of the plan and included as Mitigation Measures M.2a through M.2f that would ensure that the effects of plan implementation on water supply would remain less than significant.

Impact Evaluation

Energy and Water Use

Impact ME-1: The project would not result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner. (Less than Significant)

Construction Energy

As discussed above, the Mission Bay FSEIR Initial Study Energy/Natural Resources section estimated that the construction of development projects under the Mission Bay Plan would use approximately 20,645 billion Btu of energy. Construction of the event center and other proposed developments would also require the use of fuel, energy, and water. The FSEIR did not estimate energy consumption specific to the development of proposed on Blocks 29-32 or the amount of water that would be used during construction. However, the amount of these resources used for construction of the proposed project would be typical of a normal construction project in San Francisco, and energy consumption would be expected to be commensurate with the percentage of development at this site relative to total development under the Plan. Therefore, as indicated in the FSEIR, the use of these resources during construction would not be wasteful, and impacts related to the use of energy resources during construction would be less than significant. No new mitigation would be required.

Operational Energy and Water Resources

Fuels. As stated above, the Mission Bay FSEIR estimated that at full build out of the Mission Bay plan, fuel usage for transportation would be 3,212 billion Btu, approximately 8 times greater than the use of fuels at the time of FSEIR publication. The amount of fuel use attributable to development on Blocks 29-32 was not specifically calculated in the FSEIR.

The project could contribute to the estimated increase in the use of transportation fuels by introducing new event attendees, employees, and site visitors to the project site. However, as described in the Project

Description, the event center and other proposed developments will be served by multiple public transportation opportunities; Terry A. François Boulevard would be realigned and reconfigured to include a two-way bicycle route; the project would ensure access to bicycle parking and incorporate alternative transportation facilities. With these features, the event attendees, employees, and site visitors would be encouraged to use public transportation or use alternative transportation methods. Should one travel in a personal vehicle, the use of low emission and fuel efficient vehicles would be encouraged by providing designated parking spots in the parking garage in accordance with Section 5.103.1.10 of the San Francisco Green Building Code. Therefore, the project would not result in the wasteful use of transportation fuels and this impact would be less than significant. No new mitigation is necessary.

Energy. The Mission Bay FSEIR did not estimate energy consumption specific to the development proposed on Blocks 29-32, but concluded that compliance with Title 24 Energy Conservation Standards would ensure that the area-wide 13 fold increase in energy use at full build out in the Mission Bay plan area would not result in a wasteful use of energy.

The proposed event center and other proposed developments would require the use of energy for purposes such as lighting, heating, cooling, ventilation, food storage and preparation, and equipment operation. Subsequent to publication of the Mission Bay FSEIR, San Francisco adopted its own green building code, implementing the California Green Building Code and California Building Energy Efficiency Standards, with amendments. Accordingly, the design of the buildings would need to meet or exceed the energy efficiency requirements of the 2013 San Francisco Green Building Code which, at a minimum, would require compliance with the 2013 California Building Energy Efficiency Standards. In accordance with the San Francisco Green Building Code, the project would be designed to Leadership in Energy and Environmental Design (LEED) Gold standards, including provision of either some on-site renewable energy or purchase of green energy credits. Alternatively, the project could exceed the energy efficiency requirements specified in the 2013 California Building Energy Efficiency Standards by 10 percent. In addition, in accordance with the San Francisco Green Building Code, the project sponsor would be required to commission the building's energy systems and components to verify that they meet the energy code requirements.

As described in the Project Description, the project would use a campus approach for LEED certification. This approach treats the entire site as a shared campus, allowing several LEED credits to be pre-approved under a campus site application and then referenced by each individual or group of buildings located on the site. The arena would pursue LEED for New Construction certification as an individual building, while the mixed-use development would pursue LEED for Core and Shell certification as a group project. Some examples of energy conservation measures that could be addressed in the building designs include sustainable building envelope strategies; shading; plug load reduction such as occupancy and daylight sensors; VAV demand control ventilation systems; water-cooled chillers, variable speed pumps, and airside/waterside economizers.

No new mitigation measures or alternatives are required because, as for the Mission Bay FSEIR, compliance with Title 24 regulations and now the San Francisco Green Building Code would ensure that the proposed project would not use energy in a wasteful manner.

Water. As discussed above, the Mission Bay FSEIR Community Services and Utilities impacts section estimated the Mission Bay plan would require approximately 2.9 million gallons per day (mgd) of water at build-out and specified water conservation measures, proposed as part of the plan and included as mitigation, that would ensure that the effects of plan implementation on water supply would remain less than significant. Implementation of these measures would also ensure that water used under Mission Bay plan would not be used in a wasteful manner.

The proposed project would require the indoor use of water for toilet flushing and other sanitary needs, food preparation, and other indoor activities. However, the project would be required to comply with the water conservation measures specified in the 2013 California Green Building Code. Further, in accordance with the 2013 San Francisco Green Building Code, the project sponsor would be required to incorporate plumbing fixtures and fixture fittings to reduce the amount of potable water used by 30 percent. If and when a supply of recycled water becomes available through the Eastside Recycled Water Project⁷⁷ the project would also use recycled water for non-potable uses.

For outdoor water use (landscape irrigation), the project sponsor would be required to use climate-appropriate plants and submit the required landscape documentation to the SFPUC in accordance with the San Francisco Water Efficient Irrigation Ordinance and the San Francisco Green Landscaping Ordinance. Installation of weather- or soil moisture-based irrigation controllers that would automatically adjust irrigation in response to changes in plants' needs as weather conditions change would also be required.

Compliance with the above standards would ensure that water is not used wastefully during operation of the event center and other proposed developments, and would in effect implement FSEIR Mitigation Measures M.2a through M.2f. Therefore, impacts related to wasteful use of water would be less than significant and FSEIR Mitigation Measures M.2a through M.2f are no longer required for the proposed project. No new mitigation measures are required.

Cumulative Impacts

Impact C-ME-1: The project, in combination with other past, present, and reasonably foreseeable future projects, would not result in significant adverse cumulative impacts on energy resources. (Less than Significant)

The proposed project would use fuel, energy, and water. Although other projects in the region would also use these resources, cumulative impacts would be less than significant because all of the regional projects, including the proposed project, would be required to comply with the California Green Building Standards Code and Building Energy Efficiency Standards at a minimum. Furthermore, many of the regional projects would also be subject to local green building requirements such as those of the City and County of San Francisco, which must be as stringent as the state requirements and are often more stringent. These building codes encourage sustainable construction and operational practices related to planning and design,

⁷⁷ The SFPUC plans to provide 2 million gallons per day of high quality recycled water to the customers in the east side of the City through the Eastside Recycled Water Project for non-potable uses such as irrigation and toilet flushing. This project is still in the planning stages, and the implementation date is uncertain.

energy efficiency, water efficiency, and conservation. Therefore, cumulative impacts related to wasteful use of fuel, energy, and water resources would be less than significant.

Topics:	<i>Potentially Significant Effects Not Identified in Prior EIR</i>	<i>Potentially Substantial Increase in Severity of Significant Impact Identified in Prior EIR</i>	<i>Sponsor Declines to Adopt Feasible Mitigation Measures or Alternatives</i>	<i>No New or More Severe Significant Effects</i>
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18. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

—Would the project

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The Mission Bay FSEIR did not specifically address potential impacts of the Mission Bay plan on agriculture and forest resources. However, the project site at Blocks 29-32 does not contain any prime farmland, unique farmland, farmland of statewide importance, forest, or timberlands; does not support agricultural or timber uses; is not zoned for agricultural or timber uses; and is not under a Williamson Act contract. Therefore, none of the agriculture and forest resources significance criteria are applicable to the proposed project, and these topics are not discussed further in this Initial Study or in the SEIR.

F. MITIGATION MEASURES

This section lists the mitigation measures identified in this Initial Study. Implementation of these measures would mitigate significant project environmental impacts, and/or considerable project contribution to cumulative environmental impacts such that all corresponding impacts would be reduced to less than significant. The listed mitigation measures include those measures originally identified in the Mission Bay FSEIR that are applicable to the proposed project, as well as certain new mitigation measures identified in this Initial Study to reduce potential impacts to less than significant. Mitigation measures are numbered to correspond to the Initial Study impact number, with a cross reference to the impact numbering system from the Mission Bay FSEIR where appropriate.

It should also be noted that certain mitigation measures identified in the Mission Bay FSEIR are no longer applicable to the proposed project, as described in Section E above; those measures are not listed in this section. For those topics and impact areas to be analyzed in the SEIR, additional mitigation measures will be identified in the SEIR as needed.

Mitigation Measure M-CP-2a: Archaeological Testing, Monitoring and/or Data Recovery Program

Based on a reasonable presumption that archaeological resources may be present within the project site, the following measures shall be undertaken to avoid any potentially significant adverse effect from the proposed project on buried or submerged historical resources. The project sponsor shall retain the services of an archaeological consultant approved by OCII or its designated representative such as those from the rotational Department Qualified Archaeological Consultants List (QACL) maintained by the Planning Department archaeologist. The project sponsor shall contact the Department archaeologist to obtain the names and contact information for the next three archaeological consultants on the QACL. The archaeological consultant shall undertake an archaeological testing program as specified herein. In addition, the consultant shall be available to conduct an archaeological monitoring and/or data recovery program if required pursuant to this measure. The archaeological consultant's work shall be conducted in accordance with this measure at the direction of OCII or its designated representative. All plans and reports prepared by the consultant as specified herein shall be submitted first and directly to OCII or its designated representative for review and comment, and shall be considered draft reports subject to revision until final approval by OCII or its designated representative. Archaeological monitoring and/or data recovery programs required by this measure could suspend construction of the project for up to a maximum of four weeks. At the direction of the OCII or its designated representative, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce to a less than significant level potential effects on a significant archaeological resource as defined in CEQA Guidelines Sect. 15064.5 (a)(c).

Consultation with Descendant Communities: On discovery of an archaeological site⁷⁸ associated with descendant Native Americans, the Overseas Chinese, or other descendant group an appropriate

⁷⁸ By the term "archaeological site" is intended here to minimally include any archaeological deposit, feature, burial, or evidence of burial.

representative⁷⁹ of the descendant group and OCII or its designated representative shall be contacted. The representative of the descendant group shall be given the opportunity to monitor archaeological field investigations of the site and to consult with OCII or its designated representative regarding appropriate archaeological treatment of the site, of recovered data from the site, and, if applicable, any interpretative treatment of the associated archaeological site. A copy of the Final Archaeological Resources Report shall be provided to the representative of the descendant group.

Archaeological Testing Program. The archaeological consultant shall prepare and submit to OCII or its designated representative for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of archaeological resources and to identify and to evaluate whether any archaeological resource encountered on the site constitutes an historical resource under CEQA.

At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings to OCII or its designated representative. If based on the archaeological testing program the archaeological consultant finds that significant archaeological resources may be present, OCII or its designated representative in consultation with the archaeological consultant shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. No archaeological data recovery shall be undertaken without the prior approval of OCII or its designated representative. If OCII or its designated representative determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, at the discretion of the project sponsor either:

- A. The proposed project shall be re-designed so as to avoid any adverse effect on the significant archaeological resource; or
- B. A data recovery program shall be implemented, unless OCII or its designated representative determines that the archaeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

Archaeological Monitoring Program. If OCII or its designated representative in consultation with the archaeological consultant determines that an archaeological monitoring program shall be implemented the archaeological monitoring program shall minimally include the following provisions:

⁷⁹ An "appropriate representative" of the descendant group is here defined to mean, in the case of Native Americans, any individual listed in the current Native American Contact List for the City and County of San Francisco maintained by the California Native American Heritage Commission and in the case of the Overseas Chinese, the Chinese Historical Society of America. An appropriate representative of other descendant groups should be determined in consultation with the Department archaeologist.

- The archaeological consultant, project sponsor, and OCII or its designated representative shall meet and consult on the scope of the AMP reasonably prior to any project-related soils disturbing activities commencing. OCII or its designated representative in consultation with the archaeological consultant shall determine what project activities shall be archaeologically monitored. In most cases, any soils- disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), site remediation, etc., shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context;
- The archeological consultant shall advise all project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;
- The archaeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archaeological consultant and OCII or its designated representative until OCII or its designated representative has, in consultation with project archaeological consultant, determined that project construction activities could have no effects on significant archaeological deposits;
- The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;
- If an intact archaeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The archaeological monitor shall be empowered to temporarily redirect demolition/excavation/pile driving/ construction activities and equipment until the deposit is evaluated. If in the case of pile driving activity (foundation, shoring, etc.), the archaeological monitor has cause to believe that the pile driving activity may affect an archaeological resource, the pile driving activity shall be terminated until an appropriate evaluation of the resource has been made in consultation with OCII or its designated representative. The archaeological consultant shall immediately notify the OCII or its designated representative of the encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to OCII or its designated representative.

Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the OCII or its designated representative.

Archaeological Data Recovery Program. The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan (ADRP). The archaeological consultant, project sponsor, and OCII or its designated representative shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to OCII or its designated representative. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected

by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical.

The scope of the ADRP shall include the following elements:

- *Field Methods and Procedures.* Descriptions of proposed field strategies, procedures, and operations.
- *Cataloguing and Laboratory Analysis.* Description of selected cataloguing system and artifact analysis procedures.
- *Discard and Deaccession Policy.* Description of and rationale for field and post-field discard and deaccession policies.
- *Interpretive Program.* Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.
- *Security Measures.* Recommended security measures to protect the archaeological resource from vandalism, looting, and non-intentionally damaging activities.
- *Final Report.* Description of proposed report format and distribution of results.
- *Curation.* Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects. The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The archaeological consultant, project sponsor, OCII or its designated representative, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Final Archaeological Resources Report. The archeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to OCII or its designated representative that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Once approved by OCII or its designated representative, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and OCII or its designated representative shall receive a copy of the transmittal of the FARR to the NWIC. As requested by OCII, the Environmental Planning division of the Planning Department shall receive one bound, one unbound and one unlocked, searchable PDF copy on CD

of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, OCII or its designated representative may require a different final report content, format, and distribution than that presented above.

Mitigation Measure M-CP-2b: Accidental Discovery of Archaeological Resources (Implementing FSEIR Mitigation D.6)

The following mitigation measure is required to avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in *CEQA Guidelines* Section 15064.5(a)(c). The project sponsor shall distribute the Planning Department archaeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, supervisory personnel, etc. The project sponsor shall provide OCII officer or its designated representative with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) confirming that all field personnel have received copies of the Alert Sheet.

Should any indication of an archaeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify OCII officer or its designated representative and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until OCII officer or its designated representative has determined what additional measures should be undertaken.

If OCII officer or its designated representative determines that an archaeological resource may be present within the project site, the project sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archaeological consultant shall advise OCII officer or its designated representative as to whether the discovery is an archaeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archaeological resource is present, the archaeological consultant shall identify and evaluate the archaeological resource. The archaeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, OCII officer or its designated representative may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archaeological resource; an archaeological monitoring program; or an archaeological testing program. If an archaeological monitoring program or archaeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. OCII officer or its designated representative may also require that the project sponsor immediately implement a site security program if the archaeological resource is at risk from vandalism, looting, or other damaging actions.

The project archaeological consultant shall submit a Final Archaeological Resources Report (FARR) to OCII officer or its designated representative that evaluates the historical significance of any

discovered archaeological resource and describing the archaeological and historical research methods employed in the archaeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to OCII officer or its designated representative for review and approval. Once approved by OCII officer or its designated representative, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and OCII officer or its designated representative shall receive a copy of the transmittal of the FARR to the NWIC. OCII and the Environmental Planning division of the Planning Department shall each receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, OCII officer or its designated representative may require a different final report content, format, and distribution than that presented above.

Mitigation Measure M-BI-4a: Preconstruction Surveys for Nesting Birds

To the extent practicable, vegetation removal and grading of the site in advance of new site construction shall be performed between September 1 and January 31 in order to avoid breeding and nesting season for birds. If these activities cannot be performed during this period, a preconstruction survey of onsite vegetation for nesting birds shall be conducted by a qualified biologist.

In coordination with the OCII or its designated representative, pre-construction surveys of onsite vegetation shall be performed during bird breeding season (February 1 – August 31) no more than 14 days prior to vegetation removal, grading, or initiation of construction in order to locate any active passerine nests within 250 feet of the project site and any active raptor nests within 500 feet of the project site. Surveys shall be performed in accessible areas within 500 feet of the project site and include suitable habitat within line of sight as access is available. If active nests are found on either the project site or within the 500-foot survey buffer surrounding the project site, no-work buffer zones shall be established around the nests. Buffer distances will consider physical and visual barriers between the active nest and project activities, existing noise sources and disturbance, as well as sensitivity of the bird species to disturbance. Modification of standard buffer distances, 250 feet for active passerine nests and 500 feet for active raptor nests, will be determined by a qualified biologist in consultation with the California Department of Fish and Wildlife (CDFW). No vegetation removal or ground-disturbing activities including grading or new construction shall occur within a buffer zone until young have fledged or the nest is otherwise abandoned as determined by the qualified biologist.

If construction work during the nesting season stops for 14 days or more and then resumes, then nesting bird surveys shall be repeated, to ensure that no new birds have begun nesting in the area.

Mitigation Measure M-BI-4b: Bird Safe Building Practices

The project sponsor shall design and implement the project consistent with the San Francisco *Standards for Bird-Safe Buildings* and Planning Code Section 139, as approved by OCII. OCII shall consult with the Planning Department and the Zoning Administrator concerning project consistency with Planning Code Section 139.

Mitigation Measure M-HZ-1a. Guidelines for Handling Biohazardous Materials

Mission Bay FSEIR Mitigation Measure I.1. Require businesses that handle biohazardous materials and do not receive federal funding to certify that they follow the guidelines published by the National Research Council and the United States Department of Health and Human Services Public Health Service, National Institutes of Health, and Centers for Disease Control, as set forth in Biosafety in Microbiological and Biomedical Laboratories, Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines), and Guide for the Care and Use of Laboratory Animals, or their successors, as applicable.

Mission Bay FSEIR Mitigation Measure I.2. Require businesses handling biohazardous materials to certify that they use high efficiency particulate air (HEPA) filters or substantially equivalent devices on all exhaust from Biosafety Level 3 laboratories unless they demonstrate that exhaust from their Biosafety Level 3 laboratories would not pose substantial health or safety hazards to the public or the environment. Require such businesses to certify that they inspect or monitor the filters regularly to ensure proper functioning.

Mission Bay FSEIR Mitigation Measure I.3. Require businesses handling biohazardous materials to certify that they do not handle or use biohazardous materials requiring Biosafety Level 4 containment (i.e., dangerous or exotic materials that pose high risks of life-threatening diseases or aerosol-transmitted infections, or unknown risks of transmission) in the Project Area.

Mitigation Measure M-HZ-1b: Geologic Investigation and Dust Mitigation Plan for Naturally Occurring Asbestos

The project sponsor shall conduct a geologic investigation in accordance with the guidelines of the California Geologic Survey⁸⁰ to determine the naturally occurring asbestos content of fill materials to be excavated at the project site. If the investigation determines that the naturally occurring asbestos content of the fill materials is 0.25 percent or greater, the project sponsor or its construction contractor shall submit the appropriate notification forms and prepare an asbestos dust mitigation plan in accordance with the Asbestos ATCM. The plan shall specify measures that will be taken to ensure that no visible dust crosses the property boundary during construction. The plan must specify the following measures:

- Prevent and control visible track-out from the property
- Ensure adequate wetting or covering of active storage piles
- Control disturbed surface areas and storage piles that would remain inactive for 7 days
- Control traffic on on-site unpaved roads, parking lots, and staging areas, including a maximum vehicle speed of 15 miles per hour
- Control earthmoving activities
- Control offsite transport of dust emissions that contain naturally-occurring asbestos-containing materials

⁸⁰ California Geologic Survey, 2002. *Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California. Special Publication 124.*

- Stabilize disturbed areas following construction

Mitigation Measure M-HZ-2: RMP Provisions for Child Care Facilities

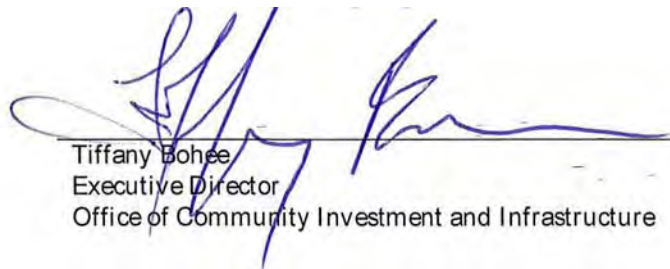
Mission Bay FSEIR Mitigation Measure J.2. Carry out a site-specific risk evaluation for each site in a non-residential area proposed to be used for a public school or child care facility; submit to RWQCB for review and approval. If cancer risks exceed 1×10^{-5} and/or noncancer risk exceeds a Hazard Index of 1, carry out remediation designed to reduce risks to meet these standards or select another site that is shown to meet these standards.

C. DETERMINATION

On the basis of this Initial Study:

- I find that the proposed project COULD NOT have a new or substantially more severe significant effect on the environment than identified in the Mission Bay FSEIR, and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed project could have a new or substantially more severe significant effect on the environment than identified in the Mission Bay FSEIR, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a new or substantially more severe significant effect on the environment than identified in the Mission Bay FSEIR, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a “potentially new or substantially more severe significant impact” or “potentially new or substantially more severe significant unless mitigated” impact on the environment than identified in the Mission Bay FSEIR, 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. A SUBSEQUENT 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 new or substantially more severe significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

11-17-14
Date


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APPENDIX A

Special Status Species Tables

TABLE 1
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Species Listed or Proposed for Listing					
Presidio Manzanita <i>Arctostaphylos montana</i> ssp. <i>ravenii</i>	FE	CE	1B.1	Open, rocky, serpentine slopes in chaparral, coastal scrub, and coastal prairie. February – March	Absent. No suitable habitat present.
Marsh sandwort <i>Arenaria paludicola</i>	FE	CE	1B.1	Freshwater or brackish marshes and swamps. May – August	Low. No suitable habitat present.
Presidio clarkia <i>Clarkia franciscana</i>	FE	CE	1B.1	Serpentine outcrops in coastal scrub, and valley and foothill grassland. May – July	Low. No suitable habitat present.
Beach layia <i>Layia carnosa</i>	FE	CE	1B.1	Sand dunes. March – July	Low. No suitable habitat present.
San Francisco lessingia <i>Lessingia germanorum</i>	FE	CE	1B.1	Coastal scrub, sandy soils free of competing species. July – November	Low. No suitable habitat present.
White rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE	CE	1B.1	Open, dry, rocky slopes and grassy areas, usually on serpentine. March – May	Low. No suitable habitat present.
Marin western flax <i>Hesperolinon congestum</i>	FT	CT	1B.1	Chaparral and grassland, usually on serpentine barrens. April – July	Low. No suitable habitat present.
California seablite <i>Suaeda californica</i>	FE	--	1B.1	Coastal Salt Marsh, wetland-riaprian July - October	Low. Documented occurrences south of the proposed project at Pier 94 and India Basin. Suitable habitat not present within the project site.
Franciscan manzanita <i>Arctostaphylos franciscana</i>	FE	--	1B.1	Open, rocky, serpentine outcrops in chaparral. February – April	Absent. No suitable habitat present. This species was believed to be extinct in the wild (although still extant through cultivation), but was rediscovered in Presidio National Park in late 2009.
Robust spineflower <i>Chorizanthe robusta</i> var. <i>robusta</i>	FE	--	1B.1	Sandy or gravelly coastal dunes, coastal scrub, cismontane woodland and maritime chaparral. April – September	Low. No suitable habitat present.
Showy rancheria clover <i>Trifolium amoenum</i>	FE	--	1B.1	Valley grassland, wetland riparian April - June	Low. No suitable habitat present. No local records documented in San Francisco.

TABLE 1 (Continued)
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EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Species Listed or Proposed for Listing (cont.)					
San Bruno Mountain manzanita <i>Arctostaphylos imbricata</i>	--	CE	1B.1	Chaparral and coastal scrub, usually on sandstone outcrops. February – May	Absent. No suitable habitat present.
Pacific manzanita <i>Arctostaphylos pacifica</i>	--	CE	1B.2	Coastal scrub and chaparral. February – April	Absent. No suitable habitat present.
San Francisco popcorn- flower <i>Plagiobothrys diffusus</i>	--	CE	1B.1	Coastal prairie, and valley and foothill grasslands. March – June	Low. No suitable habitat present.
Federal Species of Concern or State Species of Special Concern					
Adobe sanicle <i>Sanicula maritima</i>	--	Rare	1B.1	Moist clay or ultramafic soil in chaparral, coastal prairie, meadows, seeps, and valley and foothill grassland. February – May	Low. No suitable habitat present.
Hairless popcorn-flower <i>Plagiobothrys glaber</i>	--	--	1A	Coastal salt marshes and alkaline meadows. March – May	Low. No suitable habitat present.
coast lilly <i>Lilium maritimum</i>	--	--	1B.1	Coastal Prairie, mixed evergreen forest, northern coastal scrub, closed-cone pine forest, north coastal coniferous forest, wetland-riparian May – August	Low. No suitable habitat present.
Northern curly-leaved mondarella <i>Mondarella sinuata</i> ssp. <i>Nigrescens</i>	--	--	1B.2	Coastal strand, chaparral May - July	Low. No suitable habitat present.
Blue coast gilia <i>Gilia capitata</i> spp. <i>chamissonis</i>	--	--	1B.1	Coastal dunes and scrub. April – July	Low. No suitable habitat present. Extant population is present within the Presidio of San Francisco.
Kellogg's horkelia <i>Horkelia cuneata</i> ssp. <i>sericea</i>	--	--	1B.1	Coastal scrub, dunes, and openings of closed-cone coniferous forests. February – July	Low. No suitable habitat present.
Rose leptosiphon <i>Leptosiphon rosaceus</i>	--	--	1B.1	Coastal bluff scrub. April – July	Low. No suitable habitat present.
Fragrant fritillary <i>Fritillaria liliacea</i>	--	--	1B.2	On clay, often serpentine derived soils in coastal scrub, grassland, and coastal prairie. February – April	Low. No suitable habitat present. Extant population located at Twin Peaks.

TABLE 1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Bent-flowered fiddleneck <i>Amsinckia lunaris</i>	--	--	1B.2	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland. March – June	Low. No suitable habitat present.
Montara manzanita <i>Arctostaphylos montaraensis</i>	--	--	1B.2	Slopes and ridges in chaparral and coastal scrub. January – March	Absent. No suitable habitat present.
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	--	--	1B.2	Alkali flats, flooded grassland, playas and vernal pools. March – June	Low. No suitable habitat present; species presumed extirpated in San Francisco.
Pappose tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	--	--	1B.2	Chaparral, coastal prairie, meadows, seeps, coastal salt marshes and swamps, and vernal mesic, often alkaline, valley and foothill grasslands. May – November	Low. No suitable habitat present.
Franciscan thistle <i>Cirsium andrewsii</i>	--	--	1B.2	Coastal bluff scrub, coastal prairie, coastal mesic scrub, and broadleaf upland forest; sometimes on serpentine. March – July	Low. No suitable habitat present.
San Francisco Bay spineflower <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	--	--	1B.2	Coastal scrub, dunes and grassland. April – July	Low. No suitable habitat present.
Point Reyes bird's-beak <i>Chloropyron maritimum</i> ssp. <i>palustre</i>	--	--	1B.2	Coastal salt marshes and swamps. June – October	Low. No suitable habitat present.
Compact cobwebby thistle <i>Cirsium occidentale</i> var. <i>compactum</i>	--	--	1B.2	Coastal scrub, grassland, and dunes. April – June	Low. No suitable habitat present.
Round-headed Chinese-houses <i>Collinsia corymbosa</i>	--	--	1B.2	Coastal dunes and coastal prairie. April – June	Low. No suitable habitat present; species has not been seen in San Francisco for more than 100 years.
San Francisco collinsia <i>Collinsia multicolor</i>	--	--	1B.2	On humus-covered soil derived from mudstone in closed-cone coniferous forest, coastal scrub. March – May	Low. No suitable habitat present.
Dark-eyed gilia <i>Gilia millefoliata</i>	--	--	1B.2	Coastal dunes. April – July	Low. No suitable habitat present; species potentially extirpated in San Francisco.

TABLE 1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Diablo helianthella <i>Helianthella castanea</i>	--	--	1B.2	On rocky soils in broadleaf upland forest, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. March – June	Absent. No suitable habitat present.
White seaside tarplant <i>Hemizonia congesta</i> ssp. <i>congesta</i>	--	--	1B.2	Grassy valleys and hills, often on fallow fields in coastal scrub. April – November	Low. No suitable habitat present.
Short-leaved evax <i>Hesperovax sparsiflora</i> var. <i>brevifolia</i>	--	--	1B.2	Sandy bluffs and flats in coastal scrub and coastal dunes. March – June	Low. No suitable habitat present.
Arcuate bush mallow <i>Malacothamnus arcuatus</i>	--	--	1B.2	Gravelly alluvium in chaparral and cismontane woodland. April – September	Absent. No suitable habitat present.
Marsh microseris <i>Microseris paludosa</i>	--	--	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. August – June	Low. No suitable habitat present.
Choris's popcorn-flower <i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	--	--	1B.2	Mesic sites in chaparral, coastal scrub, and coastal prairie. March – June	Low. No suitable habitat present.
San Francisco champion <i>Silene verecunda</i> ssp. <i>verecunda</i>	--	--	1B.2	Mudstone, shale, or serpentine substrates in coastal scrub, coastal prairie, chaparral and valley and foothill grassland. March – June	Low. No suitable habitat present.
Santa Cruz microseris <i>Stebbinsoseris decipiens</i>	--	--	1B.2	On sandstone, shale or serpentine derived seaward facing slopes in broadleaf upland forest, closed-cone coniferous forest, chaparral, coastal prairie, and coastal scrub. April – May	Low. No suitable habitat present.
Coastal triquetrella <i>Triquetrella californica</i>	--	--	1B.2	On shaded soil, rocks sand or gravel in dry or moist conditions or in coastal bluff and coastal scrub.	Low. No suitable habitat present.
San Francisco owl's clover <i>Triphysaria floribunda</i>	--	--	1B.2	Grasslands. April – June	Low. No suitable habitat present.
Bristly sedge <i>Carex comosa</i>	--	--	2B.1	Lake margins, marshes, swamps, coastal prairie, and valley and foothill grasslands. May – September	Absent. No suitable habitat present.

TABLE 1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Oregon polemonium <i>Polemonium carneum</i>	--	--	2B.2	Coastal prairie, coastal scrub, lower montane coniferous forest. April – September	Low. No suitable habitat present.
San Francisco gumplant <i>Grindelia hirsutula</i> var. <i>maritima</i>	--	--	3.2	On sandy or serpentine slopes of sea bluffs in coastal scrub, or valley and foothill grasslands. June – September	Absent. No suitable habitat present.

NOTES:

The "Potential for Effect" category is defined as follows:

High = Species is expected to occur and habitat meets species requirements.

Moderate = Habitat is only marginally suitable or is suitable but not within species geographic range.

Low = Habitat does not meet species requirements as currently understood in the scientific community.

STATUS CODES:

Federal:

FE = Listed as "endangered" under the federal Endangered Species Act

FT = Listed as "threatened" under the federal Endangered Species Act

FSC = NOAA Fisheries designated "species of concern"

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CFP = California Department of Fish and Wildlife designated "fully protected"

SC = California Department of Fish and Wildlife designated "candidate threatened"

WL = California Department of Fish and Wildlife designated "watch list"

3503.5 = Eggs, Nests, and Nestlings Protected under section 3503.5 of the California Department of Fish and Game Code

* = California special animal

California Rare Plant Rank:

List 1A = Plants presumed extirpated in California and either rare or extinct elsewhere

List 1B = Plants rare, threatened, or endangered in California and elsewhere

List 2A = Plants presumed extirpated in California, but more common elsewhere

List 2B = Plants rare, threatened, or endangered in California, but more common elsewhere

List 3 = Plants about which we need more information--a review list

List 4 = Plants of limited distribution--a watch list

SOURCE: USFWS (2014), CDFW (2014), CNPS (2014).

TABLE 2
SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Invertebrates				
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	FE	--	Coastal scrub on rocky outcrops with broadleaf stonecrop (<i>Sedum spathulifolium</i>)	Low. No suitable habitat present. Three known populations at San Bruno Mountain, Montara, and Pacifica.
Bay checkerspot butterfly <i>Euphydryas editha bayensis</i>	FT	--	Serpentine grasslands.	Low. No suitable habitat present.
Mission blue butterfly <i>Plebejus icarioides missionensis</i>	FE	--	Grassland with <i>Lupinus albifrons</i> , <i>L. Formosa</i> , and <i>L. varicolor</i> .	Low. Closest suitable habitat present at Twin Peaks. Species unlikely to occur at the project site.
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE	--	Found in native grasslands with <i>Viola pedunculata</i> as larval food plant.	Low. No suitable habitat present.
Monarch butterfly <i>Danaus plexippus</i>	--	*	Eucalyptus groves (wintering sites).	Low. No suitable habitat present though may occur on a transient basis. Several records of this species wintering in eucalyptus groves within San Francisco including Golden Gate Park, the Presidion, Fort Mason, and Telegraph Hill.
Tomales isopod <i>Caecuditea tomalensis</i>	--	--	Still-to slow-moving water in vegetated ponds, preferably spring-fed.	Low. No suitable habitat present.
Reptiles and Amphibians				
Western pond turtle <i>Emys marmorata</i>	--	CSC	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Low. No suitable habitat present.
San Francisco garter snake <i>Thamnophis sirtalis tetrataenia</i>	FE	SE	Densely vegetated ponds near open hillsides with abundant small mammal burrows.	Absent. Species is considered likely extirpated from San Francisco.
California red-legged frog <i>Rana draytonii</i>	FT	CSC	Freshwater ponds and slow streams with emergent vegetation for egg attachment.	Low. No suitable habitat present.
Birds				
California clapper rail <i>Rallus longirostris obsoletus</i>	FE	CE	Salt marsh wetlands along the San Francisco Bay.	Low. No suitable habitat present.
Bank swallow <i>Riparia riparia</i> (nesting)	--	CT	Vertical banks and cliffs with sandy soil, near water. Nests in holes dug in cliffs and river banks.	Low. No suitable habitat present.
Yellow warbler <i>Dendroica petechia brewsteri</i>	--	CSC	Nests in dense riparian cover and montane chaparral. Breeding distribution includes the coast ranges and western slopes of the Sierra Nevada. Rare to uncommon in lowland areas.	Low. No suitable riparian habitat present.

TABLE 2 (Continued)
SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name <i>Scientific Name</i>	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Birds (cont.)				
California black rail <i>Laterallus jamaicensis coturniculus</i>	--	CT	Salt and brackish marshes; also in freshwater marshes at low elevations.	Low. No suitable habitat present.
Salt marsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	--	CSC	Forages in various marsh, riparian and upland habitats. Nests on or near the ground in concealed locations.	Low. No suitable riparian habitat present.
Alameda song sparrow <i>Melospiza melodia pusillula</i>	--	CSC	Salt marshes of eastern and south San Francisco Bay.	Low. No suitable habitat present.
San Pablo song sparrow <i>Melospiza melodia samuelis</i>	--	CSC	Salt marshes of eastern and north San Francisco Bay.	Low. No suitable habitat present.
Peregrine falcon <i>Falco peregrinus</i>	FD	FP	Woodlands, coastal habitats, riparian areas, coastal and inland waters, human made structures that may be used as nest or temporary perch sites.	Low. May forage over the project area though proposed project site does not provide nesting habitat.
Double-crested cormorant <i>Phalacrocorax auritus</i>	--	WL, 3503.5	Coastal areas and inland lakes in fresh, saline, and estuarine waters.	Low. No suitable nesting habitat present at the proposed project site though colonies are known to nest on the Bay Bridge. Species may occur in adjacent Bay waters or over the project site on a transient basis.
Cooper's hawk <i>Accipiter cooperii</i>	--	3503.5	Nests in riparian areas and oak woodlands, forages at woodland edges.	Low. No suitable habitat present.
Sharp-shinned hawk <i>Accipiter striatus</i>	--	3503.5	Nests in riparian areas and oak woodlands, forages in open areas	Low. No suitable habitat present.
Great horned owl <i>Bubo virginianus</i>	--	3503.5	Riparian, coniferous, chaparral and desert habitats.	Low. No suitable habitat present.
Red-tailed hawk <i>Buteo jamaicensis</i>	--	3503.5	Found in nearly all habitats and elevations.	Low. No suitable habitat present. May occur over the project on a transient basis.
Red-shouldered hawk <i>Buteo lineatus</i>	--	3503.5	Riparian woodlands with swamps and emergent wetlands.	Low. No suitable habitat present.
American kestrel <i>Falco sparverius</i>	--	3503.5	Frequents generally open grasslands, pastures, and fields; primarily a cavity nester.	Low. No suitable habitat present. May occur over the project on a transient basis.
Osprey <i>Pandion haliaetus</i>	--	3503.5	Habitat varies greatly and usually includes adequate supply of accessible fish, shallow waters, open and elevated nest sites (10-60 feet in height), and artificial structures such as towers. Builds large platform stick nests near or in open waters such as lakes, estuaries, bays, reservoirs, and within the surf zone.	Low. No suitable habitat is present. May forage in adjacent waters. Project site does not provide suitable nesting habitat.
Great blue heron <i>Ardea herodias</i>	--	3503.5	Shallow estuaries and fresh and saline emergent wetlands.	Low. May forage in standing water of the onsite basin.
American goldfinch <i>Carduelis tristis</i>	--	3503.5	Cismontane foothills; riparian and cropland habitats.	Present. Suitable habitat is present.

TABLE 2 (Continued)
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EVENT CENTER AND MIXED-USE DEVELOPMENT AREA AT MISSION BAY BLOCKS 29-32

Common Name <i>Scientific Name</i>	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Birds (cont.)				
Barn swallow <i>Hirundo rustica</i>	--	3503.5	Open areas from coastal grassland and shrubland to mixed coniferous forests.	Moderate. Suitable habitat is present.
Mammals				
Western red bat <i>Lasiurus blossevillii</i>	--	CSC	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Low. No suitable habitat is present.
Pallid bat <i>Antrozous pallidus</i>	--	CSC	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Low. No suitable habitat is present.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	--	CSC SC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings of rocky areas with caves or tunnels. Roosting sites limited. Extremely sensitive to human disturbance.	Low. No suitable habitat is present.
American badger <i>Taxidea taxus</i>	--	CSC	Open grasslands with loose, friable soils.	Low. No suitable habitat present.
Point Reyes jumping mouse <i>Zapus trinotatus orarius</i>	--	CSC	Upland areas of bunch grass in marshes in Point Reyes.	Low. Project site is south of the known range for this species.

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* = California special animal

SOURCE: USFWS (2014), CDFW (2014), CNPS (2014).

APPENDIX TMP

Final Transportation Management Plan

Final Transportation Management Plan for the Warriors San Francisco Event Center



Prepared by:

FEHR & PEERS

332 Pine Street 4th Floor
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(415) 348-0300

May 2015

Prepared for:



Golden State Warriors Arena LLC

FINAL

Transportation Management Plan (TMP) for the
Golden State Warriors Event Center and Mixed-Use Development

Prepared for:
Golden State Warriors Arena LLC

Prepared by:

FEHR  PEERS

May 2015

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EXECUTIVE SUMMARY

The Transportation Management Plan (TMP) is a management and operating plan designed to provide multi-modal access to a range of events at the new Golden State Warriors (GSW, or Warriors) Event Center in San Francisco's Mission Bay neighborhood, and to the retail and office uses on the same development site. The purpose of the plan is to ensure safe and efficient access by promoting and facilitating the use of nearby public transit services and pedestrian and bicycle infrastructure for travel to and from the Event Center and the adjacent mixed use development, thereby reducing vehicular impacts to the Mission Bay/Dogpatch area and the adjacent neighborhoods. The plan's primary goals include a reduction to single occupancy vehicle trips to/from the site, with a maximum auto mode split of 53 percent for event attendees during weekday peak event conditions (6:00PM – 8:00 PM), and a maximum auto mode split of 59 percent for all trips during weekend peak event conditions (6:00 PM – 8:00 PM). All employees and visitors will be encouraged to utilize other means for travel to and from the site. Auto mode share goals are based on site-specific travel demand estimates being prepared as part of the project's subsequent environmental impact report (SEIR) analysis.¹

The TMP is a working document that will be expanded and refined over time by the Warriors, the City of San Francisco, and other agencies responsible for carrying out the plan. An active monitoring process will occur during the four years after the project's completion to make any necessary adjustments. It is also anticipated that subsequent refinements will be made to respond to changing circumstances, new transportation access and parking opportunities, and planned transportation improvements that are implemented in the project vicinity over time.

The TMP provides a summary of the Event Center and mixed-use development project description; event and no-event scenarios that are addressed in this document; existing transportation facilities and planned major transportation projects; travel characteristics of Event Center attendees, office workers, and retail patrons; transportation control recommendations; travel demand and communication strategies; and performance standards.

The scenarios addressed in this plan are as follows.

- Typical Day (No-Event Day)
- Convention – weekday event with approximately 9,000 attendees
- Arena Concert – evening event with approximately 14,000 attendees
- NBA Game – an evening Warriors game with 18,064 attendees
- Dual Event – NBA game or arena concert coinciding with AT&T Park event

The travel characteristic assumptions for varying scenarios at the proposed development are based on the analysis prepared concurrently for the project's draft SEIR.

¹ *Travel, Parking, and Loading Demand Estimates for the Proposed Event Center & Mixed Use Development at Mission Bay Blocks 29-32 Final Memorandum*, Advant Consulting and LCW Consulting, November 19, 2014.

Transportation control strategies that are identified in the Plan include provision of an on-site, site-specific Transportation Management Center (TMC) located in the security center in the Event Center; designation of a Parking Control Officer (PCO) director who will staff the Event Center TMC and manage game-day controls; designation of up to three in-field PCO supervisors who will roam and oversee PCO operations; the potential locations of PCOs who will direct vehicular and pedestrian traffic under various event scenarios; provision of GSW or Event Center staff to assist with wayfinding and crowd management; a coordinated partial street closure of the northbound lanes on 3rd Street (between 16th Street and Mission Bay Boulevard South) and partial closure of westbound lanes on South Street for a short period after the conclusion of peak NBA and arena concert events; and designation of curbside locations for Muni buses, Mission Bay Transportation Management Association (TMA) shuttles, other shuttle buses, charter buses, taxis, Transportation Network Companies (TNCs) (e.g., Uber, Lyft), limousines, private vehicle loading and unloading, and media trucks. The transportation control strategies also address transit boarding at the nearby Muni stations and pedestrian control at the Event Center main garage driveway access point on 16th Street.

Communication strategies that are identified in the Plan include promotion, outreach and wayfinding strategies designed to inform event attendees of the various transportation options that are available and provide directions on how to access them. This includes a description of transportation information that will be provided by the Warriors and event promoters with event ticket purchases. The wayfinding strategies include a series of signs that will be placed to facilitate circulation and access in and around the buildings on-site.

CHAPTER 1. INTRODUCTION

This introduction describes the purpose, goals, and objectives of the Transportation Management Plan (TMP) for the Golden States Warriors Event Center and Mixed-use Development Project (“Event Center Development”). It gives a project overview within the San Francisco context, including ongoing and upcoming projects that will change the transportation system in the area and may prompt adjustments to the TMP in the coming years. It then lists organizations and agencies with a stake in the project with their respective roles and responsibilities, and discusses the overall TMP implementation strategy, including coordination between stakeholders. Finally, it outlines the information contained in the remainder of the TMP.

1.1 TMP PURPOSE, GOAL, AND OBJECTIVES

The purpose of the TMP is to outline strategies to optimize access to and from the Event Center Development within the constraints inherent to a large public event. The TMP considers the travel characteristics of Event Center attendees, office workers, retail patrons, and all other visitors to the site. Its main goal is to ensure safe and efficient access for all modes with a particular focus on promoting pedestrian, bicycle, and transit access to the Event Center and adjacent mix of uses, thereby reducing vehicular impacts to the Mission Bay/Dogpatch area and nearby neighborhoods.

The objectives of the TMP are:

- To facilitate and promote safe use of non-automobile transportation by people attending and supporting Event Center events or office and retail uses on-site, and to maintain the stated maximum auto mode share of 53 percent under peak weekday event conditions (6:00 PM – 8:00 PM) and 59 percent under peak weekend event conditions (6:00 PM – 8:00 PM);
- To highlight and optimize the use of transit by both event attendees and event or daily employees;
- To facilitate and maximize bicycle use by Event Center Development event attendees and event or daily employees;
- To facilitate a high-quality walking experience to the Event Center Development from adjacent residences, employment locations, transit stations, and parking garages by identifying key walking routes and major street crossing locations, so that wayfinding can be provided and PCOs can be located at critical points to manage the interaction of pedestrians and vehicles during major events;
- To publicize the non-traditional transportation resources existing in the site vicinity, including the Mission Bay Transportation Management Association (TMA) shuttle service and pedicab ride providers;
- To maximize safety for all transportation users at key locations around the Event Center Development site and broader neighborhood during event ingress and egress;
- To ensure the safe interaction of pedestrians and cyclists traveling along South and 16th Street and vehicles accessing the Event Center Development garage entries located on South Street at Bridgeview Way and on 16th Street at Illinois Street; and
- To facilitate the safe and efficient flow of vehicle traffic into and out of the site and throughout the Mission Bay neighborhood during event and no event conditions.

The TMP is a living document and will be amended from time to time by the Golden State Warriors, in coordination with SFMTA and with input from the nearby community, as travel patterns change as a result of development and changes to the roadway infrastructure and operations. The Golden State Warriors are committed to implementation of flexible strategies to advance the goals and objectives outlined here.

1.1.1 Design Objectives

The key transportation-oriented objectives of the Event Center Development design are:

Guest Safety

- Design clear and distinct pick-up and drop-off locations for each travel mode such that zones are primarily single-purpose and potential conflict areas are minimized (i.e., transit zones to the west, bikes and cyclists to the southeast, private vehicles to the east).
- Discourage mid-block pedestrian crossings at 3rd Street, 16th Street, or Terry François Boulevard
- Create crossings that work for an all-day, all-year development; avoid creating crosswalks that only operate under PCO supervision
- Reduce conflicts between pedestrians and autos at driveways and garage entrances

Guest Convenience

- Locate guest arrival areas near building entrances and other conveniences to create visual connections to the travel mode and to augment wayfinding, including:
 - The southeast arena entrance (along Terry François Boulevard and 16th Street)
 - Office entrances on 16th Street and South Street, especially for regular TMA shuttles
 - Northwest and southwest site corners, staging areas, and pathways, especially for arrivals via bike and Muni bus or light rail
- Prioritize open pathways designed for optimal pedestrian circulation and public access
 - Maintain open access to the atrium to preserve the 16th Street/Main plaza connection
 - Highlight, through both static and dynamic wayfinding, the northwest corner and southwest corner, and the gracious and pleasant paths to and from the Main Plaza to these corners
 - Leverage the position of the Gatehouse and the decorative fencing proposed on Third Street a means to direct patrons to the northwest and southwest corners of the project and to discourage mid-block crossings of 3rd Street
- Locate drop-off and pick-up locations for a given mode in close proximity to each other for pre- and post-event scenarios to create consistency, enhance intuitiveness, and create efficient paths of travel for patrons

Synergy & Resource Intelligence

- Build a network of dynamic, up-to-the-minute transit information signage and wayfinding, both inside and outside of project buildings, to aid in the efficiency of patron arrivals and departures
- Locate the bike valet close to the Terry François Boulevard cycle track and nearby Bay Area Bike Share station(s)
- Position the bike valet in sight of the Arena's southeast Lobby building entrance
- Locate the daily TMA shuttle stop close to office lobbies

Good Neighbor Policies

- Create generous pedestrian queuing areas on-site to minimize neighborhood spillover
- Maintain local access to 4th Street and Bridgeview Way by promoting alternate pre- and post-game routes that emphasize use of 3rd Street, 7th Street, and Terry Francois Boulevard
- Access to building entries, garage entries, and sidewalk areas for daily users of the 409 and 499 Illinois buildings, the 450 South Street garage, and of the future buildings on Blocks 33-34 will not be unreasonably impeded
- Maintain access to the UCSF Mission Bay Campus and UCSF Hospitals for patients, employees, and the university community
- Maintain the site's identity as a porous, accessible, and welcoming neighborhood center

Media Requirements

- Locate media to provide for reliable satellite connections as per NBA League guidelines while providing under-ground cabling below sidewalks for the safety of pedestrians

1.2 KEY STAKEHOLDERS

Key stakeholders in the TMP and their respective roles and responsibilities are listed in **Table 1-1**.

TABLE 1-1: KEY STAKEHOLDERS, ROLES, AND RESPONSIBILITIES

Key Stakeholders	Roles and Responsibilities
Golden State Warriors (GSW)	The GSW is the project sponsor and is responsible for implementation of the TMP.
San Francisco Municipal Transportation Agency (SFMTA)	The SFMTA oversees the City’s public right-of-way (ROW) and manages all surface transportation infrastructure and systems in the City, including roads, curb space, sidewalks, bicycle lanes, parking, transit, and traffic control measures ¹ . The SFMTA also regulates taxis and enforces parking regulations. SFMTA operates San Francisco’s bus and light rail service under the Muni brand, which will provide access to the Event Center and mixed-use development. Recommendations related to physical changes to the ROW must be supported by the SFMTA and approved by OCII. The SFMTA also coordinates closely with the SFCTA on the ongoing Waterfront Transportation Assessment, which includes the Mission Bay neighborhood in its study area.
Office of Community Investment and Infrastructure (OCII)	OCII has jurisdiction over implementing any major redevelopment projects in the Mission Bay North and South Redevelopment Project Areas. OCII will act as the land use regulatory authority and the lead agency on the EIR. OCII will ensure that the project follows the Mission Bay Infrastructure Plan, which is the guiding document for remaining infrastructure improvements in the Mission Bay Area.
Caltrans	Caltrans is California’s Department of Transportation and has jurisdiction over the freeways that provide regional vehicle access to the proposed Event Center Development site.
Port of San Francisco (Port)	The Port of San Francisco (Port) has jurisdiction over San Francisco’s waterfront, including Terry François Boulevard and small portions of 16 th and South Streets at their eastern edges. ¹ This includes the provision of any new ferry terminal facilities and a cycle track facility, and jurisdiction over street parking operations in the areas noted above.
San Francisco County Transportation Authority (SFCTA)	The SFCTA serves as the Congestion Management Agency (CMA) for San Francisco County and is responsible for the ongoing Waterfront Transportation Analysis, which includes the Mission Bay neighborhood in its study area.
San Francisco Planning Department	The Planning Department is responsible for reviewing and commenting on project design, and assessing environmental impacts on the City and its residents in collaboration with the overall assessment being led by OCII
San Francisco Department of Public Works (DPW)	DPW is responsible for street maintenance and implementation of streetscape projects as part of the Mission Bay Plan, including curb ramp installations and upgrades.
San Francisco Police Department (SFPD)	SFPD is responsible for emergency response, oversight/override of traffic control plans, incident management, and coordination with SFFD and the California Highway Patrol as needed.
San Francisco Fire Department (SFFD)	SFFD provides fire suppression and emergency medical services to the residents, visitors, and workers within San Francisco.

TABLE 1-1: KEY STAKEHOLDERS, ROLES, AND RESPONSIBILITIES

Key Stakeholders	Roles and Responsibilities
Caltrain	Caltrain is a California commuter rail line connecting San Francisco to the Peninsula and Santa Clara Valley to the south. Its San Francisco terminal station is at 4 th and King Streets, approximately 2/3 mile north of the project site. The 22 nd Street Caltrain station is also located within walking distance of the Event Center Development.
Bay Area Rapid Transit (BART)	BART is a rapid transit system that serves the San Francisco Bay Area. It operates five routes with 44 stations in four counties. Downtown San Francisco is roughly the geographic center of the BART system, and its Embarcadero, Montgomery Street, Powell Street, and 16 th Street Mission stations are within approximately 1.7 to 2.1 miles of the Event Center Development. Powell Street station will be connected to the site vicinity by the Central Subway upon that project's completion in 2019.
Water Emergency Transportation Authority (WETA) ²	WETA was established by Senate Bill (SB) 976 to improve the ability of ferries to respond in an emergency and to consolidate several regional ferry services. WETA operates service to Alameda/Oakland, Harbor Bay, San Francisco, South San Francisco, and Vallejo as San Francisco Bay Ferry. WETA is exploring the potential for a ferry terminal at the foot of 16 th Street near the Event Center Development.
Golden Gate Ferry (GGF) ³	GGF operates frequent ferry service between San Francisco and Larkspur in central Marin County, and between San Francisco and Sausalito in southern Marin County. Extra service is also offered from Larkspur to AT&T Park for Giants home games and other sporting and music events.
Mission Bay Transportation Management Association (TMA)	The TMA is a non-profit organization established to maximize access and mobility to, from, and within Mission Bay by means of free shuttle operations servicing residents and employees in the area. Shuttles transport patrons primarily to key transit locations, including the Caltrain station at 4 th St. and King St. and the Powell St. BART station. The Warriors will become members of the association and provide annual contributions for the expansion of this service (including service to Blocks 29-32 and additional evening and weekend routes throughout the neighborhood).
University of California, San Francisco (UCSF)	The UCSF Mission Bay campus is located in close proximity to the Warriors' project. Campus operations include regular shuttle service between UCSF campuses across San Francisco; these shuttles are intended to serve only university personnel (faculty, staff, students, etc.). They are, however, a regular presence within the Mission Bay street network.
Community Groups	Several community groups offer consultation and feedback on the project design and operational planning to help ensure a smooth integration into the Mission Bay neighborhood. Some community groups include the Mission Bay Community Advisory Committee (CAC), San Francisco Bicycle Coalition, and others.

Notes:

1. Although the Port has jurisdiction over certain street segments in San Francisco, SFMTA still manages all aspects of surface transportation on those streets under agreement with the Port.
2. Source: <http://www.watertransit.org>
3. Source: <http://www.goldengateferry.org>

Source: Fehr & Peers, 2014.

1.3 PROJECT CONTEXT

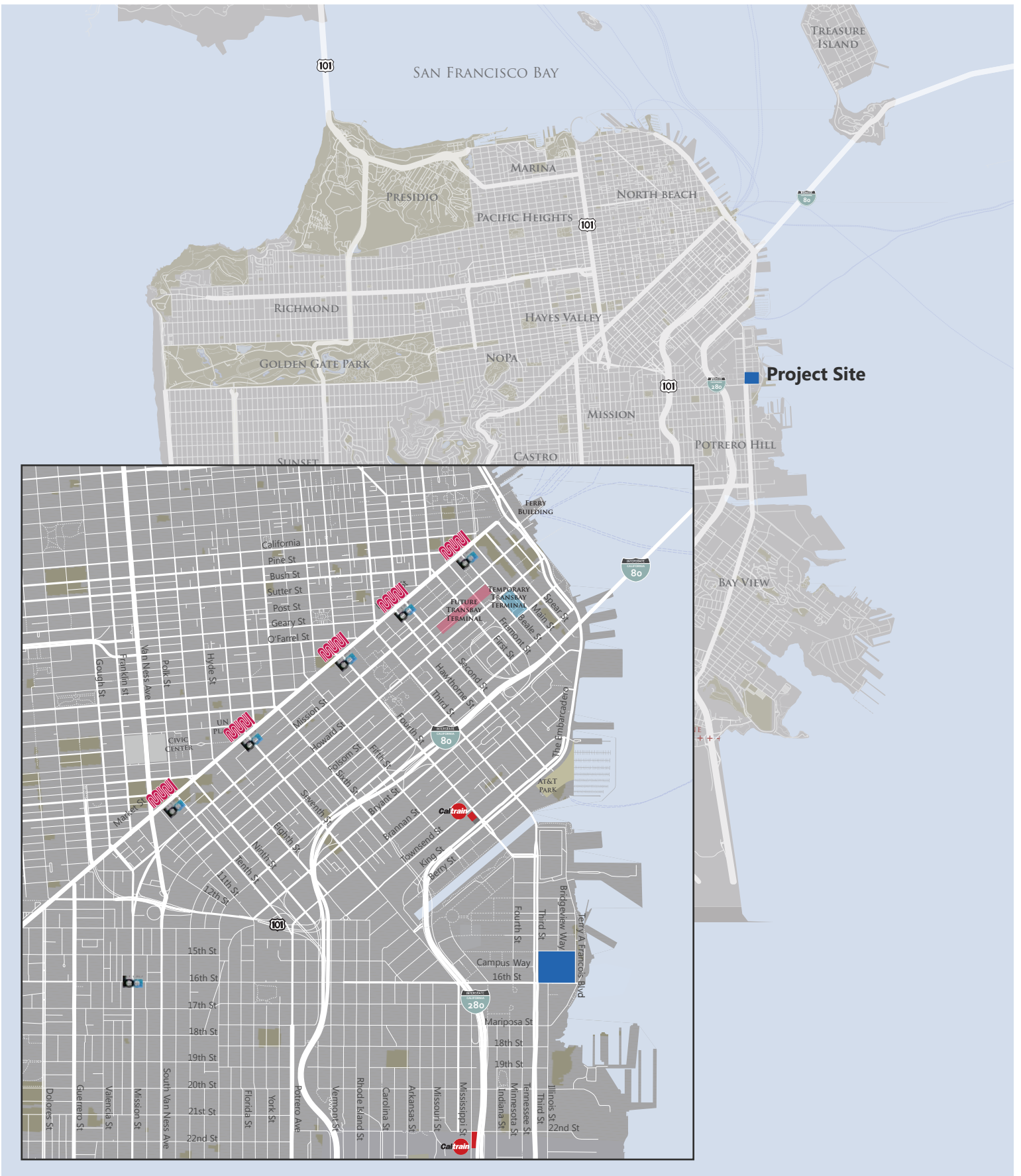
The proposed Event Center Development site consists of Blocks 29, 30, 31 and 32 in the Mission Bay neighborhood of San Francisco and is served by local and regional transit (Muni, ferries, regional buses and Caltrain); a developing roadway, bike route, sidewalk network; and freeway access. Bicyclists will be encouraged to arrive at the site via 16th Street and the planned Blue Greenway along Terry François Boulevard. The project location is illustrated on **Figure 1-1**. The project site plan is illustrated on **Figure 1-2**.

The project site is located approximately 2/3 mile from AT&T Park, a 42,000 seat Major League Baseball Stadium and home to the San Francisco Giants. Although the Warriors season does not largely overlap with the Giants season, they share some transportation facilities and management strategies. Although rare, a dual event scenario is considered as part of this document.

Over the past several years, many projects in the area have affected the transportation system in the vicinity of the Event Center Development, including the opening of the T 3rd light rail line connecting San Francisco's Financial District to Sunnydale, which started operation in 2007. The projects listed in the following sections, which are either recently completed, under construction, pending, or under consideration, will continue to enhance the transportation system in the area and may warrant changes to the TMP as they are implemented. Several significant transportation investments at or near the site are projected to begin operation within the next 5-10 years. These near-term transportation projects are illustrated on **Figure 1-3** and include SFMTA's Central Subway, the electrification of Caltrain, the Blue Greenway, enhanced transit service along 16th Street, and the 2nd Street Project, among others. These types of capacity and service enhancements provide essential context for planning safe, efficient transportation access to the Event Center and adjacent office and retail uses.

Several large-scale development projects are also proposed for the Mission Bay neighborhood that may affect travel patterns in the area. The project's SEIR (currently being prepared) will analyze traffic patterns and intersection performances under cumulative conditions that contain several prominent developments in the project vicinity. The TMP may likewise need to be revised, after development projects are realized and operational, to more effectively manage transportation systems under all event and no-event conditions. Some reasonably foreseeable development projects include the following:

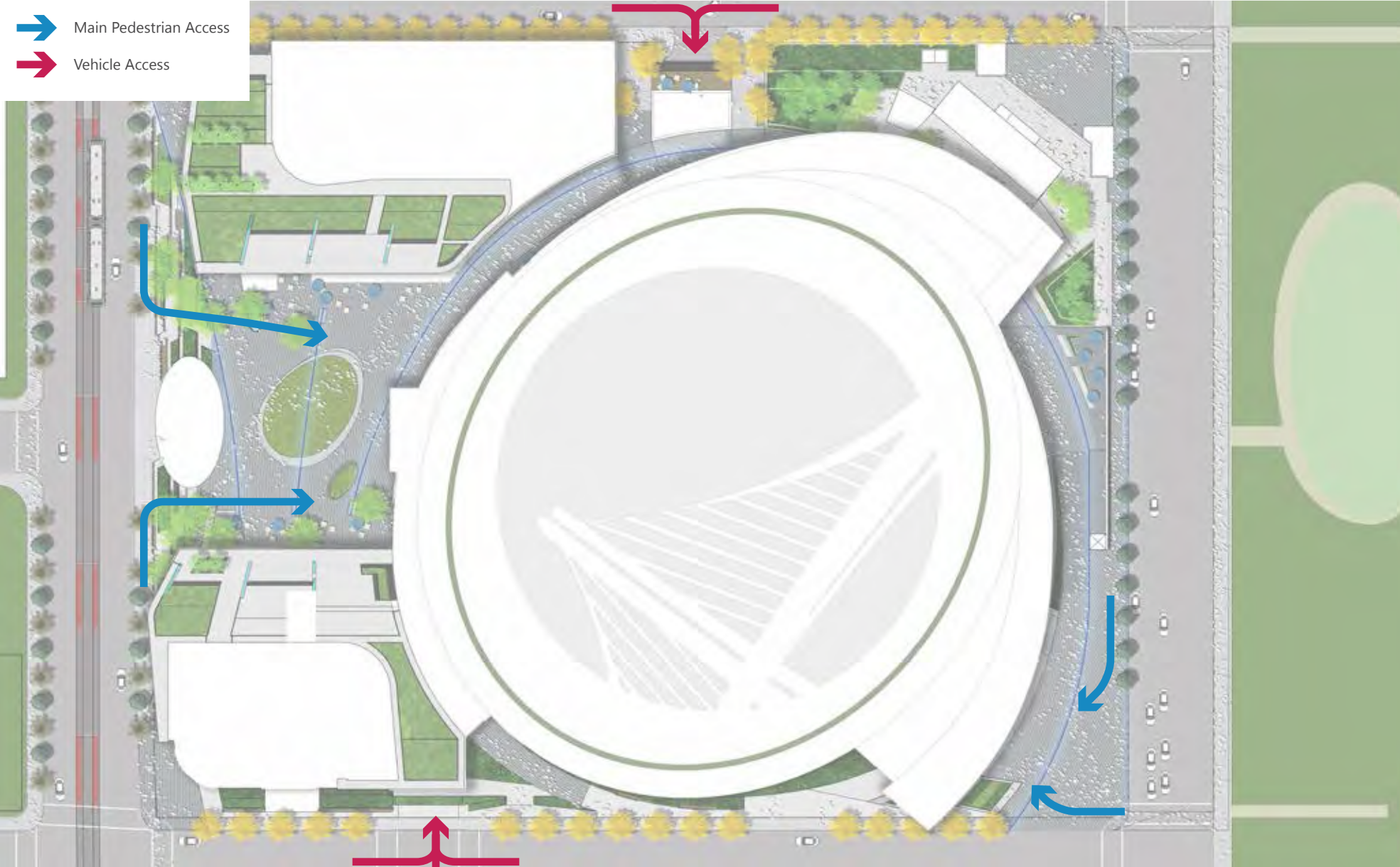
- Pier 70 Mixed-Use Project
- Seawall Lot 337 and Pier 48 Mixed-Use Project
- Kaiser Medical Office Building at 1600 Owens Street
- Central SoMa Plan
- UCSF Long Range Development Plan



Not to Scale

South Street Driveway:
three vehicle lanes






- ➔ Main Pedestrian Access
- ➔ Vehicle Access






16th Street Driveway:
two vehicle lanes, two truck access lanes









Not to Scale

-  MUNI Platform
-  Caltrain Station
-  BART Station
-  MUNI Station
-  Project Site

-  F Market & Wharves
-  KT Ingleside-Third Street
-  N Judah
-  J Church
-  L Taraval
-  M Ocean View
-  BART Line
-  Caltrain Line

Near-Term Transportation Projects

-  Central Subway
-  Blue Greenway
-  New Bus Route (22 Fillmore/Route 55)
-  Caltrain Electrification
-  Owens Extension
-  Ferry Building Expansion



NEAR-TERM TRANSPORTATION PROJECTS

1.3.1 Transit Projects

Through consultation with SFMTA a list of projects were selected based on their proximity to the Project site, ability to affect the transportation network, and likelihood of being completed. Several major near-term and long-term SFMTA Muni projects are proposed that, once implemented, will directly improve service frequency, capacity, travel time, cost-effectiveness and reliability in the vicinity of the project site.

SFMTA Muni Forward – This is the implementation phase of the SFMTA Transit Effectiveness Project (TEP). The project includes both general improvements throughout the system and measures for specific transit lines. Implementation is ongoing. The following changes are planned to take place in the project area:

- **10 Townsend** – The Muni Forward proposes to rename the 10 Townsend the 10 Sansome. Service would be rerouted off of Townsend down 4th Street. From 4th Street the route would extend through Mission Bay to new proposed street segments on 7th Street between Mission Bay Boulevard and Irwin Street, on Irwin Street between 7th and 16th streets, on 16th Street between Irwin and Connecticut streets, and on Connecticut Street between 16th and 7th streets. Peak period headways would be reduced from 20 to 6 minutes. Midday headways would be reduced from 20 to 12 minutes.
- **22 Fillmore** – The Muni Forward proposes rerouting the 22 Fillmore to continue along 16th Street, creating new connections to Mission Bay from the Mission neighborhood. The proposed route change would add transit to 16th Street between Kansas Street and 3rd Street and 3rd Street between 16th Street and Mission Bay Boulevard North. Muni Forward also proposes to change the AM peak period headway, reducing from 9 minute to 6 minute headways.

Additionally, the SFMTA has proposed two transit enhancement treatment visions for 16th Street (“Muni Forward”), of which one or a combination of the two will be selected by the SFMTA Board prior to implementation. The treatments are referred to as the Moderate and Expanded Alternatives in the TEP EIR. The Moderate Alternative proposes a number of physical changes to the portion of the rerouted 22 Fillmore in the vicinity of the Mission Bay campus site including, but not limited to, new transit stops, relocated transit stops, and transit bulbs (approximately 45 feet in length), as well as new traffic signals at Connecticut and Missouri streets. The Expanded Alternative includes the features listed for the Moderate Alternative as well as the conversion of a lane of mixed-flow lane of traffic to a transit-only lane (side running or center running to be determined) along 16th Street in both directions in the vicinity of the campus site as well as the prohibition of left turns at Bryant, Potrero (westbound only), Utah, San Bruno, Kansas, Rhode Island, De Haro, Carolina, Wisconsin, Arkansas, Connecticut, and Missouri streets. Both alternatives would reduce peak period headways; AM would be reduced from 9 to 6 minutes, PM peak headways would be reduced from 8 to 5.5 minutes, and midday headways would be reduced from 10 to 7.5 minutes. The stated purpose of both alternatives is to make the 22 Fillmore more frequent, reliable, and effective along 16th Street.

Prior to the extension of the 22 Fillmore into Mission Bay via either the Moderate or Expanded Alternative, which both require the addition of poles and extension of the Overhead Contact System (OCS), the SFMTA plans to implement a temporary motor coach service – the 55 Mission Bay - to coincide with the opening of the Phase One Medical Center at UCSF Mission Bay between Mission Bay and the 16th Street BART Station. The route would follow 16th Street from Mission Street to 3rd Street and 3rd Street from 16th Street to Mission Bay Boulevard North. The preliminarily proposed locations for new bus stops for this service in the vicinity of the Event Center site are on 16th Street at 4th Street (both directions) and on 3rd Street just south of Mission Bay Boulevard South (southbound direction). The operating hours and service frequencies of the proposal have not yet been made public at the time of publication of this document.

SFMTA Central Subway – SFMTA Muni will operate a light rail subway at high frequency between Chinatown, Union Square, Yerba Buena Gardens and the Caltrain depot at 4th and King Streets (about 2/3 mile from the project site) beginning in 2019. The T 3rd line will extend north from its current terminus at 4th and King Streets to serve this subway, and no longer operate along the Embarcadero. Construction of this project is well underway. This project would improve transit service between the project site and Downtown and create new connections between the project site and regional transit via connections to BART at Powell St. station.

SFMTA Bus Rapid Transit – SFMTA plans to build and operate a Muni “rapid bus” corridor with a terminal within 2/3 mile from the project site: the Van Ness corridor, with one of two lines terminating at 4th & King Streets. These service and infrastructure enhancements are expected to be in operation by 2020.

Caltrain Modernization Program – Caltrain plans to electrify the railway for increased efficiency and capacity. The Modernization Program will increase the frequency of service, including expanding the number of peak hour trains by one/hour. The project is scheduled for completion in 2021.

Transbay Transit Center – The new Transbay Transit Center, currently under construction and scheduled for completion in 2017, will be a major hub serving 11 transit providers. It will be located between Beale, 1st, Mission and Howard Streets, approximately 1.75 miles from the project site.

Ferry Building Landings and Terminals – the Port of San Francisco operates the ferry terminals at the Ferry Building two miles from the project site, in cooperation with the Water Emergency Transportation Authority (WETA) and Golden Gate Transit. Frequent, daily ferry service is provided between the Ferry Building and seven cities in Alameda, Solano, San Mateo and Marin Counties. The Ferry Building is also a major Muni bus and streetcar terminal hub, serving numerous cross-town and downtown lines. The Downtown San Francisco Ferry Terminal Expansion Project includes construction of up to three new ferry gates and implementation of several pedestrian amenities which would increase ferry capacity and improve the passenger experience, as well as provide additional emergency facilities in the event of a major catastrophe. The project is under environmental review and is expected to begin construction in early 2015. WETA is also currently exploring the possibility of constructing a terminal at the foot of 16th Street adjacent to the Event Center Development site, however, due to the preliminary nature of their study, ferry access to the site is not assumed for the sake of this TMP.

1.3.2 Pedestrian and Bicycle Projects

2nd Street Project – Multiple improvements are proposed for 2nd Street and could start construction as early as 2016. The goal of this project is to improve pedestrian safety along the corridor, create a more attractive public realm, provide a separated bicycle lane, minimize Muni delays, and increase foot traffic. These improvements would provide an enhanced pedestrian corridor for those walking from Downtown to and from the Event Center, offices, or retail proposed within the Event Center Development in Mission Bay.

Blue Greenway – This Port of San Francisco led project will create a network that connects public open space and water access in south-east San Francisco, from China Basin Channel to the San Francisco County Line, which will include a combination of bicycle and pedestrian trails and parks. Through Mission Bay along the Event Center Development frontage, the Blue Greenway will include a north-south bikeway on Terry François Boulevard that will connect to the Embarcadero bikeway to the north.

The 2009 Bike Plan and 2013 Bicycle Strategy includes several improvements to the bicycle network throughout the City. Of the improvements approved for implementation in the near-term and long-term, the following projects will affect bicycle circulation in the vicinity of the site:

- The transition of the Class III facilities on 16th Street to a Class II facility from 3rd Street to Terry François Boulevard (as an element of the Blue Greenway).
- The addition of bicycle lanes on Illinois Street from Cargo Way to 16th Street.
- The addition of bicycle lanes on Mississippi Street from 16th Street to Mariposa Street.
- The addition of a physically separated bikeway along The Embarcadero from 3rd Street to Fisherman's Wharf

1.3.3 Regional Traffic Projects

Proposal to remove the northern section of Interstate 280 – This proposal is currently being explored by the City and would remove the I-280 terminus on- and off-ramps from their current location adjacent to the Caltrain Station at 4th and King Streets. This removal may have various benefits, including uniting the neighborhoods currently split by the freeway, opening up land along I-280 and at the 4th and King Street rail yards for development, reducing the complexity of the downtown rail extension, and reducing vehicle-pedestrian conflicts at the crossing outside the Caltrain Station. If this project moves forward, it will likely affect access to the Event Center Development site by rerouting vehicle traffic to/from I-280, creating additional roadway connections between Mission Bay and areas west, and potentially altering pedestrian routes.

1.3.4 Near-Term Infrastructure Projects

New roadway projects are underway with an anticipated completion date of Spring 2015 at the following locations:

- Extension of Owens St from 16th Street to Mariposa Street / I-280
- Extension of 16th Street to Terry François Boulevard

New signals have recently been completed or are currently being constructed within 1 mile of the project site at the following intersections.

- 3rd Street / Channel Street
- 3rd Street / Mission Bay Boulevards
- 4th Street / Channel Street
- 4th Street / Gene Friend Way
- 16th Street / 4th Street
- 16th Street / Vermont Street
- 16th Street / 7th Street, and
- 7th Street / Mission Bay Drive / Berry Street

New signals are being constructed with an anticipated completion date in Spring 2015 at:

- Mariposa Street / 4th Street and

- Mariposa Street / I-280 SB On-ramp

Signal Modification projects are also underway within 1/3 mile of the project site. Signal reconfigurations are being constructed with an anticipated completion date in Spring 2015 at the following intersections:

- 3rd Street / 16th Street
- 3rd Street / Mariposa Street
- 16th Street / Owens Street
- Owens Street / Mariposa Street / I-280 NB Off-ramp
- Mariposa Street / I-280 SB On-ramp

Street restriping projects have been completed or are pending at the following intersections.

- 7th Street / 16th Street
- 7th Street / Mission Bay Drive / Berry Street
- Mariposa Street Bridge (over Caltrain tracks)
- Mariposa Street / 3rd Street
- Mariposa / 4th Street
- Mariposa Street from I-280 SB on-ramp to Pennsylvania Avenue

Street restriping projects are in the planning stages, and pending approval, at the following intersections.

- 16th Street / Potrero Avenue
- 7th Street / Brannan Street

Street widening or improvement projects are underway within ¼ mile of the site and have an anticipated completion date in Spring 2015 at the following locations.

- 3rd Street / 16th Street
- Mariposa Street from Owens Street to Illinois Street
- Connections to UCSF Mission Bay Campus (at 16th Street and Mariposa Street)
- NB I-280 off-ramp

1.4 IMPLEMENTATION STRATEGY

1.4.1 Coordination with Agencies and Transit Providers

Traffic controls proposed in the TMP will require coordination with several of the agencies described in section 1.2. **Table 1-2** summarizes the necessary coordination between the Warriors and public agencies and transit providers during Event Center events.

TABLE 1-2: PROPOSED CONTROL AND SERVICE COORDINATION SUMMARY

Control or Service	Entity	Coordination
Post-game special train service to South Bay	Caltrain	Real-time communication between Transportation Management Control (TMC) and Caltrain during games so any planned special event train can be put into service at 4 th /King station at the appropriate time.
Variable Message Signs (VMS)	Caltrans, SFMTA	Location, installation, and operation of variable message signs (VMS) alerting drivers of traffic conditions and temporary post-event lane closures on 3 rd Street.
Use of existing SFgo intersection surveillance cameras, as well as four new proposed surveillance cameras along the Event Center's perimeter streets, for observation of traffic conditions on streets pre-, during, and post-event	SFMTA	Permission from SFMTA to see live streams from video cameras from the TMC room at the Event Center.
Traffic management by Parking Control Officers (PCOs) on the streets pre-, during, and post-event	SFMTA	Real-time communication between TMC, Field Supervisor, variable message sign operators, emergency services personnel, and PCOs on the street.
Post-game special northbound light rail service	SFMTA (Muni)	Real-time communication between TMC and SFMTA (Muni) during events so that additional light rail trains can be put into service at appropriate times.
Pre- and Post-event Shuttles	Mission Bay TMA, Private Shuttle Providers, SFMTA	Real-time communication between TMC and Shuttle Operators during events so shuttle buses can be put into service at appropriate time.
Valet bicycle parking during events	GSW	The provision of valet bicycle parking and additional temporary secure corral parking during events at the Event Center will be coordinated with SFMTA and the San Francisco Bicycle Coalition (SFBC), or other vendor.
Pre- and Post-event Pedicab service along Terry Francois Boulevard	Private Pedicab Providers	Pre-event planning and clearly marked staging areas for private pedicab drivers.
Enhanced post-event BART service on event days	BART	Communication about event schedules so that BART can augment service by providing additional train cars post-event.
On-street special event pricing	SFMTA , Port	Provide event schedule to SFMTA Parking group and the Port for implementation of special event pricing at on-street parking meters during events, pending Port approval.
Emergency response and emergency vehicle routing	SFPD, SFFD, SDMTA	Real-time emergency response and PCO support as needed to ensure emergency vehicle access to and around the project site.

Source: Fehr & Peers 2014.

1.5 DOCUMENT ORGANIZATION

Chapter 2 summarizes the Event Center Development project and outlines the event scenarios. Chapter 3 describes the existing transportation system in the project vicinity, including the street network, transit, bicycle and pedestrian infrastructure, and regional traffic access. Chapter 4 describes the travel demand management program that will be implemented to increase the level of access to the project by transit, bicycling and walking. Chapter 5 describes the anticipated characteristics of Event Center attendees and visitors to the mixed-use development, including the key assumptions on which the TMP recommendations are based. Chapter 6 describes the proposed controls and is organized by event scenario, ranging from a no-event day to smaller convention events to the most complex event (Event Center event concurrent with event in AT&T Park). Chapter 6 also includes a discussion of the project's Transit Service Plan. Chapter 7 describes freight loading for the Event Center Development. Emergency vehicle access for the site is described in Chapter 8. Finally, Chapter 9 discusses communication strategies designed to complement the controls listed in Chapter 6, and includes wayfinding and outreach. Chapter 10 describes how the TMP will be monitored and refined over time, while outlining performance standards for evaluating the plan's effectiveness.

CHAPTER 2. PROJECT DESCRIPTION AND EVENT SCENARIOS

2.1 PROJECT DESCRIPTION

2.1.1 General

The proposed site is comprised of land referred to as Blocks 29, 30, 31 and 32, located in the Mission Bay South area of San Francisco. The 11-acre project consists of a new approximately 18,000-seat multi-purpose event center and mixed-use development including multiple office buildings, retail, restaurants, structured parking, plaza areas, and other amenities. The event center would host the Golden State Warriors basketball team during the National Basketball Association (NBA) season, as well as provide a year-round venue for a variety of other uses, including concerts, family shows, other sporting events, cultural events, conferences and conventions.

The proposed program for the Mission Bay South project site at Blocks 29-32 includes the following:

- Event Center Basketball seating capacity: 18,064
- Event Center supporting uses include a practice facility and Bayfront Terrace
- 750,000 square foot Event Center
- 25,000 square feet of GSW office space
- 580,000 square feet of office buildings
- 125,000 square feet of visitor-serving retail and restaurant uses
- 950 parking stalls in on-site parking structure
- 13 underground truck docks
- 132 stalls in existing structured garage at 450 South Street
- Access points for trucks and automobiles on 16th Street at Illinois Street
- Access points for small delivery vehicles and automobiles on South Street at Bridgeview Way

The public realm zones and uses for the Event Center Development are shown on the site plan in **Figure 1-2**. There will be five pedestrian entries to the site, one midblock on South Street, one on the 3rd Street frontage, one midblock on 16th Street, one at the corner of 16th Street and Terry François Boulevard via the southeast Plaza, and one midblock on Terry François Boulevard. Large open plaza areas will be located on the west side of the multi-purpose event center and in the southeastern portion of the site. The plazas will provide access to the retail and office uses on site and would be connected by a ramp wrapping around the exterior along the north and eastern-sides of the multi-purpose event center. An atrium connecting 16th Street and the western plaza area serves as a secondary connection between open spaces on-site.

2.1.2 Proposed Street Cross-Sections

As part of the Event Center Development, the existing or planned cross-sections for several adjacent streets are proposed to be modified to better meet the needs of the Event Center and surrounding mix of uses. The conceptual striping plan for the project site is shown on **Figure 2-1**.

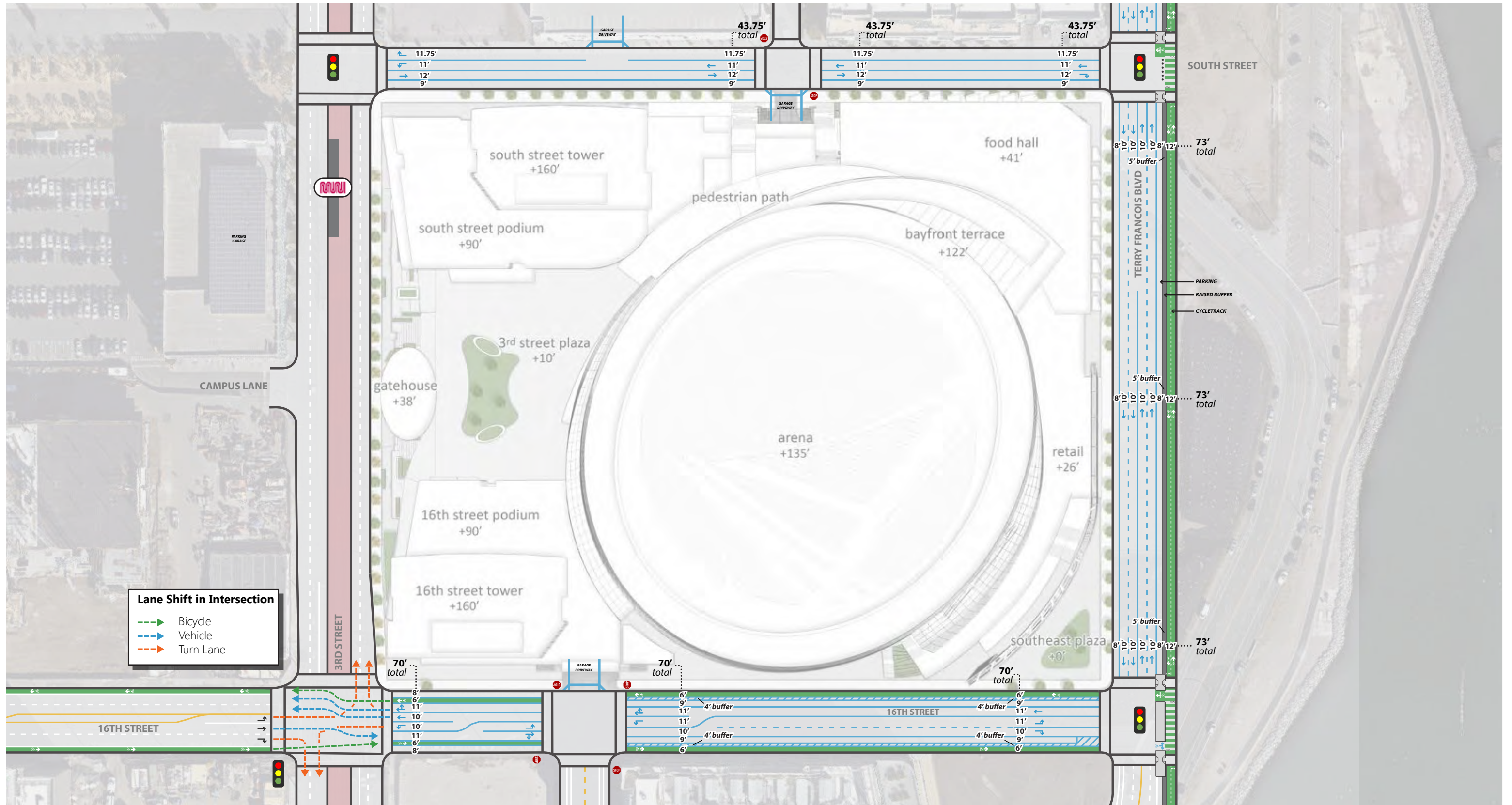
The project proposes to revise the planned cross-section for 16th Street from 3rd Street to Terry François Boulevard. The revised street cross-section would include 6 foot bike lanes with a 4 foot buffer on both sides, -9 foot parking lanes on both sides (for the segment from Illinois Street to Terry François Boulevard), one 11 foot through lane in each direction, and an 11 foot center lane that would serve as left turn pockets at 3rd Street, Illinois Street, and Terry François Boulevard. The on-street parking provided along 16th Street will be metered for general daytime use on non-event days, but restricted during limited hours for a variety of event-related needs including shuttle bus loading, media trucks, and charter bus loading when events are scheduled. One on-street space on the north side of 16th Street, between 3rd Street and Illinois Street, will be designated for on-street metered commercial loading for all hours until event-related curb regulations go into effect.

The project also proposes to restripe South Street within the boundaries of the project. The proposed cross-section would include a 9-foot parking lane on the south side of the street and a parking lane on the north side of the street measuring just less than 12 feet. Parking would be prohibited on the north side of the street between the 450 South Street parking garage entrance and 3rd Street, and the curbside lane would be used for an exclusive westbound right turn lane at the 3rd Street intersection. The proposed cross section would also include an 11 to 12-foot through lane in each direction. A bus stop for the Mission Bay TMA shuttle will be provided on the south side of South Street, from the 3rd Street intersection east a distance of 60 feet. A taxi loading area will be provided on the south side of South Street, from the Event Center garage access (opposite Bridgeview Way) east a distance of 100 feet. The remainder of the curbside frontage along South Street will be metered for general daytime use on non-event days. Eight on-street spaces on the south side of South Street will be designated for on-street metered commercial loading for all hours until event-related curb regulations go into effect. During events as needed, all on-street parking on the south side of South Street between 3rd Street and Terry François Boulevard will be prohibited so this space may be used for bus and taxi loading areas. Parking on the north side of South Street may be prohibited during peak events to allow use of the westbound parking lane for vehicle access and egress to the Event Center garage and the 450 South Street garage.

The planned Blue Greenway project will add a two-way bikeway along the east side of Terry François Boulevard with a 4-foot buffer. The reconstructed portion of Terry François Boulevard along the project frontage will also provide four travel lanes and on-street parking lanes on both sides. A Paratransit stop, 75 feet in length, which will accommodate up to three vans, will be provided on the west side of Terry François Boulevard near the southeast entrance to the Event Center and elevators to the Pedestrian Path. The remainder of the curbside frontage along Terry François Boulevard will be metered for general daytime use on non-event days. Eight on-street spaces on the west side of Terry François Boulevard will be designated for on-street metered commercial loading for all hours until event-related curb regulations go into effect. During events as needed, all on-street parking on the west side of Terry François Boulevard will be prohibited. During these conditions, the frontage will be designated for taxi use, Paratransit vehicle use, and TNC or private vehicle passenger drop-off/pick-up. At the intersection of Terry François Boulevard and 16th Street, two-stage bike boxes or equivalent measures will be provided to facilitate safe turns for cyclists traveling between 16th Street and the Blue Greenway bikeway on the east side of Terry François Boulevard.

In addition to the changes in cross sections, the following intersection controls would be implemented as part of the proposed project:

- The intersection of Terry A. Francois Boulevard/South Street is currently stop-controlled at the eastbound approach to the intersection, and would be signalized.
- The intersection of Bridgeview Way/South Street is currently uncontrolled, and would be made a side-street stop-controlled intersection with southbound vehicles on Bridgeview Way required to stop.
- The new intersection of Terry A. Francois Boulevard/16th Street would be signalized.
- The intersection of Illinois Street/16th Street is currently uncontrolled, and would be made an all-way stop-controlled intersection. Conditions at this intersection would be monitored, and if determined by the SFMTA that a traffic signal is warranted, the intersection would be signalized.
- The intersection of Terry A. Francois Boulevard/Illinois Street/Mariposa Street is currently stop-controlled, and would be signalized.



Lane Shift in Intersection

- Bicycle
- Vehicle
- Turn Lane



Not to Scale

2.1.3 Mission Bay TMA Shuttle Program Expansion

The Mission Bay Transportation Management Association (TMA) strives to reduce single-occupant vehicle trips by encouraging alternative modes of transportation for residents, employees and visitors to the Mission Bay development area. The Mission Bay TMA currently provides two free shuttle bus route services (east and west) between Mission Bay and the Powell Street BART Station and the 4th/King Caltrain Station.

The Warriors will join the Mission Bay TMA and the organization's required contributions to the association will enable expanded service, which may include additional evening or midday shuttles and/or weekend service. Additional routes to locations including the 16th Street BART Station and/or Transbay Terminal may also be feasible. This service will enable office employees and retail visitors to access the site from key transit locations. All standard shuttle service funded in part by the Warriors development will be an integrated part of the TMA network and will continue to be free of charge for all residents and employees in Mission Bay, regardless of origin or destination. If the Warriors choose to fund incremental event-only shuttle service in partnership with the TMA, such service would be supported exclusively by the Warriors and limited to event attendees.

The site's design includes an additional TMA shuttle stop, located on the south side of South Street just east of 3rd Street, located by the lobby of one of the project's office/lab buildings. This stop may also serve developments on the UCSF campus to the west, the Gap (existing) and Uber (planned) office buildings on the north side of South Street, and the Bayfront Park nearby.

2.1.4 Bicycle Parking

Bicycle parking will be provided in an enclosed 300+ bicycle valet facility located on the 16th Street frontage just west of the southeast Event Center entrance. Valet doors will face east to direct departing cyclists towards the signalized intersection at Terry Francois Boulevard and 16th Street, where they can safely mount their vehicles. The bike valet facility will be available for self-park to arena and GSW employees for all-day use but will not be staffed during non-peak event times; it is assumed that the valet partner and the SFMTA will provide guidance on the most efficient secure storage system under these conditions. The bike valet is proposed to be staffed by a partner such as the San Francisco Bicycle Coalition (SFBC) for evening use by ticketholders during peak events such as NBA games and concerts. The valet parking facility will be attended from two hours before the start of peak events to approximately one hour after the event ends. Additional valet service will be provided by partners at temporary, staffed bike corrals of 50-100 bikes on plaza level in the southeast and west portions of the site for events where bike use is projected to exceed the supply provided by the permanent 300+ space bike valet facility. This additional bike corral will be positioned to be accessible to bicyclists, but not to interfere with pedestrian pathways or ADA access points. Additional bicycle parking will be located throughout the development for daily users, including a secure bike parking room for each office building for office and retail employees and bike racks at ground level on South Street, Terry François Boulevard, and 16th Street for all users. Bike rack design will be determined in consultation with SFMTA staff. Total proposed bike parking is in excess of 500 spaces (including temporary corrals).

In addition to the bicycle parking program, the Event Center Development program will include sponsorship for a Bay Area Bike Share station on or near the site, likely along Terry Francois Boulevard or South Street, and support in principle for additional stations in the project vicinity. Precise location of the Bay Area Bike Share station(s) will be determined through coordination between the Port of SF, the SFMTA, and the bike share operator.

2.1.5 Vehicle Parking

The current Event Center Development program includes an approximately 950-space parking structure with below-grade parking and an at-grade level located under the plaza podium, all concealed from the public's view. Access to the garage will be provided via two controlled driveway entrances, one on South Street at Bridgeview Way and the other on 16th Street across from Illinois Street.

The 16th Street driveway will serve as the primary access point for arena patrons, who will be required to show pre-purchased parking passes to Event Center staff located on the street prior to entering the driveway. Any parking passes can be scanned at the interior end of the driveway to allow more cars to queue upon arrival. Office workers will also use the 16th Street Driveway, where, Automatic Vehicle Identification System (AVI) or fob controls will enable access at an entry point at the interior end of the driveway. AVIs may also be used for select season ticket holders for Event Center uses. The South Street driveway will provide access to retail patrons on-site and will include a valet drop-off area within the garage able to serve up to 280 vehicles. Self-parking visitors to office or retail during daytime hours will utilize a more traditional system using ticket-issuing machines and pay-on-foot ticket kiosks located throughout the garage. Each driveway will feature one in-bound lane during event hours and two egress lanes during the post-event period.

There will also be 13 truck docks located below grade, with access via distinct driveway lanes at the 16th street entry. The truck dock is physically separated from the primary vehicle parking areas.

In addition, the Golden State Warriors organization has purchased the right to use 132 additional stalls located in the structured parking garage at 450 South Street, directly across the street from the site's northern boundary. These spaces will be used by daily office employees and/or Golden State Warrior employees, not by event attendees. The Warriors are open to working with additional third parties to accommodate excess parking demand if the need arises.

Event attendees who purchase reserved parking on-site will receive instructions for entering and exiting the Event Center garage with their ticket confirmation. They will also receive a dated parking pass to hang on their rear view mirror. Signage will be provided at both Event Center garage access points indicating event center parking is available for those attendees with pre-purchased tickets only. The parking operation on event days will consist of attendants checking entering vehicles for valid parking access to a space in the garage. The parking pass checks will be done by attendants stationed curbside at garage driveways along 16th Street and South Street so that vehicles without proper credentials will not be able to enter the parking garage driveway. If queues extend from the 16th Street garage driveway back onto 16th Street, this access will be temporarily closed and inbound event attendees will be directed to the South Street garage access. Vehicles without reserved parking passes will be directed to the north or to the west of the site to other nearby parking facilities off-site.

Parking for retail and restaurant customers will be available at the 950-space garage on no-event days, during daytime events, and on non-peak event evenings. Garage operation for these customers will consist of attended valet parking. The valet parking drop-off and pick-up area will be located within the garage via the South Street driveway where the majority of the retail uses are located. When parking in the garage is not available, and during peak events, valet attendants will park retail customers' vehicles at off-site locations, including public lots in the vicinity.

Retail and office employees with reserved parking will use the 16th Street entry to the parking garage across from Illinois Street. The garage operation at this location will be an automated electronic system (no attendants) to facilitate efficient entry/exit for these daily users.

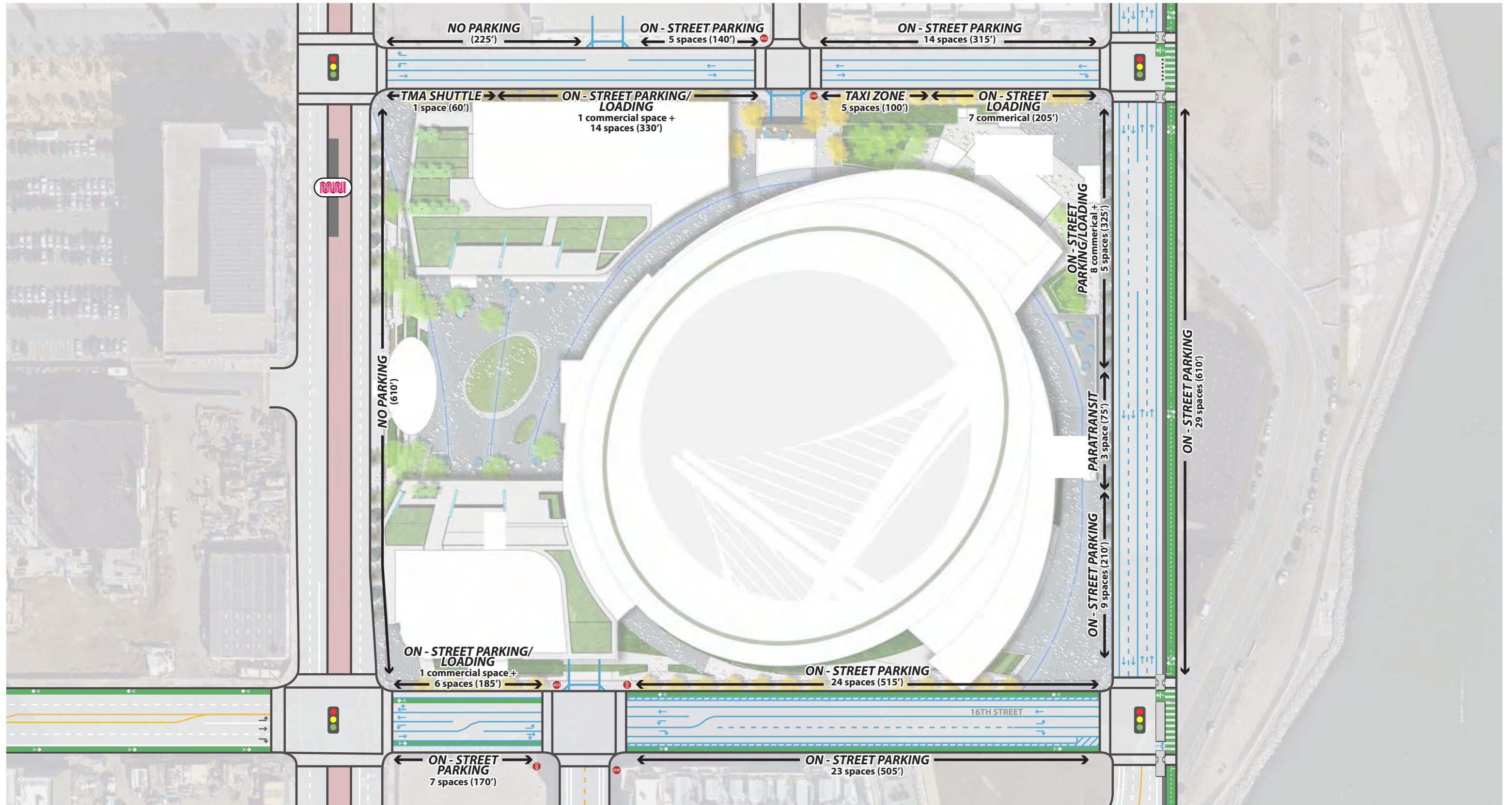
As part of the proposed street restriping, on-street metered parking is planned to surround the site on three sides – South Street, Terry François Boulevard, and 16th Street. This on-street parking will be used for various parking and loading designations on event days. During no-event times, the on-street space may be used for general parking, as summarized in **Table 2-1** and **Figure 2-2**. Pending Port approval, on-street spaces on blocks adjacent to the Event Center Development are likely to be marked with Special Event parking signs, similar to those found in the vicinity of AT&T Park, and carefully monitored for compliance.

TABLE 2-1: NO-EVENT ON-STREET PARKING³					
Street Segment		From	To	Length (ft.)	On-Street Parking Available^{1,2}
South Street	North Side	3rd Street	450 South Street Garage Driveway	225	--
		450 South Street Garage Driveway	Bridgeview Way	140	5
		Bridgeview Way	Terry François Boulevard	315	14
	South Side	3rd Street	Bridgeview Way	410	15
Bridgeview Way		Terry François Boulevard	305	--	
Terry François Boulevard	East Side	South Street	16th Street	610	29
	West Side	South Street	16th Street	610	15
16 th Street	North Side	3rd Street	Parking Garage Driveway	185	7
		Parking Garage Driveway	Terry François Boulevard	515	24
	South Side	3rd Street	Illinois Street	170	7
		Illinois Street	Terry François Boulevard	505	23

Notes:

1. On-street parking space = 15' for end stall; 20' for regular stall; 25' for loading stall
2. Red zone at each corner = 20'
3. Excludes TMA shuttle stop and no-event taxi zone, both also located on the south side of South Street, and select metered commercial loading zones on South Street and Terry François Boulevard. .

Source: Fehr & Peers, Golden State Warriors, SFMTA Parking Stall Standards.



Not to Scale

2.2 EVENT SCENARIOS

The event scenarios and time periods analyzed in the TMP are designed to provide a range of typical scenarios, including several of those being studied for transportation impacts in the project SEIR. In full, this range of scenarios will offer a menu of options to event operators and City personnel to fit most event conditions. Transportation control measures for events not specifically described will be derived based on reviewing the plans for events with comparable attendance levels and time periods included in the TMP and making adjustments as needed.

The primary event scenarios that are addressed in this TMP are as follows:

- Typical No-Event Day
- Convention – weekday event with 9,000 attendees
- Arena Concert – an evening event with 14,000 attendees
- NBA Game – an evening Warriors game with 18,064 attendees
- Dual Event – NBA game or arena concert coinciding with an AT&T Park event (with 41,500 attendees)

2.2.1 Typical No-Event Day

The retail, restaurant, and office uses located adjacent to the Event Center will be open 365 days a year. Project sponsors anticipate daily activity from these users in addition to passive recreation or seasonal festivals in the open plaza areas and in Bayfront Park located across the street.

2.2.2 Small Event

Small events (3,000 to 9,000 attendees) may consist of conventions, small “arena theater” concerts, family shows, non-NBA sporting events, and other types of events to be decided. For the purpose of the TMP, a small event is defined as a daytime convention with an attendance of 9,000 people.

2.2.3 Arena Concert Event

Arena concert events are defined in this TMP as events with 14,000 attendees. The estimated 30 annual arena concerts (typically occurring on Friday and Saturday evenings within a 7:30 PM to 10:30 PM window) at the event center would vary in attendance levels, depending on the artist and stage configuration. The estimated average attendance level would be approximately 12,500 patrons. The event center design would allow for an end-stage concert configuration to accommodate a maximum of 14,000 patrons.

Occasionally, arena concerts would occur in a full 360-degree center-stage configuration which would allow for a maximum attendance above the seated capacity of 18,064 – up to 18,500 patrons. This would account for less than 10 percent of the total annual arena concerts (no more than four per year). Logistics for these larger arena concerts are considered as part of the peak event scenario.

2.2.4 Peak Event

Peak events are defined in this TMP as events where more than 90 percent of the seating capacity of the Event Center will be occupied (i.e. more than 16,200 attendees). These include all GSW pre-season, regular season,

and post-season games as well as sold-out center stage concerts. The peak event analyzed in detail in the TMP is a sold out basketball game that fills the Event Center to capacity (18,064 attendees).

The NBA regular season consists of 41 home games.

The majority of games take place in the evening (7:30 PM tipoff). In the 2012-2013 season, there was one daytime game (1:00 PM tipoff) during the regular season and it took place on a holiday (Martin Luther King Day, 01/21/13). Since most concerts typically take place in the evening, most of the egress from the Event Center will occur at night, during off-peak traffic conditions. Some games and concerts, though, will have ingress activity during the weekday evening commute period. Most inbound pre-event traffic on weekdays will be traveling in the opposite direction of evening commute traffic that is exiting the area.

2.2.5 Peak Event Concurrent with Event at AT&T Park

The dual event scenario occurs when a high-attendance event at the Event Center (a sold-out NBA game or concert) and a baseball game or sold-out concert at AT&T Park occur at the same time. This combination of events, in which up to 18,064 persons would be at the Event Center and up to 41,500 persons at AT&T Park, would most likely occur on a weekend evening. Since the 2004 seasons, there have been 19 days in which both the Giants and Warriors have had overlapping regular season home games, for an average of approximately 2 such days per year. The transportation control strategies for a dual event scenario also apply when a baseball game or sold out concert at AT&T Park occurs at the same time as a 14,000 person concert at the Event Center.

2.3 TYPICAL ANNUAL EVENT DISTRIBUTION

It is anticipated that the Event Center will have a total of approximately 200-220 events each year, distributed as follows:

- **43-60 GSW home games** (2-3 pre-season + 41 regular season + a maximum possible of 16 home playoff games), all taking place from 7:30 PM to around 9:40 PM.
- **45 Concerts**, consisting of approximately 30 large arena concerts and 15 small “arena theater” concerts. These events will occur mostly on Friday and Saturday nights from 7:30 PM to 10:30 PM, concentrated during late fall, winter, and early spring.
- **55 Family Shows**. Tours typically perform 10 shows in the building over 5 days (Wed-Sun) as described in Table 2-2.
- **31 Conventions/Corporate Events**, distributed throughout the year as the building schedule permits.
- Approximately **30 other sporting events** distributed throughout the year as the building schedule permits.

Table 2-2 summarizes the annual event distribution.

TABLE 2-2: TYPICAL ANNUAL EVENT CENTER EVENT DISTRIBUTION

Event Description	Quantity	Event Times	Daytime or Evening
Warriors Events	43-60		
Pre-season	2-3	7:30 PM – 9:40 PM	Evening
Season	41	7:30 PM – 9:40 PM	Evening
Post-season	0-16	7:30 PM – 9:40 PM	Evening
Non-Warriors Events	161		
Concerts	45		
"Arena Theater" Concerts (3,000 attendees)	15	Fri-Sat 7:30 PM – 10:30 PM	Evening
Arena Concerts (14,000 attendees)	30	Fri-Sat 7:30 PM – 10:30 PM	Evening
Family Shows	55	Typically 10 shows over 5 days (Wed. to Sun.): Wed. (1): 7:30 - 9:00 PM Thur. (1): 7:30 - 9:00 PM Fri. (2): 10:30 AM - Noon; 7:30 - 9:00 PM Sat. (3): 11 AM-12:30 PM, 3:00 PM - 4:30 PM; 7:00 PM -8:30 PM Sun. (3): 11 AM - 12:30 PM, 3:00 PM - 4:30 PM; 7:00 PM-8:30 PM	Both
Conventions/ Corporate Events	31	Variable	Both
Other Sporting Events	30	Variable	Both

Notes:

1. Of the peak events, it is anticipated that fewer than 10 will overlap with events at AT&T Park.

Source: Golden State Warriors.

CHAPTER 3. EXISTING CONDITIONS

Chapter 3 describes existing transportation systems serving the Event Center Development site, including the street network, freeways, transit hubs, bicycle facilities, and truck routes. Select commitments to make near-term significant changes in conditions that are certain and fully-funded are noted as many of these investments and changes in capacity and service will be completed by 2020 and will be key to assumptions about the operation and functionality of the transportation networks serving the Event Center Development. This Chapter is included in the TMP for contextual and informational purposes only. A full environment document will be prepared that includes a more complete and quantitative analysis of the existing conditions as they pertain to transportation.

3.1 PEDESTRIAN FACILITIES



Major pedestrian routes to the Event Center Development include 16th Street for east-west travel as well as 3rd Street and Terry François Boulevard/Bay Trail for north-south travel.

Within the project site area, sidewalks generally exist on both sides of the street, and are generally 12 to 15 feet wide. There is currently no sidewalk along the frontage of the project site except on 3rd Street; however sidewalks will be completed along 16th Street, South Street, and Terry François Boulevard adjacent to the site as part of the project. There are gaps in the sidewalk along nearby roadways that are currently under construction, including the south side of 16th Street between 7th and 3rd streets and the west side of 3rd Street between 16th and Mariposa streets. These sidewalk gaps will be closed upon completion of the adjacent buildings. All intersections surrounding the site have standard painted crosswalks and directional curb ramps. All signalized intersections include pedestrian signals with count down timers.

The **Bay Trail** is a planned 500-mile recreational shoreline corridor that, when complete, will encircle San Francisco and San Pablo Bays with a continuous network of bicycling and hiking trails. In the project vicinity, the Bay Trail will run along the east side of Terry François Boulevard, and is designated as a multi-use trail shared by pedestrians and bicycles. As a major mostly uninterrupted pedestrian facility, this path will carry a significant proportion of pedestrian flow to and from the Event Center and between the Event Center and major regional transit hubs and bike share stations, and certain segments along congested areas, such as the Embarcadero, are being designed to provide separate paths for bicyclists and pedestrians to improve safety.

3.2 TRANSIT NETWORK



This section discusses both regional and local transit provision to the proposed Event Center Development site. The site is well-served by both local and regional public transit. Local service is provided by Muni Bus, light rail lines, and the Mission Bay TMA shuttles. Regional service is provided by BART, Caltrain, AC Transit, Golden Gate Transit, SamTrans, and various ferry providers. Riders from these regional transit services would either walk or transfer to Muni or privately operated shuttles to access the Event Center Development. This section is organized in order of proximity to the site, starting with the transit hub that is furthest away (BART Stations) and ending with the one that is closest (Muni light rail platforms). Existing rail transit is shown in **Figure 3-1** and existing bus transit is shown in **Figure 3-2**.

3.2.1 Bay Area Rapid Transit (BART, Regional)

BART provides regional commuter rail service in the Bay Area. San Francisco's Financial District is centrally located within the system, which provides service to the East Bay (Pittsburg/Bay Point, Richmond,

Dublin/Pleasanton and Fremont) and to San Mateo County (San Francisco International Airport and Millbrae) with operating hours between 4:00 AM and midnight daily. In the Financial District, BART operates underground below Market Street. The Event Center Development can be most directly accessed from four BART stations including the Embarcadero (2.1 miles), Montgomery Street (1.8 miles), Powell Street (1.7 miles), and 16th Street Mission (1.7 miles) stations. When the Muni Central Subway opens in 2019, its connection to the BART Powell Street Station will likely make this a primary transfer station to the Event Center. During the weekday PM peak period, when many event-goers are expected to arrive, headways are generally 5 to 15 minutes for each line. Off-peak headways are generally 20 minutes for each line. BART trains range from 3 to 10 cars depending on time of day and demand. BART will extend its service to Warm Springs in 2015 and to San Jose in 2018 and to east Contra Costa County via eBART in 2016. BART is also proposing early phases of its “BART Metro” project (that increases Transbay Tube/SF frequency) and to introduce higher-capacity train cars within the next 5-10 years. BART is also performing a study to recommend measures to increase platform and station circulation capacity, particularly at Embarcadero and Montgomery Stations. The BART system map is illustrated below.



3.2.2 Ferry Building

WETA, Blue & Gold, and Golden Gate operate regular ferry service between the San Francisco Ferry Building (2 miles from the project site) and Vallejo, Larkspur, Sausalito, Tiburon, Oakland, Alameda and South San Francisco. Golden Gate and WETA also provide event-level service to AT&T Park, 2/3 mile from the project site. The Ferry Building is also a terminal / hub for Muni and Amtrak/Amtrak Capital Corridor service.

A Mission Bay ferry terminal near 16th Street has been identified in Water Emergency Transportation Authority (WETA) and MTC’s 2040 Regional Transportation Plan “One Bay Area” planning documents as a potential future infrastructure investment, but there has not yet been an environmental assessment or full-funding strategy identified for the project. WETA plans to continue developing this concept.

3.2.3 Caltrain (Regional)

Caltrain provides passenger rail service on the Peninsula between San Francisco and Downtown San Jose with several stops in San Mateo and Santa Clara Counties. Limited service is available south of San Jose. Within San Francisco, Caltrain terminates at a station located on 4th Street between King and Townsend Streets, approximately 2/3 mile from the proposed Event Center Development site. The 4th/King station is served by local, limited, and “Baby Bullet” trains. The 22nd Street Station is also nearby, located directly underneath I-280, approximately one mile from the Event Center Development site, and is served by local, limited, and a few of the currently scheduled “Baby Bullet” trains.

Caltrain service headways in the northbound direction during the PM peak, which will serve Event Center weekday events, are variable depending on the specific service provided by the train (bullet or limited); however, there are typically 5 arrivals in one hour. Southbound headways after the PM peak are once per hour. Electrification of Caltrain by 2021 will allow implementation of increased train frequencies. On weekends, headways are once per hour, so most Event Center attendees will likely arrive in a single train. However some guests may come on an earlier train for weekend events to visit the city or the retail and restaurant uses on site. Finally, Caltrain currently provides special post-game train service following Giants games.

3.2.4 San Francisco Muni (Local)

Muni operates bus, cable cars, streetcars, and light rail lines within San Francisco. The line that most directly serves the proposed Event Center Development site is the T 3rd Street light rail line, which operates in a dedicated right-of-way in the center of 3rd Street. A couple of Muni bus lines, the 22 Fillmore and 10 Townsend, as well as the N Judah light rail line stop within 1 mile of the project site. **Figure 3-1** shows rail lines and **Figure 3-2** shows bus lines that provide service in the immediate project vicinity.

T 3rd Street – The T 3rd Street light rail route connects Visitacion Valley to Mission Bay via Bayview and Dogpatch. It also connects Balboa Park BART Station to Mission Bay through Downtown San Francisco as the K Ingleside route via St Francis Wood, West Portal, and the Castro. It operates weekdays and weekends from approximately 4:00 AM to 1:00 AM, mostly with one-car trains using platforms that are typically long enough for two car-trains in the vicinity of the Event Center. This line will be diverted to the Central Subway in 2019, will regularly be served by 2-car trains at a higher frequency than current scheduling north of Mariposa Street, and its UCSF Mission Bay station is located at the northwest corner of the project site.

The T 3rd Street line stops at side-running raised platforms located along 3rd Street at the following locations:

- Inbound/Outbound far-side curbside stops at South Street (at the northwest corner of the site)
- Inbound/Outbound far-side curbside stops at Mariposa Street (1/4-mile south of the site)
- Inbound/Outbound far-side curbside stops at 20th Street (1/2 mile south of the site)
- Inbound/Outbound far-side curbside stops at Mission Rock Street (1/3-mile north of the site)

In addition, all other Muni light rail lines and several east-west Muni bus lines overlap the T 3rd line at the Downtown stations, including the Embarcadero BART/Muni Station and other Market Street Muni bus/rail hubs that are within 2 miles away. Event-goers coming from other parts of San Francisco can transfer to the T 3rd line. Within five years, Muni expects to operate enhanced transit service described in the TEP, which could include the T 3rd and the 22 Fillmore trolley bus rerouted to run along 16th Street east of I-280 to Terry François Boulevard, with a more near-term plan to operate a Muni 55 motor coach line between the 16th Street BART and the Event Center until the trolley bus extension can be completed. The Muni 33 line may be extended to

serve the segment in Potrero Hill currently served by the 22. Two new Muni Bus Rapid Transit corridors (Van Ness and Geary) will have at least one of the programmed lines terminate within 2/3 mile of the project site within the next 5-8 years. Lastly, many major Muni bus lines have current terminus stations at the Temporary Transbay Terminal, Caltrain Terminal and Ferry Building (see below).

3.2.5 Mission Bay TMA Shuttles

The Mission Bay Transportation Management Association (TMA) strives to reduce single-occupant vehicle trips by encouraging alternative modes of transportation for residents, employees and visitors to the Mission Bay development area. Mission Bay TMA currently provides two shuttle bus route services (east and west) between Mission Bay and the Powell Street BART Station and the 4th/King Caltrain Station. They are free of charge and open to all employees, residents, and visitors to the Mission Bay Area and the China Basin building at 185 Berry Street. The west route serves 16th and Illinois streets, while the east route serves 4th Street and Mission Bay Boulevard; both operate at 15-minute intervals from 7:00 to 10:00 AM and 3:45 to 8:15 PM. Figure 3-2 shows TMA Shuttle routes and existing stops.

The Golden State Warriors will join the Mission Bay TMA and the shuttles will be made available for employees and visitors. According to the Mission Bay TMA, the evening service is currently at or near capacity. After joining the TMA, shuttle routes, stops, and schedules may be reconfigured to better serve the site and Mission Bay. A new stop to serve the site is suggested on the south side of South Street near the intersection with 3rd Street.

If the Warriors choose to fund incremental event-only shuttle service in partnership with the TMA, such service would be supported exclusively by the Warriors and limited to event attendees.














3.2.6 UCSF Campus-to-Campus Shuttles

UCSF provides shuttles for university personnel, including faculty, staff, technicians, and students, to travel between the university's campuses in San Francisco. These shuttles relieve capacity constraints for both the Mission Bay TMA shuttles and the road network via a reduction in single-occupant vehicle trips. Non-university affiliated personnel in the neighborhood are not permitted to ride UCSF shuttles.

3.2.7 Temporary Transbay Terminal

The Temporary Transbay Terminal provides temporary bus terminal facilities during construction of the new multi-modal Transbay Transit Center, which is scheduled for completion in 2017. The Temporary Terminal is located in the area bounded by Main, Folsom, Beale and Howard Streets, approximately 1.75 miles north of the project site. It currently serves AC Transit, WestCAT Lynx, Muni, Golden Gate Transit, and SamTrans passengers.

The new Transbay Transit Center will be located in an area bounded by Beale Street, 2nd Street, Minna Street, and Natoma Street and will serve the same transit providers as the Temporary Terminal plus capacity to accommodate Caltrain expansion and California High Speed Rail. Phase I of the project is expected to be completed by 2017.









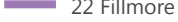



-  MUNI Platform
-  Caltrain Station
-  BART Station
-  MUNI Station
-  Project Site
-  F Market & Wharves
-  KT Ingleside-Third Street
-  N Judah
-  J Church
-  L Taraval
-  M Ocean View
-  BART Line
-  Caltrain Line

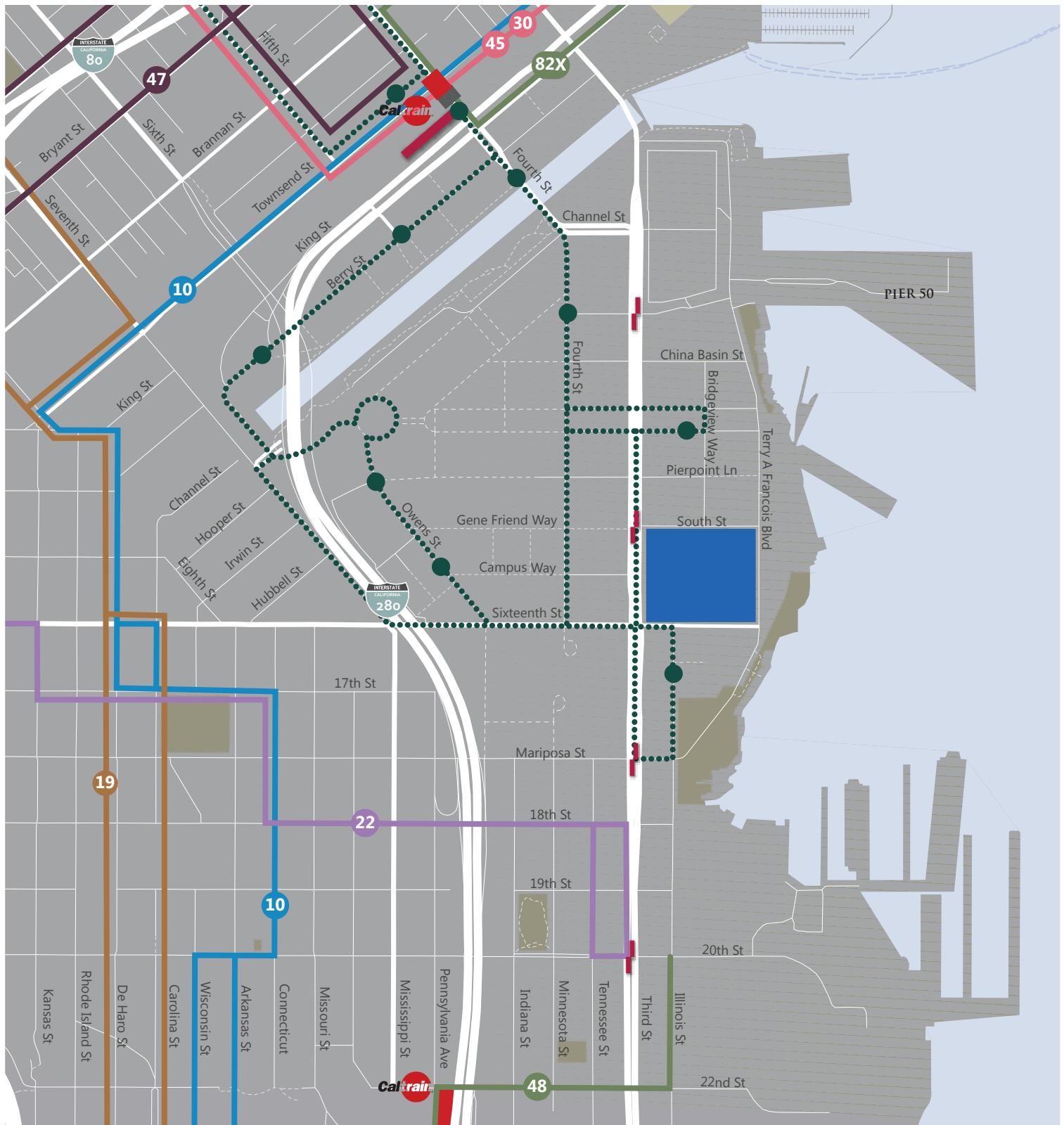



Not to Scale

EXISTING RAIL TRANSIT FACILITIES

FIGURE 3-1

-  BART Station
-  Caltrain Station
-  MUNI Platform
-  Project Site
-  Mission Bay TMA Shuttles (● TMA Shuttle Stops)
-  10 Townsend
-  82X Levi Plaza Express
-  19 Polk
-  22 Fillmore
-  48 Quintara/24th Street
-  47 Van Ness
-  30 Stockton/45Union-Stockton




Not to Scale

3.3 BICYCLE FACILITIES



Bicyclists may use all roadways in the city, not just designated bicycle routes; however, the City of San Francisco has an extensive bicycle network. The three classes of bicycle facilities are described below.



Class I (Multi-use paths) are paved multi-use facilities separated from roadways. The City of San Francisco has Class I facilities in large parks (e.g., Golden Gate Park or the Panhandle) and in areas where bicycling on the street would be challenging (e.g., US 101/Cesar Chavez Interchange).

Class I facilities are generally shared with pedestrians and may be adjacent to an existing roadway, or may be entirely independent of existing vehicular facilities.



Class II (Bicycle Lanes) are striped lanes on roadways designated for use by bicycles through striping, pavement legends, and signs.



Class III (Bicycle Routes) are designated roadways for shared bicycle/vehicle use indicated by signs only; may or may not include additional pavement width for cyclists. The majority of San Francisco's bicycle facilities are Class III facilities. In San Francisco, Class III Bicycle Routes are routinely striped with the shared-lane arrow, or "sharrow," reminding drivers and cyclists to share the roadway.

Current on-street bicycle facilities in the vicinity of the project are shown in **Figure 3-3** and described below. The majority of the study area is flat, with limited changes in grade, facilitating bicycling within and through the area. However, dedicated bicycle lanes are not provided on all routes. For a description of planned bicycle projects which will add key links to the existing network including the Blue Greenway on Terry François Boulevard, refer to section 1.3.2.

The Bay Trail, described above, connects China Basin to Mission Bay across the Channel and runs along bicycle route #5. Additionally, the Embarcadero Enhancement project, now underway proposes to develop a conceptual design and cost estimate for a bikeway - a bicycle facility that is physically separated from moving or parked vehicles and pedestrians - along The Embarcadero from 3rd Street in South Beach to Powell and Jefferson Streets in the Fisherman's Wharf area. A bikeway is a bicycle facility that is physically separated from moving or parked vehicles and pedestrians. The SFMTA proposes to study a bicycle connection across the Lefty O'Doul Bridge that would connect the two waterfront bicycle facilities.

Route #5 runs north to south along Terry François Boulevard and Illinois Street as a Class II bike lane. This route connects China Basin to the north with the project site and Route #7 to the south.

Route #536 is a two-block section of northbound sharrows on 3rd Street between Terry François Boulevard and Townsend Street.

4th Street is a north-south bike route that extends from Berry Street to the north to 16th Street. 4th Street is designated as a Class III bicycle facility as it crosses Mission Creek until Channel Street, south of which it has Class II bike lanes.

Route #7 is primarily a north-south bike route that runs along Indiana Street as a Class III facility. At Mariposa St to the north, it merges with Route #23 and runs to the east to Illinois Street, where it continues north to the Event Center site. This route connects to Route #23 to the west as well as Route #5 and the Bay Trail to the east.










Route #23 is primarily a north-south bike route that extends along 7th Street from Brannan Street to 16th Street and down Mississippi Street to Mariposa Street with Class II bike lanes. At Mississippi Street and Mariposa, it runs east along Mariposa Street as a Class III facility and merges with Route #7.

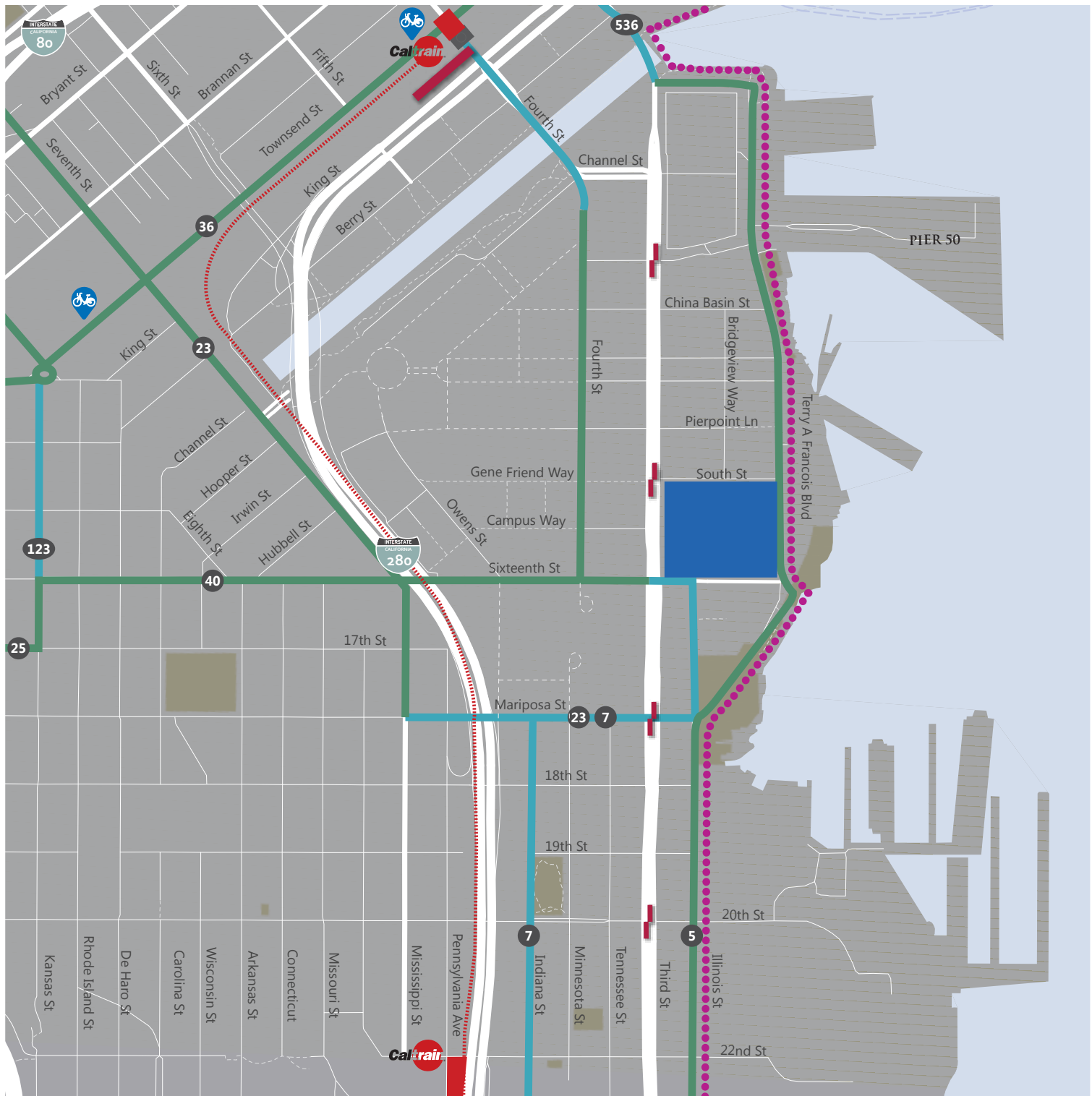
Route #123 is a short north-south bike route that runs along Henry Adams/Kansas Street between Division Street and 16th Street as a Class III bicycle facility. It connects Routes #36 and #40.

Route #36 is an east-west bike route that runs along Townsend Street between The Embarcadero and 8th Street as a Class II bike lane. It connects the Caltrain Station at 4th and King Streets with Routes #23 and #123 to the west.

Route #40 is an east-west bike route that runs along 16th Street from Kansas Street to 3rd Street as a Class II bike lane. It continues for less than a block as a Class III bike facility from 3rd Street to the project site at Illinois Street. This route connects Route #25 and #123 to the west with Routes #23, 4th Street, and the project site to the east. Route #40 is planned to be moved to 17th Street between Kansas and Mississippi Streets before returning to 16th Street, where it will continue to Terry François Boulevard.

There is currently a **Bay Area Bike Share** (BABS) pod at the Caltrain Station and on Townsend Street between 7th and 8th streets, and at least one planned in the Mission Bay neighborhood near the UCSF residences. The Warriors are exploring locations for a new bike share station at or immediately adjacent to the Event Center or Bayfront Park.

-  Bikeshare Station
-  Bicycle Route Number
-  BART Station
-  Caltrain Station
-  MUNI Platform
-  Project Site
-  Bicycle Lane - striped, marked, and signed lanes for bicycle travel (Class II)
-  Bicycle Route - shared travel lane marked and signed for shared use (Class III)
-  Bay Trail




Not to Scale

3.4 STREET NETWORK



Since the Event Center Development site is located at the eastern edge of the Mission Bay neighborhood, the street network serving it extends to the north, west, and south only. The project proposes to restripe the roads adjacent to the Event Center Development frontage, as discussed in more detail previously in Chapter 2.

3.4.1 Local Access

This section describes the existing streets that are most relevant for access to the immediate vicinity of the site and discusses their relevance for particular modes as appropriate.

16th Street is a four-lane east-west Secondary Arterial roadway with left turn pockets that extends to Castro Street to the west and currently terminates at Illinois Street in the east. Upon build out, 16th Street will continue along the south border of the project site to Terry François Boulevard. East of Illinois Street and along the majority of the corridor within the study area, on-street parking is prohibited on both sides of the street. On-street parking is currently allowed on both sides of the street between 3rd Street and Illinois Street. Muni line 22 currently runs along the length of 16th Street west of Kansas Street. Interim Muni line 55 is proposed to run along 16th Street to 3rd Street. Bicycle Route 40 is a Class II route that runs along 16th Street between 3rd and Kansas streets. Future plans will extend the route east along 17th to Mississippi where it will return to 16th Street. Sidewalks are generally provided on at least one side of the road within the study area (on the south side of the road to the east of 3rd Street and on the north side of the road west of 3rd Street). On-street bike lanes are planned along 16th Street between 3rd Street and Terry François Boulevard.

South Street borders the project to the north and runs for one block from Terry François Boulevard to 3rd Street. It is a four-lane road that transitions to a pedestrian plaza, Gene Friend Way, to the west of 3rd Street. Parking is prohibited on both sides of the street and wide sidewalks are provided on the north side. No bicycle facilities are provided on South Street.

3rd Street is a four-lane north-south roadway that extends from Market Street to Bayshore Boulevard. It is designated as a Primary Transit Important roadway in San Francisco's General Plan. Near the Event Center site, on-street parking is prohibited on both sides of the street. 3rd Street is designated as a Class III bike route with sharrows between King Street and Terry François Boulevard in the northbound direction only. The T 3rd Street light rail line operates along 3rd Street between Channel Street and Bayshore Boulevard along a physically separated median in the roadway. During peak events at AT&T Park, vehicle capacity across the 3rd Street Bridge is reduced to one lane in each direction to accommodate surges in pedestrian activity around the park.

Terry François Boulevard is primarily a four-lane road that runs north-south from Mission Rock Street to 3rd Street and borders the project site to the east. The road transitions to a two-lane road north of Mission Rock Street, where it curves to the west to its terminus at 3rd Street. Terry François Boulevard is part of the Bay Trail and Bicycle Route 5 (Class II in both directions). On-street parking is generally permitted on both sides of the street, except along the frontage of Pier 48 and Pier 50. During events at AT&T Park, Terry François Boulevard is closed to vehicle traffic from 3rd Street to Pier 48. The proposed Blue Greenway project will add a two-way bikeway along the east side of the street with a 4-foot buffer. As part of the Blue Greenway project, Terry François Boulevard will be realigned to create a regular block shape for Blocks 30 and 32 and to maximize the size of the Bayfront Park. The four travel lanes and on-street parking lanes on both sides will be maintained.

Bridgeview Way is a privately managed, narrow two-lane road that runs from South Street directly across from the north parking entrance for the Event Center Development, to China Basin Street. Parking is prohibited on

both sides of the street and sidewalks are provided on both sides along the entire stretch. This road provides internal access and circulation for the residential and office uses along the corridor.

Illinois Street is a two-lane road that runs north-south from Cargo Way to 16th Street at the south parking entrance to the Event Center Development. Through the project area, parking is permitted on both sides of the street and the majority of the road. Parking is prohibited on the west side of Illinois between Mariposa and 18th streets during the post-event period when there are events at AT&T Park. Illinois Street also serves as Bicycle Route 5, with Class II facilities in both directions. Parking is prohibited on the west side of Illinois between Mariposa and 18th streets during the post-event period when there are events at AT&T Park.

4th Street is a two-lane north-south Primary Transit Important roadway that extends from Market Street to 16th Street. On-street parking is provided on both sides of the street. 4th Street is designated as a Class III bike route as it crosses Mission Creek, after which it transitions into Class II bike facilities (bike lanes) between Channel Street and 16th Street. The T 3rd Street light rail line operates on 4th Street between King Street and Channel Street. The 4th Street Bridge is closed to northbound traffic except transit, taxis and bikes during the post-event period for AT&T Park events. As part of the Mission Bay Redevelopment Plan, 4th Street will extend south of 16th Street to access a new UCSF hospital facility, but will not connect through to Mariposa Street.

7th Street is a two-lane north-south Secondary Arterial roadway that extends from Market Street to 16th Street. On-street parking is provided on both sides of the street between Irwin Street and 16th Street. 7th Street has Class II bike facilities between Brannan and 16th streets.

Mission Bay Boulevard North and South are a one-lane one-way east-west couplet Local Street that extends from Terry François Boulevard to 4th Street; right-turn only lanes are provided at intersections. It is located at the northern edge of the Mission Bay campus site and will be eventually extended to connect to the Mission Bay Circle in the future, located approximately 1,300 feet to the west, as part of the Mission Bay Redevelopment Plan. On-street parking is provided on the north side of the Mission Bay Boulevard North.

King Street is a five to six-lane Primary Transit Important east-west roadway that connects to the terminus of I-280 approximately 2/3 mile north of the project. The Muni line T 3rd Street operates in the median along King Street between The Embarcadero and 4th Street, where it continues down 4th Street to the Event Center site. AT&T Park, home of the San Francisco Giants, is located on King Street between 2nd and 3rd Streets. Caltrain has its terminus station on 4th Street between King and Townsend Streets. Although King Street is not directly adjacent to the Event Center Development project site, it plays a major role in providing access to and from the site. King Street is closed in eastbound direction between 3rd and 2nd streets during post-event period for AT&T Park events.

Berry Street is a two-lane east-west Local Street that extends from 3rd Street to Owens Street. Berry Street operates as an eastbound one-way street between 3rd and 4th Streets. On-street parking is provided primarily on the south side, though there are some areas that have on-street parking on both sides of the street.

Channel Street is a four-lane east-west Local Street that currently extends from west of 4th Street to 3rd Street. On-street parking is prohibited on both sides of the street between 3rd and 4th Streets, and permitted west of 4th Street. The T 3rd Street rail line operates on Channel Street between 3rd and 4th streets within a physically separated median in the roadway. Channel Street will be extended to the Mission Bay Circle in the future, as part of the Mission Bay Redevelopment Plan.


Mission Rock Street is a two-lane east-west Local Street that extends from Terry François Boulevard to 4th Street. On-street parking is provided on both sides of the street for most of the length, but is not available east of 3rd Street.

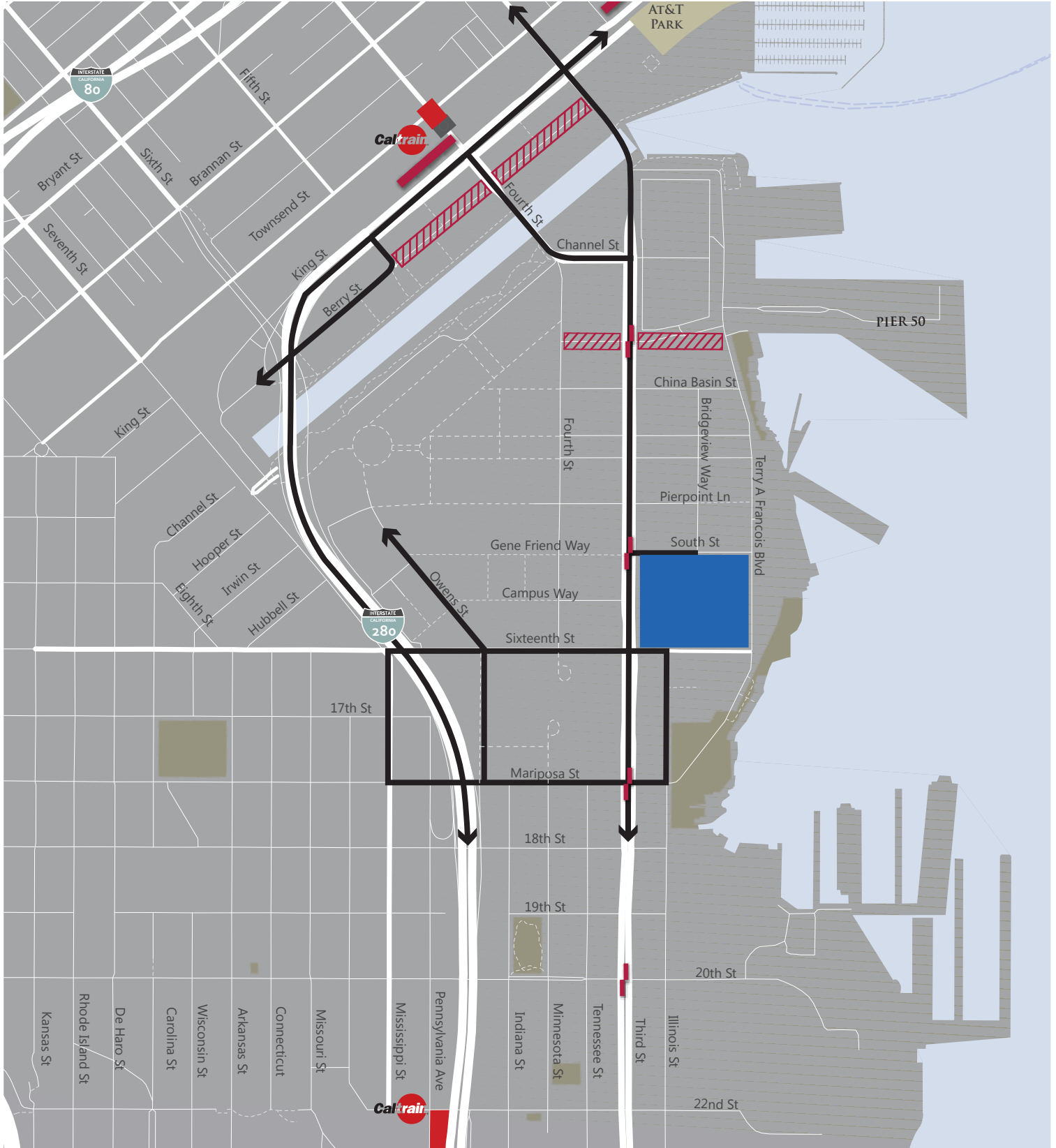
Mariposa Street is a two-lane east-west Local Street that extends from Illinois Street to Harrison Street. During special events, parking is prohibited to provide four travel lanes. The I-280 on- and off-ramps (southbound and northbound, respectively) are located immediately east of the intersection of Pennsylvania and Mariposa streets. The intersection of Mariposa Street and Fourth Street serves as a major access point to the UCSF hospital facilities currently under construction. Both sides of the street provide on-street parking. In addition, Mariposa Street is a designated Class III bike route with sharrows between Illinois Street and Mississippi Street. Mariposa Street will be widened to five lanes between 3rd Street and I-280 prior to opening of the Event Center.

Owens Street is a north-south roadway that runs from 16th Street north to a future roundabout, where it continues to the west until it runs into Mission Bay Drive. It operates as a two-way street with one travel lane in each direction. There are no Muni routes or bicycle designations on Owens Street. Owens Street sidewalk widths within the study area are generally adequate. Owens Street will be extended south to Mariposa Street and will connect with the I-280 off-ramp at Mariposa.

3.4.2 Truck Access

Major truck routes in Mission Bay are along I-280, King Street, Mariposa Street, 16th Street, and 3rd Street. These routes are illustrated in **Figure 3-4**. Primary truck access to the project site will be along Mariposa Street to Illinois Street, where direct access to the parking garage will be provided at the Illinois Street / 16th Street intersection. Secondary truck access to the site will be along Cesar Chavez Street to Illinois Street. Truck access to and circulation throughout the Event Center Development site is explained in further detail in Chapter 7.

-  BART Station
-  Caltrain Station
-  MUNI Platform
-  Project Site
-  Truck Route
-  No Thru Truck Traffic




Not to Scale

3.5 REGIONAL TRAFFIC

Interstate 80 (I-80): I-80 provides the primary regional access by car from the East Bay to the project area. It connects to the East Bay and other major freeways (I-580 and I-880) via the San Francisco-Oakland Bay Bridge. Within San Francisco, I-80 generally has eight lanes (four lanes in each direction). On- and off-ramps serving the site are located as follows:

- Off-ramps:
 - Westbound: Harrison Street at 5th Street; 8th Street at Harrison Street
 - Eastbound: 4th and Bryant, 7th and Bryant
- On-ramps:
 - Eastbound: Bryant Street between 1st and 2nd Streets; Essex Street at Harrison Street; , 1st Street at Harrison Street, 8th Street
 - Westbound: 7th Street and Harrison, 4th and Harrison

Interstate 280 (I-280): I-280 provides the primary regional access by car from the South Bay and the Peninsula to the project site and is generally a six-lane freeway. There is a freeway interchange between I-280 and **Highway 101** (US 101) approximately 2.5 miles south of the site. US 101 also provides access to Cesar Chavez Street south of the site and Vermont Street west of the site. I-280 has a terminus (both on- and off-ramps) at 4th and King Streets, adjacent to the Caltrain Station, which results in the need to ensure safe pedestrian circulation at that intersection. The closest on- and off-ramp serving the site for southbound and northbound I-280 traffic is at Mariposa Street. Drivers will be encouraged to also use the ramp at Cesar Chavez St/Pennsylvania Avenue to reduce the impacts on the ramps before and after a peak event and distribute traffic more efficiently. On- and off-ramps serving the site are located as follows:

- Off-ramps:
 - Northbound: Cesar Chavez Street; Mariposa Street; 5th Street / King Street (terminus)
 - Southbound: 18th Street / Pennsylvania Avenue; Cesar Chavez Street / 25th Street
- On-ramps:
 - Northbound: 25th Street; 18th Street;
 - Southbound: 5th Street / King Street (terminus); Mariposa Street; Cesar Chavez Street

Regional auto traffic will seek parking in locations close to the Event Center. A total of 8,290 parking spaces exist in the area between the Event Center and I-280/King Street to the west and north. This includes 4,690 spaces in parking structures and 3,590 spaces in surface lots. Major parking facilities in the area include Lot A (2,300 space surface lot), the 1,400 space structure at 450 South Street, the 730 space UCSF garage at 3rd Street and Campus Lane, a 500 space structure at 499 Illinois Street, and an 800 space structure located behind 1650 Owens Street.

CHAPTER 4. TRAVEL DEMAND MANAGEMENT

The purpose of the strategies described in this chapter is to increase the level of access to the project by transit, bicycling and walking while discouraging the use of private automobiles, particularly by solo drivers. The strategies identified in this chapter will be reviewed and refined both during the Event Center's first year of the project's completion and as new transportation facilities are developed in the project vicinity.

4.1 GENERAL TRANSPORTATION MANAGEMENT STRATEGIES

Measures that will be implemented to support all public transit, bicycle, and automobile reduction strategies include:

1. Designate a TMP coordinator to: develop and implement marketing/communications/incentives programs, and coordinate with facility and tenants on policies and capital needs to support sustainable trip making by employees and event center visitors.
2. Develop means of in-building, on-site, and/or neighborhood communication (radio, TV, smart phone app, etc.) that give Event Center, office, or retail users multiple, real-time advisories about the status of the transportation system and event schedule to facilitate convenient transportation choices. Information provided may include availability of public transit and shuttle bus service, location and capacity of bike parking facilities, best walking paths, location of taxi stops, and limited extent of – or high price for – available parking.
3. Develop a crowd-sourced app that puts information on all transportation modes in the hands of event attendees with smart communication devices. This real-time information on travel conditions and travel times by mode will lead to a transportation system that will become increasingly more user optimized. The app may also be equipped to send notifications about event times and traffic conditions. The app will be free and available to anyone who wishes to download it, and will be useful for anyone working, living, or visiting the Mission Bay Area.
4. Provide extensive use of real-time transit info in public assembly areas that reflect the range of transit services in the area.
5. Install a machine to add value to Clipper Cards on-site.
6. Establish an annual TDM budget for all components of the TDM program applying to GSW employees and event center visitors.

4.2 EMPLOYEE TDM

The strategies described below are designed to reduce employee auto mode share.

4.2.1 Employee Public Transit Strategies

1. Participate in and promote pre-tax commuter benefits, a federal program that allows employees to reduce their commuting costs by up to 40 percent using tax-free dollars to pay for their commuting expenses.
2. Contribute to the Mission Bay TMA shuttle program; designate priority curbside areas on-site for TMA shuttles.

3. Promote use of Mission Bay TMA shuttles to employees; notify them that they are eligible to ride the Mission Bay TMA shuttles, and provide information about routes, stop locations, and schedule.

4.2.2 Employee Bicycle Strategies

1. Provide indoor secure bicycle parking facilities for employees.
2. Provide shower and locker facilities for employee use.
3. Promote use of the indoor bicycle valet facility (approximately 300 bike spaces) (available to Event Center and GSW employees only during non-event hours and days).
4. Sponsor a Bay Area Bike Share station in the project vicinity.
5. Encourage all employees and visitors to participate in public events that promote bicycling such as the annual "Bike to Work" day.

4.2.3 Employee Automobile Reduction Strategies

Measures that will be implemented to reduce the effects of employee vehicular traffic include:

1. Enroll in free-to-employees ride-matching program through www.511.org.
2. Enroll in free-to-employers Emergency Ride Home program through the City of San Francisco (www.sferh.org).
3. Designate parking spaces for carpool/vanpool participants.
4. If applicable, comply with California's parking cash-out program.
5. Organize and publicize community efforts, such as Spare the Air days (as declared for the Bay Area region) or a Rideshare Week.
6. Encourage tenants to allow certain employees to work flexible schedules and telecommute, to the extent reasonable.

4.2.4 Additional Strategies

1. Identify potential tenants who may provide on-site amenities (such as fitness and exercise centers, food and beverage options, and/or automated banking resources) to encourage employees to stay on-site during the work day.

4.3 EVENT CENTER PATRON TDM

The strategies described below are designed to limit event patron auto mode split for peak-event travel (6:00 PM – 8:00 PM) to no more than 53 percent (weekday) or 59 percent (weekend). They should also reduce auto mode split for retail, restaurant, and other site visitors where applicable.

4.3.1 Patron Public Transit Strategies

Measures that will be implemented to increase the use of public transit among guests include:

1. Work with the City to identify arena event patrons arriving via transit and reward those patrons with promotional incentives that may include discounted food or beverage, team or venue merchandise, raffle entry, access to a “fast-track” security line or one or more other options. Market these incentives with a robust communications strategy prior to an event day so that guests can make choices accordingly.
2. Distribute GSW-branded Clipper Cards to encourage patrons to associate event attendance with transit usage during attendee’s trip planning process.
3. Work with the SFMTA to determine the market feasibility and benefits of bundling the cost of a roundtrip Muni fare into the cost of all ticketed events.
4. Encourage customers at point of ticket purchase to use sustainable modes via communications on the internet and through the ticket vendor.
5. Work with the SFMTA to brand transit stops/stations near the project site, covering any costs associated with re-branding. Utilize TVs and other screens inside the Event Center building to display real time transit information and prominent comparisons between transportation choices available to fans, employees, and visitors to the Event Center Development. Emphasize transit’s lower-cost, higher sustainability, and other beneficial factors as compared with private autos.
6. Play recorded announcements during halftime (for games) or between opening and main acts (for concerts), and as Event Center attendees exit the building, to notify guests of non-auto travel options home, including real time transit and shuttle departure times.
7. Provide additional communication of transit options and wayfinding during playoff games for non-season pass holders who may be coming from out of town by providing information to, and coordinating displays within, hotels and local businesses in the Event Center vicinity

4.3.2 Patron Bicycle Strategies

Measures that will be implemented to increase the frequency and convenience of biking among Event Center patrons include:

1. Promote use of the indoor bicycle valet facility (approximately 300 bike spaces) on 16th Street. Identify and reward patrons of the bike valet with promotional incentives that may include discounted food or beverage, team or venue merchandise, raffle entry, access to a “fast-track” security line or one or more other options. Market these incentives with a robust communications strategy prior to an event day so that guests can make choices accordingly.
2. If and when peak event bicycle storage demand exceeds the 300-space enclosed valet facility and on-site bike rack capacity, provide additional temporary outdoor bike valet parking areas.
3. Provide outdoor bicycle storage/racks for Event Center and office, retail, or restaurant visitors.
4. Sponsor a Bay Area Bike Share station in the project vicinity.
5. Encourage all guests to participate in public events that promote bicycling such as the annual “Bike to Work” day

6. Provide a bicycle map, showing routes to the Event Center development site, on the Event Center web site, mobile applications, and in event literature and advertisements, when appropriate.

4.3.3 Patron Automobile Reduction Strategies

Measures that will be implemented to reduce the effects of visitor vehicular traffic include:

1. If parking is not bundled with ticket purchases for arena events (i.e., select event days and types), charge market-rate fees for on-site parking in connection with such arena events. Encourage off-site parking partners to charge market-rate parking fees for all arena events.
2. Designate priority curb areas on-site for taxis, charter buses, and rideshare vehicles. Explore partnership options with rideshare/carpool/TNC companies to offer discounts to event attendees and other visitors and/or employees.

4.3.4 Patron Communication Strategies

1. Design a “Getting There” page for the venue website that lists multi-modal options and comparisons before showing preferred driving routes or available parking.
2. Promote transit access to project by providing: interactive trip-planning tools, transit maps, with recommended stops/stations for accessing site and best routes to the Event Center; and walking directions from transit stations/stops. Promote transit information on Event Center web site, mobile apps, on websites of events taking place at the site (to be required as a standard part of event contract), and in event literature and advertisements, when appropriate.
3. Provide real-time transit information, including train or bus arrivals and departures, in key Event Center locations (exit areas, gathering areas, etc.), inside the building (on TVs and other screens), and/or via mobile applications.
4. Make available additional communication of transit options and wayfinding during playoff games for non-season pass holders who may be coming from out of town by providing information to, and encouraging displays within, hotels and local businesses in the event center vicinity.
5. Create schedules of upcoming events for display on electronic message boards, to discourage auto use and parking in the Event Center vicinity.

4.3.5 Additional Strategies

1. Identify potential tenants who may provide on-site amenities (such as food and beverage options, and/or automated banking resources) to encourage Event Center patrons to stay on-site for longer post-event periods.

4.4 SPECIAL EVENT TRANSIT SERVICE PLAN

This section summarizes a preliminary Transit Service Plan (TSP) for the Warriors Event Center and Mixed Use Development as outlined by the SFMTA in a presentation on October 1, 2014.

4.4.1 Service Plan Objectives

The key objective for the TSP is as follows:

- Provide high quality service to event goers, without affecting service reliability for other Muni customers
- Accommodate a 35 percent transit mode share for peak event trips
- Develop a service plan that maximizes existing infrastructure and prioritizes operations efficiencies
- Develop a service plan adequate for peak event ridership volumes that is also scalable for small and medium events

4.4.2 Service Plan for Peak Event

The majority of regional transit riders will use Muni as a last-mile connection to the Event Center Development. Most Muni passengers will travel on the T 3rd southbound pre-event, and northbound post-event. The T 3rd service pre-event is expected to have excess capacity, while post-event excessive capacity will not be allocated from regular service, but rather will be served from additional trains and supplemental routes. The T 3rd service will be supplemented with bus service to respond to distributed customer demand, to minimize transfers made, and to minimize rail car demand. **Inset 4-1** shows proposed routes for each of the supplemental shuttles. Supplemental bus routes include:

- T 3rd Supplemental Service
- Metro Shuttle via The Embarcadero
- 16th Street BART Station Shuttle
- Van Ness Avenue Shuttle
- Ferry Building / Transbay Terminal Shuttle

Inset 4-1 Supplemental Shuttle Routes

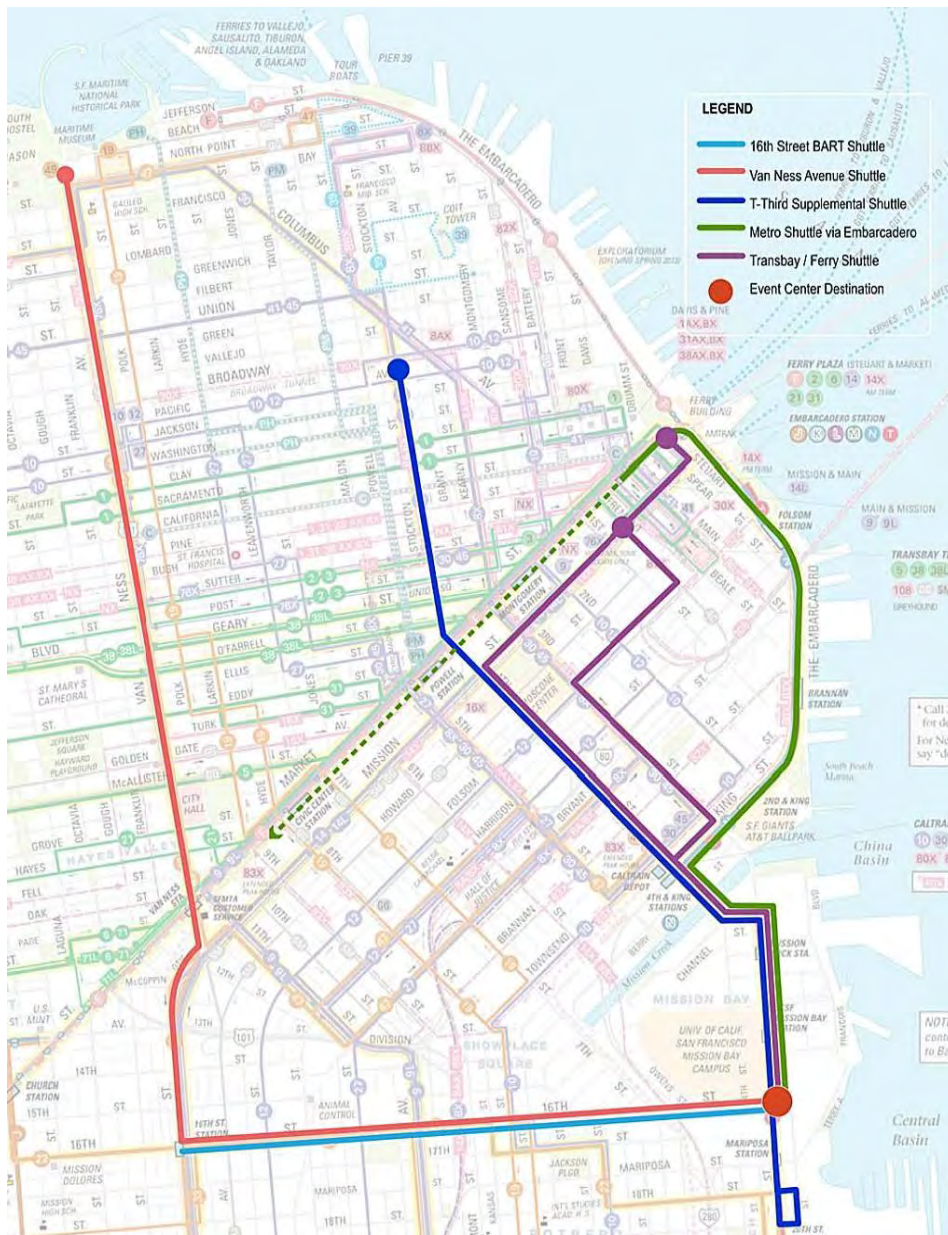


Table 4-1 summarizes the fleet of shuttle buses and light rail vehicles necessary for pre- and post-event scenarios.

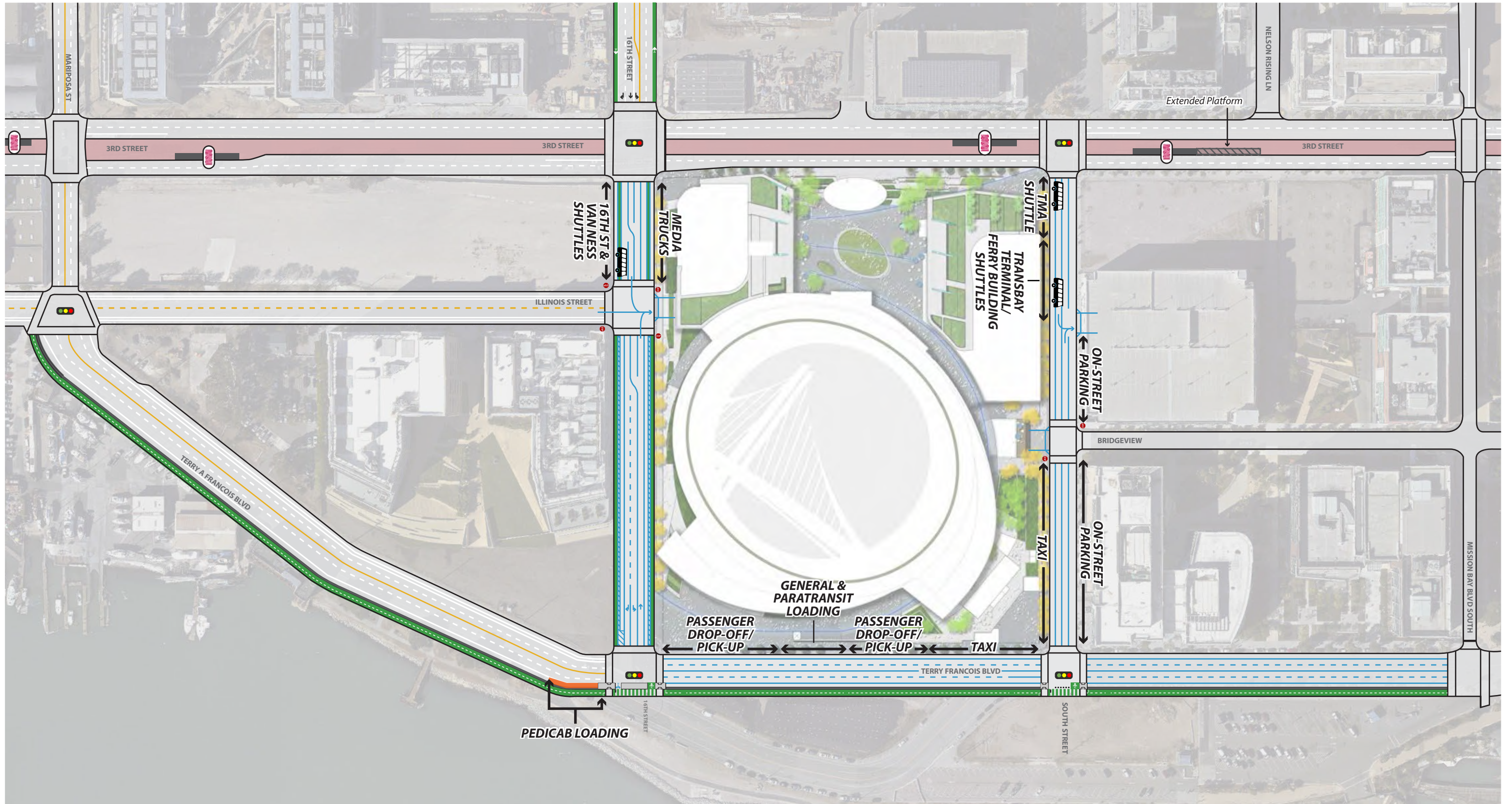
Figure 4-1 shows the pre-event shuttle plan, including stop locations at the site. Figure 4-2 shows the post-event shuttle plan; including shuttle stop locations, staging areas, and temporary lane closers, which are discussed in more detail in Chapter 6.

TABLE 4-1: PRELIMINARY TRANSIT SERVICE PLAN FOR PEAK EVENT²

SERVICE	FLEET NECESSARY	
	Pre-Event	Post-Event
T 3 rd Supplemental Service	4 two car trains between Chinatown and Mission Bay Loop combined with 4 minute scheduled subway service	10 two car trains staged to clear event
Metro Shuttle via The Embarcadero	None – limited car availability	2 three car trains staged to clear event
16 th Street BART Station Shuttle	4 articulated motor coaches operating between 16 th Street BART and the arena every 7-8 minutes	4 articulated motor coaches + 1 standard motor coaches operating between 16 th Street BART and the arena staged to clear event with half of vehicles returning for a second trip
Van Ness Avenue Shuttle	5 standard motor coaches operating every 12 minutes along the Van Ness corridor to arena via 16 th Street	4 standard motor coaches operating to the Van Ness corridor via 16 th Street staged to clear event
Ferry Building / Transbay Terminal Shuttle	6 standard motor coaches operating every 10 minutes via Ferry Plaza and the Transbay Terminal to the arena	6 standard motor coaches operating to Transbay Terminal and Ferry Building Plaza staged to clear event

Source: SFMTA (Oct. 1, 2014).

² The Transit Service Plan can also be modified and implemented to serve varying attendance size for small and medium events.



Not to Scale

CHAPTER 5. TRAVEL CHARACTERISTICS OF EVENT CENTER ATTENDEES AND SITE USERS

This chapter describes the travel characteristics of current Oracle Arena attendees and the assumptions for the new Event Center based on the analysis prepared by the SEIR Team (as of December 2014), focusing on travel patterns typical of game days. For typical sequences of events on game and concert days, please see **Appendix A**. This Chapter is included in the TMP for contextual and informational purposes only. A full environment document will be prepared that includes a more complete and quantitative analysis of travel characteristics (i.e., projected mode split, intersection performance, parking demand, and traffic routing) as they pertain to transportation.

5.1 NBA EVENT ATTENDANCE LEVELS

The NBA regular Season consists of 82 games total with half of them played at the home Arena. Home games over the year would typically consist of the following:

- 2-3 pre-season home games;
- 41 regular season home games;
- 0-16 post-season home games (should the Warriors reach the playoffs, the minimum number of home games is 2 and the maximum is 16)

The monthly distribution of home games tends to be evenly spread at about 7 games/month over 6 months (November-April), with a typical month having 1-3 games on Fridays, 1-3 games on Saturdays, 0-1 game on Sundays, and 2-6 games on Mondays through Thursdays.

The capacity of the existing Oakland Arena is 19,596. Average attendance levels at home games over the last 10 years are summarized in **Table 5-1**.

TABLE 5-1: WARRIORS' HISTORIC GAME ATTENDANCE LEVELS BY YEAR

Season	Average Attendance	Occupancy
2012-13	16,831	86%
2011-12	16,749	86%
2010-11	16,399	84%
2009-10	14,884	76%
2008-09	17,573	90%
2007-08	18,120	93%
2006-07	16,024	82%
2005-06	16,173	83%
2004-05	14,471	74%
2003-04	14,370	73%

Source: GSW Attendance and Employment Memo (Feb. 7, 2014).

Based on the information above, games in many years have, on average, almost filled the Arena to capacity. As a result, the discussion and controls in the following sections are based on 18,064 attendees.

5.2 EVENT CENTER PATRON ARRIVALS

5.2.1 Trip Origins and Arrival Distribution

Table 5-2 summarizes the known origins of attendees who currently attend games at Oracle Arena and estimated origins of future attendees. As shown, it is anticipated that at the proposed new Event Center site, the breakdown of trip origins will shift considerably. It is anticipated that fewer attendees will come from the East Bay (33 percent vs. 53 percent) and that more attendees will come from San Francisco, the South Bay, and the North Bay.

TABLE 5-2: ORIGINS OF NBA EVENT ATTENDEES		
Origin	Origins for Current Oakland Arena Location ¹	Weekday Inbound Forecast Origins for San Francisco Location ¹
San Francisco	16%	29.3%
Super District 1	N/A	14.8%
Super District 2	N/A	4.6%
Super District 3	N/A	5.5%
Super District 4	N/A	4.4%
North Bay	7%	8.9%
East Bay	53%	31.1%
South Bay	24%	26.7%
Out of Region	N/A	4%

Notes:

1. Source: *Technical Memorandum – Travel, Parking and Loading Demand Estimates for the Proposed Event Center & Mixed-Use Development at Mission Bay Blocks 29-32*, March 2015.

Assuming the pattern is similar for the proposed Event Center site, it can be expected that patron arrivals at the Event Center will begin approximately 2½ hours prior to event start, peak during the ½ hour prior to event start, and continue after the event is under way. Approximately 70 to 80 percent of attendees are assumed to depart in the hour immediately after the event ends.

For other events at the Event Center (e.g. family shows, theatre events) the arrival and departure distributions times are different compared to the peak NBA game event. Although the attendance levels will be lower for such events, due to the nature of the event and the audience it attracts, it is much more likely that all guests will arrive prior to the start time and will stay until the end.

5.2.2 Pedestrian Arrivals

Most attendees will take transit or drive and park at nearby garages and lots, and then walk to the Event Center. Transit and auto trips to games make up approximately 90 percent of all trips. Regardless of their primary mode of travel, most guests will walk the final leg of their trip. Figure 5-1 illustrates the projected routes that

pedestrians will likely take as they walk from nearby transit stops/stations and the walking times associated with each route.

The main pedestrian entry points to the Event Center include the main plaza on the west side of the site with direct access from 3rd Street sidewalks, and the southeastern corner of the site with access from Terry François Boulevard, 16th Street, and the Bayfront Park. The majority of pedestrian traffic is expected to come from north of the site along The Embarcadero and the 3rd Street corridor, with its direct links to Market Street and major transit hubs. Some pedestrians walking from the Embarcadero may use Terry François Boulevard instead of 3rd Street. Upon completion of the Blue Greenway, Terry François Boulevard will become a much more attractive walking route to pedestrians coming to the site from the north or the south. The majority of pedestrians coming from the south and west are likely coming from nearby BART and Caltrain stations and will walk along 16th Street, 3rd Street, or Terry François Boulevard to the Event Center Development.

5.2.3 Transit Arrivals

Arrivals from Caltrain

Most attendees who choose to take Caltrain to the Event Center are expected to get off at the 4th & King Station (0.7 mile walk) during the peak pre-game hour, while a very few may choose to get off at the 22nd Street Station. On weekends, train headways are typically one per hour; thus, most attendees using Caltrain will likely arrive in a single train. However some guests may come on an earlier train for weekend events to visit the city or the shop at the retail and restaurant uses on site. On weekdays, 6-7 trains arrive between 6:00 and 7:00 PM. With future electrification, Caltrain anticipates an additional train per hour.

From 4th & King most pedestrians will cross King Street, walk along 4th Street, across the 4th Street Bridge to Channel Street, and finally along 3rd Street or Terry François Boulevard to the Event Center. Muni assumes that about half of Caltrain riders will get on the T 3rd at Caltrain and ride to the Event Center. Key intersections along pedestrian routes from Caltrain should be monitored to determine if additional traffic control is necessary.

Arrivals from UCSF Mission Bay Muni Platforms

Many event attendees coming from downtown San Francisco or BART or AC Transit or Golden Gate Transit will likely take Muni Metro (T 3rd Street Line) to the Event Center. Most Muni passengers are predicted to be coming from the north and will likely get off at the UCSF Mission Bay stop, located on 3rd Street south of South Street, approximately 500 feet away from the Event Center entry. Muni passengers coming from the south will either get off at the Mariposa Street stop and walk the remaining quarter mile to the arena, or will get off at the UCSF Mission Bay stop on 3rd Street north of South Street. To deter pedestrian crossings mid-block between South Street and 3rd Street, decorative fencing will be placed along the Muni transit right-of-way.

Because the UCSF Mission Bay platform will need to accommodate high volumes of pedestrians during the pre- and post-event period, the project will require the extension of the platforms at 3rd Street and South Street to provide longer, larger, and safer landing spaces for crowds. PCOs will also be positioned at key intersections and crossings to assist with safe pedestrian crossing and vehicle operations in the vicinity of the platforms during peak events. To deter pedestrian crossings mid-block between South Street and 3rd Street, decorative fencing will be placed along the Muni transit right-of-way.

Arrivals from Special Event Shuttles

Event attendees arriving from the Mission and 16th Street BART station or Van Ness shuttles will be dropped off along the south side of 16th Street, just west of Illinois Street. Pedestrian access to the Event Center will be provided at PCO-assisted crossings at either 3rd Street or Illinois Street. Transbay Terminal and Ferry Building shuttles will drop off patrons on the south side of South Street, just east of 3rd Street.






5.2.4 Bicycle Arrivals






Valet bicycle parking will be provided for peak events near the southeast corner of the site. A total of more than 300 attended, free, indoor valet bicycle parking spaces will be provided. Up to 200 additional bicycles (or more if demand exceeds this number) will be accommodated on game days through a combination of permanent independently accessible outdoor bike racks installed near on-site destinations and entries, and temporary staffed outdoor bike valet facilities. In addition, secure bike rooms located at grade in each office building will provide up to 80 total bicycle spaces for office users. The nearest bike share station is currently located at the 4th & King Caltrain Station, approximately 2/3 mile away, or a 15 minute walk. The project will sponsor a bike share station in the immediate vicinity of the Arena, likely along Terry Francois Boulevard.

Based on the mode splits for different events, the most bicycle traffic is expected during Saturday peak event days, resulting in approximately 250 bicycle trips, of which approximately half will arrive in the hour preceding game start. If all bicyclists choose to use the bicycle valet, then the bicycle valet will be nearly filled to capacity during most events.

Most bicyclists traveling north or south to the arena are expected to use the Terry François Blue Greenway when it is complete. Bicyclists traveling west to the arena are expected to use 16th Street. All bicyclists will be expected to walk their bikes across 16th Street or Terry Francois Boulevard at designated crosswalks to access the bike valet. Signage to direct this movement will be clearly displayed to ensure organized, safe movements of bicycles and to reduce conflicts with vehicles and pedestrians. Location and design of the bike valet and nearby landscaping will also direct the safe movement of pedestrians and cyclists.

Pedicabs, will be accommodated near the site, especially during peak events. Most pedicabs are expected to travel north/south to the site and are expected to use the Terry François Blue Greenway when it is complete. A pedicab staging area is proposed for the east side of Terry François Boulevard just south of 16th Street. This is consistent with the bicycle focus in the southeast corner of the site.

-  BART Station
-  Caltrain Station
-  MUNI Station
-  MUNI Platform
-  Project Site

- Potential Pedestrian Path of Travel from Regional Transit**
-  From BART
 -  From Transbay Terminal
 -  From Caltrain
 -  From Ferry Building
 -  # min Walking Time to Warriors Arena




Not to Scale

POTENTIAL PEDESTRIAN PATHS OF TRAVEL FROM REGIONAL TRANSIT

5.2.5 Taxis and Charter Buses

An evening NBA game is not forecast to attract more than 2-3 large charter buses on average³; however they may become more relevant or necessary to help meet auto mode share goals in the future. A charter bus zone will be located along the north side of 16th Street close to Terry François Boulevard for drop-off/pick-up activity during small events. A total of 500 feet of curb space (accommodating 6-8 buses at a time) will be available on the north side of the street between Illinois Street and Terry François Boulevard. No additional off-site staging for the buses is necessary or anticipated at this time.

While conventions are expected to draw a much smaller number of visitors, nearly half of all trips are forecast to be taken by shuttle bus or taxi.

A staffed taxi zone will be designated along the west side of Terry François Boulevard and along the south side of South Street for all events to ensure taxi maneuverability from the Event Center in all directions, especially post event, and to increase the attractiveness of taxi options for patrons exiting daily retail and restaurant uses on-site. Access for passenger drop-off/pick-up activity during concerts and peak events will occur in a separately designated curb space on the west side of Terry François Blvd. This zone will be managed to avoid vehicle conflicts with surrounding traffic. Drop-offs will be located on the west side of the street and will minimize conflicts with cyclists on Terry François Boulevard. During non-peak events, taxis would load along the Terry François Boulevard frontage.

5.2.6 Vehicle Arrivals at Event Center

The Event Center parking garage will have approximately 950 parking spaces. 500 spaces will be available for pre-purchase by designated ticketholders, and others may be shared-use spaces for daytime office employees and evening Event Center patrons. Based on the arrival pattern of Event Center attendees, most vehicles will arrive at the garage in the hour preceding game tipoff. Parking pass-holders will self-park in the garage after having their credentials checked. Garage management procedures are described in Section 2.1.3 and Chapter 6.

The main garage access will be located on 16th Street, creating a 4-way stop controlled intersection at Illinois Street. Pre-event vehicle access to the garage will be distributed to a northbound through movement from Illinois Street, an eastbound left-turn movement from 16th Street, and a westbound right-turn movement from 16th Street. The Illinois Street intersection with the garage entrance/exit will be controlled by an all-way-stop, except for before and after large events, where it will be controlled by Parking Control Officers (PCOs). Operations will be monitored at this and other locations, and additional controls (e.g. signalization) may be added if deemed necessary to minimize conflicts between pedestrians and bicycles on the sidewalk/multi-use path and the vehicles entering the garage or exiting the site vicinity.

The suggested pre-event driving routes are shown on **Figure 5-2**. These routes will be provided to attendees prior to an event (via website, email, app, etc.) to encourage effective distribution of arrival traffic. In order to maintain clear access to the UCSF Campus and UCSF hospital center, guests traveling from south of the project site will not be encouraged to use Owens St. en route to the Event Center. Likewise, guests traveling from the west or north of the site will be encouraged to use alternatives to 16th Street to reduce congestion during UCSF shift changes (primarily the night shift nurse arrival period from 6:30 PM to 7:00 PM). The pre-event routes shown are subject to revision based on monitoring during the first four years of operations.

³ Golden State Warriors.

Parking facilities shown on **Figure 5-2** are solely representative and do not pre-suppose third party agreements. The Warriors are exploring options for shared-use agreements to provide additional parking resources to guests and additional revenue to copious public and private lots in the vicinity. If parking demand is not met by supply in Mission Bay, the Warriors will secure agreements for satellite parking lots with transit or shuttle connections to the Event Center.

- MUNI Platform
- Caltrain Station
- BART Station
- Project Site
- BART Line
- Caltrain Line
- Potential Pre-Event Driving Routes
- Lane Closure
- P Representative Parking Facilities (to be confirmed)



Not to Scale

5.3 EVENT CENTER PATRON DEPARTURES

5.3.1 Trip Departure Distribution

For a weekend peak event, the distribution of event attendees to post-game destinations is forecast to be the same as the pre-game trip origin distribution, as summarized in **Table 5-2**.

The existing pattern of departures at the Oakland Event Center varies depending on game circumstances. In general, 30-40 percent of fans depart prior to the final buzzer while 60-70 percent stays through the end of the game. Periodically, there are also post-event activities that encourage some attendees to stay longer. The presence of retail uses on the San Francisco site provides incentives, which are not available in Oakland, for patrons to remain on site for a period of time after events. When this is the case, departure times are more spread out. Overall, the majority of departures occur over a shorter period of time than the 2-1/2 hour window of pre-event arrivals.

For the purpose of analyzing departures, the busiest post-game hour is the hour including the end of the game, when up to 80 percent of attendees will depart. This time period will require the highest level of traffic control given the concentration of pedestrian activity exiting the Event Center.

5.3.2 Pedestrian Departures

The main pedestrian exit points from the Event Center include the main plaza on the west side of the site with direct access to 3rd Street sidewalks and the southeastern corner of the site with access to 16th Street and Terry François Boulevard. Similar to pre-game conditions, pedestrians leaving the Event Center are expected to walk primarily along 3rd Street or Terry François Boulevard after the game, as illustrated in **Figure 5-1**. Event attendees will be directed to walk towards different exits depending on their mode of departure. Due to post-game distribution patterns, the volume of pedestrians leaving the Event Center post-game will be higher in the hour following a game than the volume arriving in the hour pre-game; following the first hour, the volume of pedestrians will drop significantly.

5.3.3 Transit Departures

Departures towards Caltrain

Attendees who will take Caltrain following game's end will most likely walk or take Muni to board at the 4th & King Station, and a small share of Caltrain riders are expected to board at the 22nd Street Station. It is likely that all attendees will board the same late service train, which may be provided by Caltrain specifically on event nights. SFMTA Parking Control Officers will be stationed at key intersections along pedestrian routes towards Caltrain to monitor these intersections and adjust controls as needed to ensure safe and efficient flow of all modes.

Departures towards UCSF Mission Bay Muni Platforms

Many event attendees departing towards downtown San Francisco, Caltrain, or BART will likely take Muni Metro (T 3rd Street Line) from the Event Center. Most Muni passengers are predicted to be leaving towards the north and will likely get on at the UCSF Mission Bay stop, located on 3rd Street at South Street, approximately 500 feet away from the Event Center Main Plaza. Muni passengers departing towards the south will likely get on at the Mariposa Street stop to avoid crowds at the closer UCSF Mission Bay stop. It is also predicted that some northbound passengers will walk south to the Mariposa Street stop to travel north in an attempt to avoid the

large crowds at the UCSF Mission Bay stop. To deter pedestrian crossings mid-block between South Street and 3rd Street, decorative fencing will be placed along the Muni transit right-of-way.

Because the UCSF Mission Bay platform will need to accommodate high volumes of pedestrians during the pre- and post-event period, the project will require the extension of the platforms at 3rd Street and South Street to provide longer, larger, and safer landing spaces for crowds. Departures will be more concentrated than pre-game arrivals, so Parking Control Officers (PCOs) will be stationed at all nearby Muni platforms. Both northbound lanes on 3rd Street will be closed between 16th Street and Mission Bay Boulevard South to accommodate the pedestrian flow exiting the Event Center. A portion of South Street will also be closed to prevent vehicle conflict with pedestrians at the intersection with 3rd Street.

Departures towards Special Event Shuttles

Event attendees departing towards the Mission and 16th Street BART station will be directed to the Muni staging area along Illinois Street. Event attendees departing towards Van Ness will be directed towards the shuttle stop located on the north side of 16th Street east of the garage driveway. Northbound Illinois Street will be closed post-event to through traffic to allow unimpeded access for Muni. All traffic associated with adjacent office, clinic, or parking uses will be allowed full access at all times. Pedestrian access from the Event Center to the temporary Muni stop on Illinois will be directed either east or west along the north side of 16th Street to a pedestrian crossing located at the Illinois Street/parking garage driveway. The 16th Street north sidewalk will be designed with a minimum 15-foot clearance from the curb to provide adequate circulation and queuing space for pedestrians. Transbay Terminal and Ferry Building-bound attendees will be directed towards the shuttle stops located on the east side of 3rd Street north of South Street. Both northbound lanes on 3rd Street and all lanes on South Street west of 450 South St. will be closed to vehicle traffic to allow for safe and effective pedestrian access to special event shuttles.

5.3.4 Bicycle Departures

For those cyclists using the indoor bicycle valet, departures will be metered by the process of retrieving bicycles. It is forecast that approximately 300 bicycles will depart from the indoor valet bicycle parking facility over approximately 30 minutes with three staff retrieving a bike every 15-20 seconds. Some cyclists may utilize the planned bike share station after a game. Bicycles will also depart from nearby public bike racks and from the temporary outdoor bike valet area, when available.

Most bicyclists are expected to use the bikeway on Terry François Boulevard to travel north or south from the Event Center. Most cyclists traveling westbound will likely use the routes on 16th and 17th Streets. During peak event conditions, temporary lane closures will be in place on 16th Street and the westbound curb-side bike lane will be closed to accommodate shuttle bus loading. PCOs will use cones or other physical barriers to designate an alternate route for westbound cyclists through a closed vehicular lane from Terry François Boulevard to Illinois Street during post-event conditions. PCOs will facilitate safe access for cyclists along this segment of 16th Street.

Pedicabs, will be accommodated near the site, especially during peak events. Most pedicabs are expected to travel north/south to the site and are expected to use the Terry François Blue Greenway when it is complete. A pedicab staging area is proposed for the east side of Terry François Boulevard just south of 16th Street. This is consistent with the concentration of bicycle and cyclist-serving facilities in the southeast corner of the site.

5.3.5 Taxis and Charter Buses

During peak events, most taxi trips will occur immediately following the end of the event. On convention days, several hundred taxi trips will occur as attendees travel between the Event Center and nearby hotels and the Moscone Convention Center. Unlike game patron departures for an NBA event, which are heavily concentrated in the first hour following the end of a game, convention attendee departures will be more spread out.

A charter bus zone will be located along 16th Street for pick-off activity during both small events. A total of 500 feet of curb space (accommodating 6-8 buses) will be available on the north side of the street between Illinois St. and Terry François Boulevard.

Taxi zones will be designated for all events on the south side of South Street, east of Bridgeview Way and along the west side of Terry François Boulevard south of South Street. Terry François Boulevard will also include access for additional non-taxi pick-off activity at all times. This zone will be managed by PCOs and Event Center staff to avoid vehicle conflicts with surrounding traffic. This zone will be located on the west side of the street and will minimize conflicts with bicycles on Terry François Boulevard.

During a post-peak event scenario, when temporary lane closures are in place, taxis will have preferential treatment to access the designated taxi zones adjacent to the Event Center. PCOs will be able to assist taxis arriving and departing the site to ensure safe, efficient, and convenient pick-up/drop-off operations.

5.3.6 Vehicle Departures from Event Center Garage

The intersection of 16th Street and Illinois Street at the garage driveway will be controlled by PCOs during the peak post-event period. Vehicles exiting from 16th Street will be forced to turn right (west – toward 3rd Street) or continue through to southbound Illinois Street. If this intersection becomes congested after events, Event Center staff may choose to direct some departing vehicles to the South Street garage access using signage inside the garage. Vehicle egress from both driveways is anticipated to take approximately twenty minutes in total.⁴

16th Street between 3rd Street and Terry François Boulevard will have restricted access, and will be used predominantly as a post-event shuttle staging area. Northbound lanes on Illinois Street (north of Mariposa Street) will be restricted to local traffic only and will also be used as a post-event shuttle staging area.

South Street, between 3rd Street and the 450 South Street Garage, will be closed post-event, and cars exiting the garages or coming from Bridgeview will be directed to travel east to Terry François Boulevard.

Vehicles with destinations along southbound I-280 will be suggested to travel either from 16th Street to the Owens Street extension, from Terry François Boulevard to Mariposa Street, or from 3rd Street to Cesar Chavez Street.

The suggested post-event driving routes are shown on **Figure 5-3**. These routes will be provided to attendees prior to an event to encourage effective distribution of departure traffic. All south-bound guests will be encouraged to use Mariposa Street, Illinois Street, or Third Street, not 16th Street and Owens Street, to access I-280 on-ramps. West-bound guests will not be encouraged to use Mission Bay Boulevard North, which is located close to several residential buildings. North-bound guests will be encouraged to leave the neighborhood

⁴ Source: Parking garage schematic design studies, Walter P. Moore, 2014.

efficiently and quickly by utilizing all available connections out of Mission Bay, including Third Street and Seventh Street. The post-event routes shown are subject to revision based on monitoring during the first four years of operations and may be modified to reflect new or updated neighborhood parking agreements.

Parking facilities shown on **Figure 5-2** are solely representative and do not pre-suppose third party agreements.

5.4 DAILY NON-EVENT ARRIVALS AND DEPARTURES

The project will provide a total of approximately 950 on-site parking spaces and 132 reserved spaces in the 450 South parking garage. Most of these spaces will be dedicated to office users (537), and arena use (283), with a limited number of valet parking spaces for retail users (130). The 132 reserved spaces in the 450 South Street parking garage will be dedicated to daily office and/or GSW employees only.

Office users are forecast to travel to the site primarily by auto and transit modes, with the balance walking and taking other modes. Retail users are forecast to have a slightly lower auto and transit share, with a higher share of patrons arriving by walking or other modes. As described above, TDM programs are proposed to increase above the forecasted proportion of office users who bicycle, walk or take transit to the site, and reduce the proportion who drive and park.

- MUNI Platform
- Caltrain Station
- BART Station
- Project Site
- BART Line
- Caltrain Line
- Potential Post-Event Driving Routes
- Lane Closure
- P Representative Parking Facilities (to be confirmed)




 Not to Scale

CHAPTER 6. CONTROLS BY EVENT SCENARIO

This chapter describes controls to be implemented around the Event Center Development given the range of scenarios previously described, starting with a typical, no-event day; and ending with a day when an Event Center event coincides with an event at AT&T Park. The primary goals of these controls are to ensure safety through reduction of conflicts between modes, manage all modes of traffic to ensure orderly access and egress reflecting transportation mode priority, and reduce nuisance and inconvenience to surrounding residents and businesses. The level of controls needed increases with the intensity of the scenario; thus, as events get larger, all controls listed for the smaller events are required, and additional controls are added.

The purpose of the transportation controls described in this chapter is to outline the necessary processes in order to meet the primary goals as described above.

The planned traffic control type (signalized or stop-controlled) for each intersection discussed in this section will be the following:

Traffic Signal

- 3rd Street / 16th Street (existing)
- 3rd Street / South Street (existing)
- 3rd Street / Mariposa Street (existing)
- Terry François Boulevard / South Street (current side-street stop control)
- Terry François Boulevard / 16th Street
- Terry François Boulevard / Illinois Street / Mariposa Street (current stop control)

All-way Stop Control

- 16th Street / Illinois Street / Event Center Development Garage Entrance (current side-street stop control)

While the initial traffic control for the 16th Street / Illinois Street / Event Center Development Garage Entrance intersection will be an all-way stop, conditions at the intersection will be monitored during various event and no-event days, and the GSW will install a traffic signal if needed.

Side-Street Stop Control

- South Street / Bridgeview Way / Event Center Development Garage Entrance

The Event Center Transportation Coordinator (ECTC), designated by the GSW for the project site, will communicate regularly with SFMTA to provide information on events and identify those events that require traffic control. A summary of the traffic control strategies identified in this chapter for the various event scenarios is provided in **Table 6-1**.

TABLE 6-1: SUMMARY OF TRAFFIC CONTROL STRATEGIES BY EVENT TYPE

TRAFFIC CONTROL STRATEGY	EVENT SCENARIOS				
	No Event	Convention/ Small Event (Weekday Daytime) ¹	Arena Concert (Evening) ²	Peak Event/ NBA Game (Evening)	Dual Event With AT&T Event
Coordination with SFMTA and Mission Bay Ballpark Transportation Coordinating Committee (MBBTCC)		√	√	√	√
Muni Ticket Sales at Event Center Box Office		√	√	√	√
Taxi Zone on Terry François Boulevard		√	√	√	√
Taxi Zone on South Street	√	√	√	√	√
Designated Commercial loading zone (non-event hours)	√	√	√	√	√
Dedicated TMA Shuttle Stop	√	√	√	√	√
Dedicated Charter Bus Stop on 16 th Street		√			
Dedicated Shuttle Zone for Connection to 16 th BART Station			√	√	√
Dedicated Paratransit Stop on Terry François Blvd, north of 16 th Street (serving up to three vans)	√	√	√	√	√
Dedicated Media Truck Zone				√	√
PCO Supervisor at Event Center TMC			√	√	√
PCOs positioned at key locations throughout the surrounding intersections and transportation network		See Figures 6-1 and 6-2 for locations and times	See Figures 6-4 and 6-6 for locations and times	See Figures 6-8 and 6-10 for locations and times	See Figures 6-11 and 6-12 for locations and times
Event Center staff positioned at key locations throughout the site to facilitate crowd control, wayfinding, and curb management		√	√	√	√
Post-Event Temporary Lane Closure: NB lanes on 3 rd Street between 16 th Street and Mission Bay Boulevard South			√	√	√
Post-Event Temporary Lane Closure: South Street between 3 rd Street and 450 South Street garage entrance			√	√	√
Post-Event Temporary Lane Closure: NB Illinois Street between Mariposa Street and 16 th Street, except for local traffic and Shuttle staging and loading			√	√	√
Post-Event Temporary Lane Closure: WB lanes on 16 th Street between Terry François Boulevard and Illinois Street, and EB lanes on 16 th Street between 3 rd Street and Illinois Street, Except for Shuttle staging and loading			√	√	√
Coordinate with BART, Caltrain, Muni			√	√	√

TABLE 6-1: SUMMARY OF TRAFFIC CONTROL STRATEGIES BY EVENT TYPE

Coordinate with Giants Special Events Staff	√	√	√	√	√
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1. The 55 family shows held each year, with an average of about 5,000 attendees, are expected to require similar controls to the small event.
2. Arena Concert is assumed for events of average 12,500 attendees.

Source: Fehr & Peers, 2014.

6.1 CONTROL RECOMMENDATIONS FOR NO-EVENT DAY SCENARIO

The number of trips generated by the Event Center office, retail and restaurants on a typical no-event day does not warrant special traffic controls. The Event Center Development garage will be staffed on a typical day to monitor access for delivery vehicles. Signage will be posted to direct traffic to the parking garage entrances as well as to a valet parking stand located inside the parking garage, which will be staffed during a typical day.

Curb designations on the Event Center Development frontage will be as follows:

- Metered On-Street Parking on north side of South Street: north side of South Street from 450 South Street garage entrance to Terry François Boulevard. On-street parking may be prohibited along this stretch shortly before, during, and after events to allow the option for a second travel lane.
- TMA Shuttle Stop on South Street: south side of South Street, east of 3rd Street (all days/hours).
- Metered On-Street Parking on south side of South Street: from TMA shuttle stop to Bridgeview Way.
- Commercial Loading Zones: south side of South Street, just east of TMA Shuttle Stop (one designated space) and between Taxi Zone and Terry François Boulevard (seven designated spaces).
- Commercial Loading Zone on Terry François Boulevard: on west side of Terry François Boulevard, just south of South Street (eight designated spaces).
- Commercial Loading Zone on 16th Street: on north side of 16th Street, between 3rd Street and Illinois Street (one designated space).
- Taxi Zone on South Street: on the south side of South Street between the Event Center garage access (opposite Bridgeview Way) and the commercial loading zone.
- Metered On-Street Parking on Terry François Boulevard: on portions of the west side from South Street to 16th Street, with the exception of the centrally located paratransit vehicle stop area. On-street parking will be prohibited along this stretch after 5:00 PM to allow event pick-up/drop-off.
- Paratransit Bus Stop on Terry François Boulevard: west side of Terry François Boulevard, north of 16th Street (all days/hours, serving up to three paratransit vans).
- Metered On-Street Parking on 16th Street: north and south sides of 16th Street from Illinois Street east to Terry François Blvd., and the north side of 16th Street from 3rd Street to Illinois Street. On-street parking will be prohibited along this stretch after 5:00 PM on event days. The segment between Illinois Street and Terry François Boulevard on the north side of this segment will be reserved for post-event shuttles and charter buses during events.

- Media Trucks on 16th Street: the north side of 16th Street between 3rd Street and Illinois Street will be reserved for media trucks for NBA events.

Valet parking will be provided for the retail visitors along the South Street frontage, just inside the Event Center parking garage entry opposite Bridgeview Way.

Accessible passenger loading zones will be provided consistent with the requirements as outlined in the Draft Pedestrian Right of Way Accessibility Guidelines (PROWAG).

On-street parking is not currently permitted on the east side of 3rd Street adjacent to the site, and will continue to be prohibited. Signage will be placed along the east side of 3rd Street that prohibits stopping at all times, including passenger loading or unloading, under no-event and all event scenarios. Enforcement will be provided to prohibit any drop-off or pick-up activity.

Figure 2-2 summarizes on-street parking restrictions and availability for no-event conditions.

6.2 CONTROLS FOR CONVENTION SCENARIO

For the purposes of this TMP, a small event scenario is a 9,000 person convention. Conventions will be staffed by up to 6 Parking Control Officers (PCOs). The Event Center Development garage access and valet parking stand will be staffed as described above for a typical day.

6.2.1 General

PCO Supervisor

A PCO Supervisor will be stationed in the Transportation Management Center starting at least one hour prior to the convention start time and until pedestrian and vehicle volumes on-street have returned to typical no-event conditions following event's end. The PCO Supervisor will deploy up to 6 PCOs and assign transportation control tasks pre-event; monitor traffic conditions before, during, and after the event; and deploy PCOs and assign transportation control tasks post-event, as needed.

The PCO Supervisor will have radio contact with the Field Supervisor and all PCOs on the street and phone contact with relevant city agencies and departments (Muni, SFMTA Signal Shop, SFPD, SFFD), transit operators (Muni, BART, Caltrans) and Event Center staff (security, valet attendants, etc.). The PCO supervisor will also have authority and discretion in how PCOs are deployed, and may adjust the controls described below as conditions warrant.

6.2.2 Pre- and Post-Event Controls

Figures 6-1 and 6-2 show the location of temporary charter bus drop-off/pick-up locations for convention events. Convention events are expected to generate a large number of charter bus and taxi trips. Taxi trips will be served on the designated curb zone located on the south side of South Street and the west side of Terry François Boulevard.

All curbside parking and loading areas described for no-event conditions will convert to the event curb zones described below at 5:00 PM (before an evening event beginning 7:00 PM or later), or two hours before an event (starting at all other times). Event curb zone designations will revert back to no-event parking and loading conditions ninety minutes following an event's end.

Charter Bus Stop Zone

To serve the demand for increased charter bus service, a bus stop zone will be designated along a portion of westbound 16th Street. This curbside zone will be 500 feet (accommodating 6-8 buses at a time) in length and will be designated for charter bus pick-up/drop-off activity during a convention.

PCO Locations

PCOs' primary task will be to direct shuttle and taxi traffic that will be bringing attendees from area hotels and the Moscone Convention Center. Up to six PCOs will be stationed at the following locations:

- 3rd Street and South Street
- South Street and Terry François Boulevard
- 3rd Street and 16th Street
- 16th Street and Illinois Street
- 16th Street and Terry François Boulevard

The PCO locations listed in this document are solely representative and will remain flexible to respond to changing traffic conditions once the Event Center Development is complete. The number of PCOs per suggested location will be determined in consultation with the SFMTA and refined based on monitoring during the first four years of operations.

- Project Site
- MUNI Platform
- On-Street Metered Parking
- Garage Exit
- TMA Shuttles
- Taxi
- Buses
- Paratransit Bus
- Charter Buses
- Black Car
- Passenger Pick-up
- PCO Station
- Approximate Storage Length



Not to Scale

6.3 CONTROLS FOR ARENA CONCERT SCENARIO

This section addresses controls for a 14,000 person arena concert.

6.3.1 General

PCO Supervisor

A PCO Supervisor will be stationed in the Transportation Management Center (TMC) starting at least two hours prior to the concert start time and until pedestrian, bicycle, and vehicle volumes on-street have returned to typical no-event conditions following event's end. The TMC will be housed within the security center in the Event Center, though the TMC's final design will be developed through coordination with SFMTA Enforcement. The PCO Supervisor/Field Supervisor will deploy up to 17 PCOs to locations and assign transportation control tasks pre-event; monitor traffic conditions before, during, and after the event; and deploy PCOs and assign transportation control tasks post-event. The number of PCOs estimated for deployment are based on information available at this time and may be adjusted both prior to and during venue operations as more detailed information and observations allow.

The PCO Supervisor will have radio contact with the Field Supervisor and with all PCOs on the street, and phone contact with relevant city agencies and departments (Muni, SFMTA Signal Shop, SFPD, SFFD), transit operators (Muni, BART, Caltrans) and Event Center staff (security, valet attendants, etc.). The PCO supervisor will also have authority and discretion in how PCOs are deployed, and may adjust the controls described below as conditions warrant.

Transit loading may also be monitored by Transit Fare Inspectors (TFIs) and SFMTA Passenger Assistance Program staff (MTAPs) stationed at Muni platforms. The appropriate number of staff stationed in these roles will be determined in consultation with the SFMTA prior to the project opening.

6.3.2 Curb Management

All curbside parking and loading areas described for no-event conditions will convert to the event curb zones described below at 5:00 PM (before an evening event beginning 7:00 PM or later), or two hours before an event (starting at all other times). Event curb zone designations will revert back to no-event parking and loading conditions ninety minutes following an event's end.

Pre-event and post-event curb management for the concert scenario is shown in **Figures 6-3** and **6-5**. In order to manage the increased volume of attendees using regional transit, the concert scenario will also include designated curb space for a Muni bus that will travel back and forth to the 16th Street BART station exclusively. This pre-event bus stop will be 150 feet in length along the south side of 16th Street for BART passenger drop-off before concert events. These buses will then continue south on Illinois Street to Mariposa Street to return to the BART station. Post-event curb management will include a bus layover zone on northbound Illinois Street, where buses will layover to pick up passengers after a concert event. Post-event bus staging and passenger loading will be along the eastern side of Illinois Street and the north side of 16th Street east of Illinois St.

A concert event will also include increased drop-off/pick-up activity as attendees are shuttled to and from the event in passenger vehicles. To accommodate this, the 550 feet of "flex space" on Terry François Boulevard will include passenger drop-off/pick-up activity to be shared with taxis along the west side of the street. During concerts, as during Peak events, a taxi zone will also be located on the south side of South Street.

To provide a safe location for the high volumes of pedestrians to queue that are destined for the Muni station in the median of 3rd Street, and in consultation with the SFMTA, temporary lane closures will be implemented on northbound 3rd Street between 16th Street and Mission Bay Boulevard South, on westbound and eastbound on South Street from 3rd Street to the 450 South Street garage. Traffic exiting the 450 South Street garage, the north exit of the Event Center garage or Bridgeview Way will be directed east to Terry François Blvd. It is anticipated that the temporary lane closures will be in place for approximately 30-45 minutes during the peak post-event period, until most event attendees are able to board Muni trains on 3rd Street and most shuttle riders have boarded shuttles. It is anticipated that the no-event traffic volumes on the streets adjacent to the Event Center Development will be light after a typical concert event, so impacts to the existing traffic as a result of the temporary closure of northbound 3rd Street will be low. Traffic on Bridgeview Way will be monitored by PCOs and will be signed to encourage access for local traffic only to the uses within that block, including the 450 South Street Garage. Variable Message Signs (VMS) and detour signs that will be programed and/or placed well in advance of the temporary closures to notify drivers of alternate routes, including those depicted in **Figure 6-10**. Proposed locations for permanent Variable Message Signs are listed below:

- Northbound 3rd Street – South of Mariposa (existing VMS)
- Westbound 16th Street – East of I-280 (proposed new VMS)
- Southbound 3rd Street – South of Lefty O'Doul Bridge (proposed new VMS)
- Eastbound Mariposa Street – East of I-280 (proposed new VMS)

Based on operating conditions for AT&T Park, it is assumed that SFMTA staff will set up and store barricades to mark and enforce temporary lane closures. Barricade equipment may be temporary stored in a truck at the southern end of Illinois St., just north of Mariposa, and/or in a storage facility located on-site.

The UCSF Women's Cancer & Children's Hospital, scheduled to open on February 1, 2015, is located on the west side of 3rd Street between 16th Street and Mariposa Street. Access to the hospital will be provided from, both 16th Street and Mariposa Street via an extension of 4th Street. Emergency vehicles traveling to the hospital will not be affected by the post-game partial street closures on northbound 3rd Street (north of 16th Street) described above, as multiple other routes to the hospital's major access points will main open. Emergency vehicles exiting the hospital may need to travel northbound on 3rd Street, north of 16th Street, where the temporary closures are planned. In those situations, PCOs may remove temporary barriers and allow emergency vehicles to use northbound 3rd Street, or emergency vehicles may use the southbound lanes of 3rd Street to travel northbound. The Event Center Transportation Coordinator will provide the hospital with a list of dates and times during which partial street closures are anticipated. Post-event traffic will be directed to use both 16th Street and Mariposa Street to access I-280 ramps to enable fast and efficient departures from the site. Northbound traffic will be directed to westbound 16th Street and north on 7th Street, east on Bryant Street to the I-80 ramp at 5th Street.

6.3.3 Pre-Event Controls

Pre-event controls are detailed here and illustrated on **Figures 6-3** and **6-4**.

PCO Locations

Up to 17 PCOs will be stationed at key locations, as determined by the PCO Supervisor before, during, and after events, such as those listed below. Their primary task will be to manage pedestrian and vehicle traffic.

- 3rd Street and South Street
- South Street and Bridgeview Way
- South Street and Terry François Boulevard
- 3rd Street and 16th Street
- 16th Street and Illinois Street
- 16th Street and Terry François Boulevard
- Mariposa Street and I-280 northbound ramps/Owens Street
- Mariposa Street and 3rd Street
- Mariposa Street and 4th Street
- Mariposa Street and Illinois Street
- Channel Street and 3rd Street
- Channel Street and 4th Street
- Mission Bay Boulevard North and Terry Francois Boulevard
- Mission Bay Boulevard South and Third Street
- One roving PCO (or more if necessary) to monitor general parking issues and respond to complaints called in throughout the neighborhood

The PCO locations listed in this document are solely representative and will remain flexible to respond to changing traffic conditions once the Event Center Development is complete. The number of PCOs per suggested location will be determined in consultation with the SFMTA and refined based on monitoring during the first four years of operations.

UCSF Mission Bay Muni Platform

PCOs will be stationed at the intersection of South Street and 3rd Street to facilitate pedestrian crossings to/from the Muni platforms and minimize conflicts with vehicles and light rail cars.

Event Center Garage Driveway on 16th Street

Concert attendees with pre-sold parking passes for the Event Center garage will enter via the left turn lane on eastbound 16th Street leading to the garage driveway or from northbound Illinois Street to self-park. Event Center staff will check parking passes before vehicles enter the garage.

PCOs will be stationed at the Event Center garage driveway to facilitate vehicle egress (office employees leaving on weekday evenings) and ingress (event attendees entering the garage), minimize conflicts with pedestrians and bicycles on 16th Street, and coordinate with PCOs located at the adjacent 3rd Street / 16th Street intersection. A key goal of the PCOs located at the adjacent intersections on 16th Street will be to give priority to the eastbound left turn movements from 16th Street into the garage to ensure that this inbound event traffic

entering the Event Center garage does not queue back to the 16th Street / 3rd Street intersection. PCOs will also work in conjunction with Event Center staff that will be checking attendees' tickets for valid access to the garage on the day of the concert. Drivers who enter the eastbound left-turn pocket or are stationed to enter the garage on Illinois Street without a valid parking pass will be redirected to drive east on 16th Street to Terry François Boulevard towards other nearby garages or parking lots.

3rd Street / 16th Street Intersection

PCOs will be stationed at the intersection of 3rd Street and 16th Street to maintain the flow of Muni trains on 3rd Street, provide for the safe movement of pedestrians and bicyclists, and facilitate the flow of vehicles to eastbound 16th Street to access the Event Center parking garage. PCOs will work to ensure that the intersection does not become blocked with vehicles. As noted above, the PCO stationed at 3rd Street/16th Street will work in conjunction with the PCO at the Event Center garage entrance to coordinate the flow of traffic into the garage.

Drop-Off on Southbound Terry François Boulevard

Event Center ticket holders may be dropped off on the west side of Terry François Boulevard between South Street and 16th Street as shown on **Figure 6-3**. This curbside area will be shared with taxis.

6.3.4 Post-Event Controls

Many of the post-event controls are similar to the pre-event controls but are repeated here for ease of understanding, and the post-event curb and lane configurations are illustrated on **Figures 6-5** and **6-6**.

PCO Locations

PCOs will be stationed at all of the same locations as identified previously for the pre-event scenario, with one exception. The PCO(s) located at the intersection of Mariposa Street and I-280 northbound ramps/Owens Street during the pre-event period will relocate to the intersection of 16th Street/ Owens Street during the post-event period.

UCSF Mission Bay Muni Platform

Muni tickets will be sold at the Event Center box office before, during, and after events.

PCOs will be stationed at the intersection of 3rd Street and South Street to manage pedestrian flow to/from the Muni platforms and minimize conflicts with vehicles and light rail cars. Temporary lane closures will also be in effect for enhanced pedestrian safety on northbound 3rd Street north of 16th Street and on South Street west of the 450 South St. garage exit. Muni staff will also be stationed to check transit tickets and manage the boarding process.

Event Center Garage Driveway on 16th Street

During no-event conditions, traffic at the 16th Street / Illinois Street intersection will be managed by an all-way stop control. During events, the PCOs will be able to direct traffic at the intersection during event conditions to allow continuous flow on individual movements as needed. PCOs at the garage driveway located at the intersection will have the following objectives:

- Managing alternating flows of vehicle traffic exiting the garage with pedestrian-bicycle flows along 16th Street

- Managing alternating flows of vehicle traffic exiting the garage with shuttle traffic and occasional westbound traffic flow on 16th Street to accommodate safe and efficient shuttle loading and departure.
- Coordinating with PCOs located along 16th Street so that they stop pedestrian crossings of 16th Street during the same windows of time that vehicles are released from the Event Center garage onto east- and westbound 16th Street
- Maintaining vehicle access to garages for the 409 and 499 Illinois Street buildings, as well as future UCSF buildings on Blocks 33 and 34, from 16th Street and Illinois Street.

Post-events, southbound traffic exiting the Event Center garage will be advised to travel west on 16th Street to southbound Owens Street to access I-280. Any traffic heading to the north from the parking garage will be advised to travel west on 16th Street to northbound 7th Street due to the temporary northbound closure on 3rd Street.

3rd Street / 16th Street

PCOs will be stationed at the intersection of 3rd Street and 16th Street to facilitate the flow of vehicles from westbound 16th Street from the parking garages, along with Muni trains, bicyclists, and pedestrians while preventing event traffic from going north on 3rd Street. They will work in conjunction with the PCO at the garage entrance to stop pedestrians crossing 16th Street during the same window that vehicles are exiting the garage on 16th Street, and prohibit northbound traffic from accessing 3rd Street north of 16th Street due to the temporary lane closures and direct traffic to northbound Terry François Boulevard.

Temporary Lane Closures

Up to 17 PCOs will be stationed at key locations to redirect traffic due to the temporary lane closures. The PCO station located on South Street east of 3rd Street will manage the South Street partial closure as well as Bridgeview Way. The PCOs will direct all traffic exiting the 450 South Street and Event Center garages to Terry François Boulevard via eastbound South Street, and restrict northbound traffic from using Bridgeview Way except for neighborhood traffic. The PCOs will also direct any southbound traffic on Bridgeview Way left onto eastbound South Street

PCOs will also be stationed at the Terry François Boulevard / South Street intersection to manage traffic exiting the garages on South Street. They will direct traffic either north or south on Terry François Boulevard, and restrict vehicle access onto westbound South Street. They will also manage alternating flows of pedestrian crossings of South Street and vehicles turning onto Terry François Boulevard.

PCOs will be stationed on 3rd Street at Mariposa Street to direct no-event northbound traffic to alternative routes in advance of the temporary closure on northbound 3rd Street, to reduce congestion at the intersection of 3rd Street / 16th Street. Northbound traffic will be redirected east along Mariposa Street to northbound Terry François Boulevard. Variable message signs will also direct no-event through traffic to Terry François Boulevard in advance of the intersection of 3rd Street / Mariposa Street. All PCOs stationed at locations along 3rd Street will also assist emergency vehicles and autos needing emergency access to the UCSF Medical Center to navigate congested conditions and utilize closed travel lanes as needed. New permanent Variable Message Signs (VMS) will be added at three locations, and existing VMSs will operate to provide traffic alerts, messages, and alternative driving routes for neighborhood residents at the following locations:

- Northbound 3rd Street – South of Mariposa (existing VMS)

- Westbound 16th Street – East of I-280 (proposed new VMS)
- Southbound 3rd Street – South of Lefty O’Doul Bridge (proposed new VMS)
- Eastbound Mariposa Street – East of I-280 (proposed new VMS)

Based on operating conditions for AT&T Park, it is assumed that SFMTA staff will set up and store barricades to mark and enforce temporary lane closures.

Temporary Turn Restrictions

Temporary turn restrictions will be in place post-event to discourage vehicles traveling westbound on 16th Street from turning left onto 3rd Street, Owens Street or Mississippi Street. PCOs will be responsible for coning off left turn pockets at these three intersections and enforcing left-turn restrictions. Signage will be provided inside event garages to direct vehicles destined for I-280 to use Terry François Boulevard to Mariposa Street as the primary access.

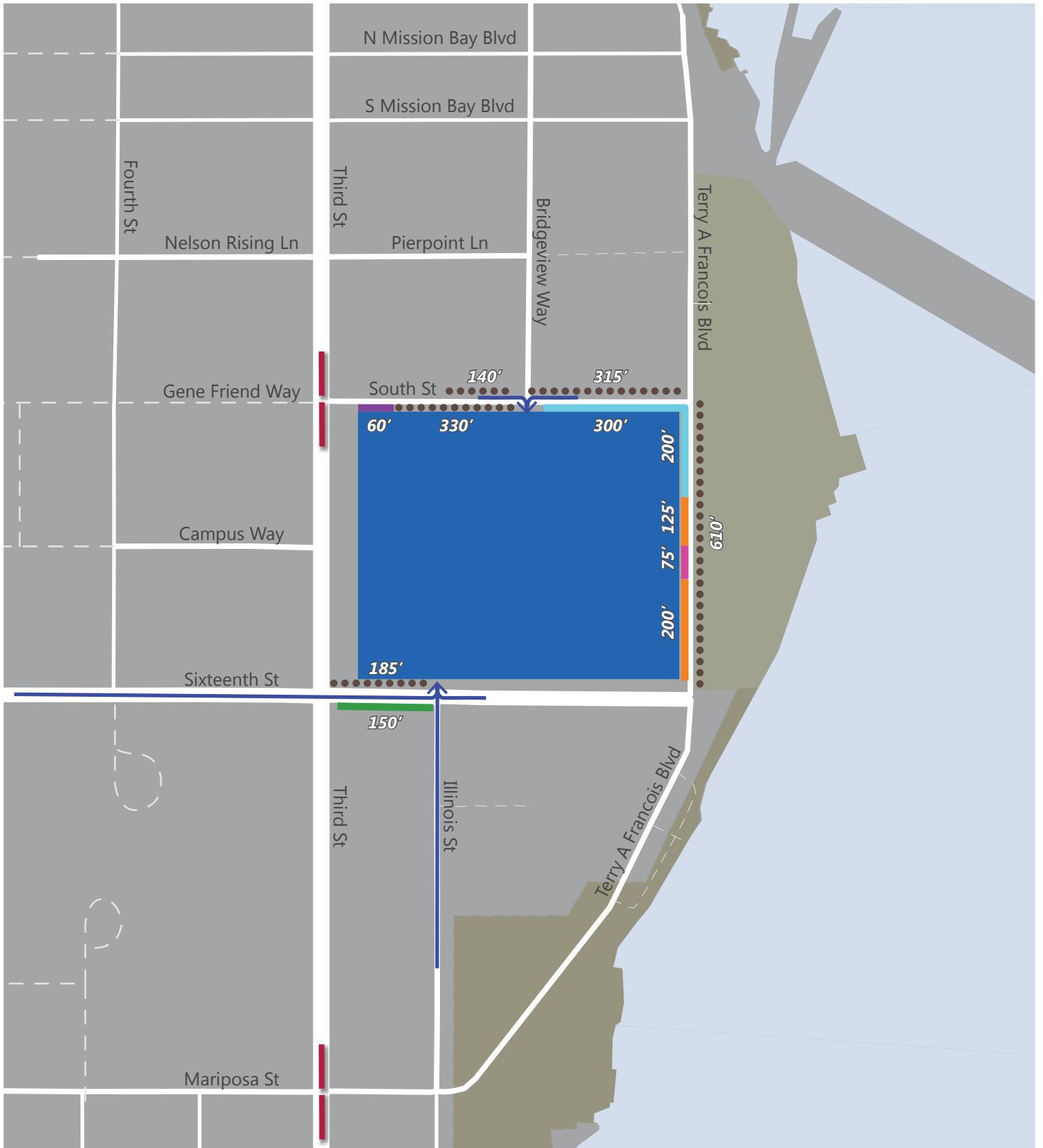
Passenger Pick-Up on Terry François Boulevard

The passenger pick-up location will be the same as the pre-event drop-off location – on the west side of Terry François Boulevard. This location will also include Paratransit loading, however each space will be designated and separated.

Terry François and 16th Intersection

PCOs will be stationed at the intersection of Terry François Boulevard and 16th Street following a concert to manage bicycle and pedestrian flows, detour traffic from the temporary lane closures on South Street and 3rd Street, as well as event traffic from nearby parking facilities. Traffic will be directed mostly north and south on Terry François Boulevard to avoid adding to the congestion on 16th Street and to avoid conflicts with shuttle buses. Post-event PCO controls are proposed to be the same and are illustrated on **Figure 6-6**.

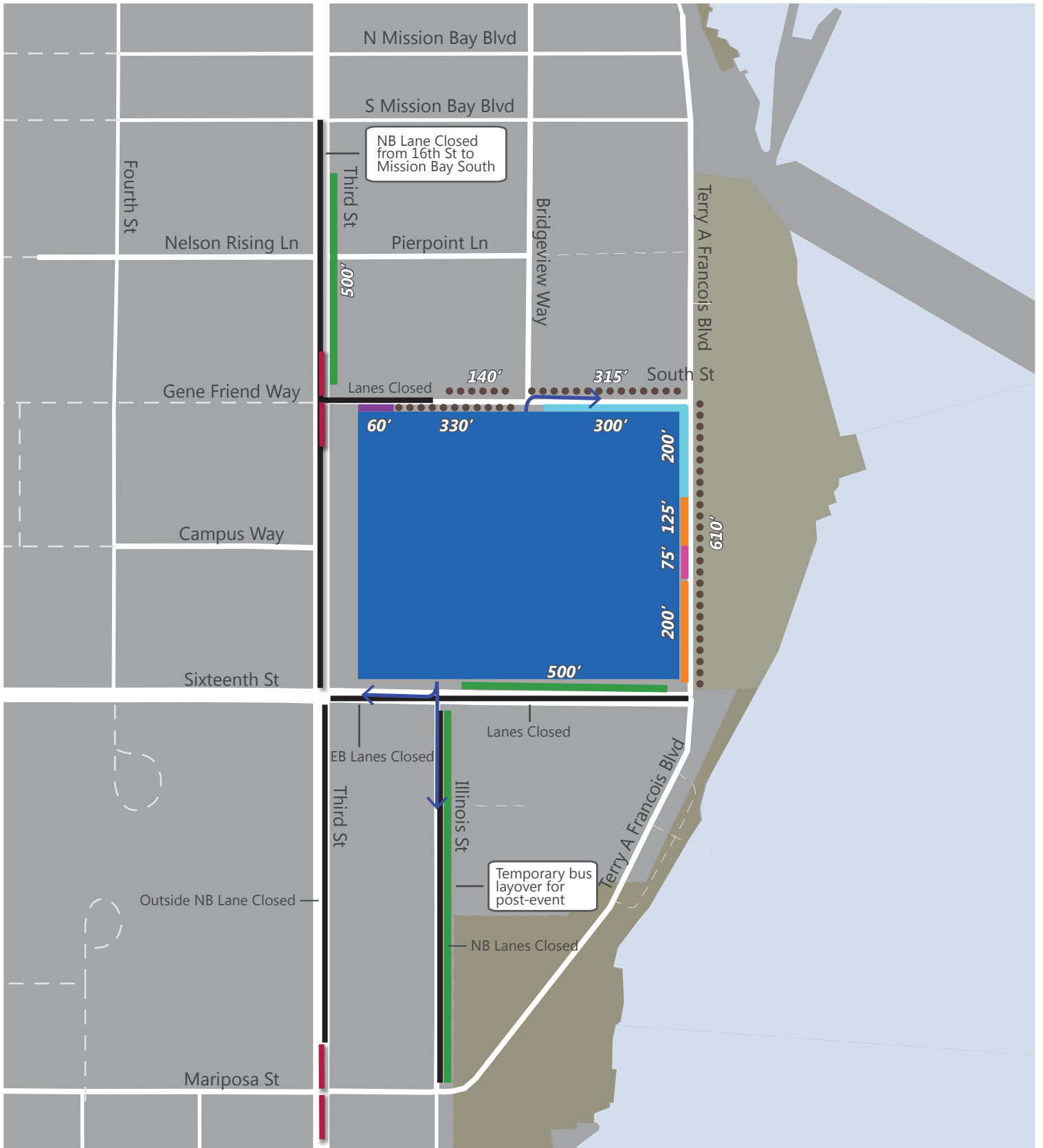
- Project Site
- MUNI Platform
- TMA Shuttles
- Buses
- Charter Buses
- Passenger Drop-off
- Paratransit Bus
- Taxi
- Lane Closure
- Black Car
- Approximate Storage Length
- On-Street Metered Parking
- Garage Entry



Not to Scale



- Project Site
- MUNI Platform
- On-Street Metered Parking
- Garage Exit
- TMA Shuttles
- Taxi
- Buses
- Paratransit Bus
- Charter Buses
- Lane Closure
- Passenger Pick-up
- Black Car
- Approximate Storage Length



Not to Scale

- MUNI Platform
- Caltrain Line
- Project Site
- PCO Station
- Existing VMS
- Proposed New VMS
- Post-Event Lane Closure



Not to Scale

6.4 CONTROLS FOR PEAK EVENT SCENARIO

6.4.1 General

PCO Supervisor

As with a concert event, a PCO Supervisor will be stationed in the Transportation Management Center and/or in the field starting at least two hours prior to the event's start time and until pedestrian, bicycle, and vehicle volumes on-street have returned to typical no-event conditions following event's end. The PCO Supervisor will deploy up to 18 PCOs to locations and assign transportation control tasks pre-event monitor traffic conditions before, during, and after the event; and deploy PCOs and assign transportation control tasks post-event.

Transit loading may also be monitored by Transit Fare Inspectors (TFIs) and SFMTA Passenger Assistance Program staff (MTAPs) stationed at Muni platforms.

6.4.2 Curb Management

All curbside parking and loading areas described for no-event conditions will convert to the event curb zones described below at 5:00 PM (before an evening event beginning 7:00 PM or later), or two hours before an event (starting at all other times). Event curb zone designations will revert back to no-event parking and loading conditions ninety minutes following an event's end.

Pre-event curb management will be the same as that shown for the concert scenario with one addition. GSW games will require media coverage and designated curbside parking for media satellite trucks. The total curb length required will be up to 200 feet during regular season games, which includes parking for 2 uplink trucks and 4 ENG trucks. This will be provided on the north side of 16th Street starting just east of 3rd Street. A curb distance of 150 feet will be designated for media trucks, as shown in **Figure 6-7**.

Post-event curb management will be the same as that shown for the concert scenario with the exception of 16th Street. The media satellite truck parking detailed above in the pre-event curb management for the peak event will also be implemented in the post-event curb management. All other post-event curb designations for a peak event are the same as the post-event concert scenario, including the temporary lane closures on South, 3rd, and Illinois Streets, the special event shuttle stops, and the additional passenger pick-up zone on Terry François Boulevard. These are shown on **Figure 6-9**.

To increase safety for the high volumes of pedestrians walking to the Muni Station on 3rd Street, temporary lane closures will be implemented on northbound 3rd Street between 16th Street and Mission Bay Boulevard South, on westbound and eastbound South Street west of the parking garages. It is anticipated that the background traffic volumes will be light after a game, so impacts to the existing traffic patterns will be low. Variable message and detour signs will be placed well in advance of the temporary closures to notify drivers of alternate routes. Proposed locations for permanent variable message signs are listed below:

- Northbound 3rd Street – South of Mariposa (existing VMS)
- Westbound 16th Street – East of I-280 (proposed VMS)
- Southbound 3rd Street – South of Lefty O'Doul Bridge (proposed VMS)
- Eastbound Mariposa Street – East of I-280 (proposed VMS)

Emergency vehicles exiting the UCSF hospital west of 3rd Street between 16th Street and Mariposa Street will be granted access to northbound 3rd Street during the post-event street closure described above. PCOs may remove temporary barriers and allow emergency vehicle access to northbound 3rd Street in those situations, or emergency vehicles may drive in the southbound lanes to travel northbound. GSW staff will provide the hospital with a list of dates and times of post-event street closures.

6.4.3 Pre-Event Controls

Pre-event controls will be the same as the concert scenario, but are repeated here and illustrated on **Figure 6-8**.

PCO Locations

Up to 17 PCOs will be stationed at key locations, as determined by the PCO Supervisor before, during, and after events, such as those listed below. Their primary task will be to manage pedestrian and vehicle traffic.

- 3rd Street and South Street
- South Street and Bridgeview Way
- South Street and Terry François Boulevard
- 3rd Street and 16th Street
- 16th Street and Illinois Street
- 16th Street and Terry François Boulevard
- Mariposa Street and I-280 northbound ramps/Owens Street
- Mariposa Street and 3rd Street
- Mariposa Street and 4th Street
- Mariposa Street and Illinois Street
- Channel Street and 3rd Street
- Channel Street and 4th Street
- Mission Bay Boulevard North and Terry Francois Boulevard
- Mission Bay Boulevard South and Third Street
- One roving PCO (or more if necessary) to monitor general parking issues and respond to complaints called in throughout the neighborhood

The PCO locations listed in this document are solely representative and will remain flexible to respond to changing traffic conditions once the Event Center Development is complete. The number of PCOs per suggested location will be determined in consultation with the SFMTA and refined based on monitoring during the first four years of operations.

UCSF Mission Bay Muni Platform

PCOs will be stationed at the intersection of South Street and 3rd Street to facilitate pedestrian crossings to/from the Muni platforms and minimize conflicts with vehicles and Muni trains.

Event Center Garage Driveway on 16th Street

Game attendees with pre-sold parking passes for the Event Center garage would enter via the left turn lane on eastbound 16th Street leading to the garage driveway or from northbound Illinois Street to self-park. GSW staff will check parking passes before vehicles enter the garage.

PCOs will be stationed at the Event Center garage driveway to facilitate vehicle egress (office employees leaving on weekday evenings) and ingress (event attendees entering the garage), minimize conflicts with pedestrians and bicyclists on 16th Street, and coordinate with PCOs located at the adjacent 3rd Street / 16th Street intersection. A key goal of the PCOs located at the adjacent intersections on 16th Street will be to ensure safety to all modes by minimizing conflicts between modes while ensuring the flow of vehicles into the garage does not result in queues that back up into adjacent intersections. They will also work in conjunction with Event Center staff that will be checking attendees' tickets for valid access to the garage on game day. Drivers who enter the eastbound left-turn pocket or are stationed to enter the garage on Illinois Street without a valid parking pass will be redirected to drive east on 16th Street to Terry François Boulevard towards other nearby garages or parking lots.

3rd Street / 16th Street Intersection

PCOs will be stationed at the intersection of 3rd Street and 16th Street to maintain the flow of Muni trains on 3rd Street, and provide for the safe movement of pedestrians, bicyclists, and vehicles. PCOs will work to ensure that the intersection does not become blocked with vehicles. As noted above, the PCO stationed at 3rd Street/16th Street will work in conjunction with the PCO at the Event Center garage entrance.

Drop-Off on Southbound Terry François Boulevard

Event Center ticket holders may be dropped off on the west side of Terry François Boulevard between South Street and 16th Street as shown on **Figure 6-7**. This curbside area will be separately designated, but shared.

6.4.4 Post-Event Controls

All of the post-event controls are generally the same as the post-event controls for a concert scenario but are repeated here for ease of understanding when reviewing all controls for the peak event exclusively. The post-event curb and lane configurations are illustrated on **Figures 6-9** and **6-10**.

Muni tickets will be sold at the Event Center box office before, during, and after events.

PCOs will be stationed at the intersection of 3rd Street and South Street to manage pedestrian flow to/from the Muni platforms and minimize conflicts with vehicles and Muni trains. Temporary lane closures will also be in effect for enhanced pedestrian safety on northbound 3rd Street north of 16th Street and on South Street east of 3rd Street. Muni staff will also be stationed to check tickets and manage the boarding process.

PCO Locations

PCOs will be stationed at locations determined by the PCO Supervisor, which may include those identified previously for the pre-event scenario, with two exceptions. At least one PCO will be located at the intersection of 16th Street/Owens Street to facilitate heavy left turn flows from westbound 16th Street onto southbound Owens Street and access to I-280. One PCO will also be located at the intersection of Fifth Street/Bryant Street/I-80 eastbound ramps.

Event Center Garage Driveway on 16th

PCOs at the Event Center garage driveway at the intersection of 16th Street / Illinois Street will have the following objectives:

- Managing alternating flows of vehicle traffic exiting the garage with pedestrian-bicycle flows along 16th Street
- Managing alternating flows of vehicle traffic exiting the garage with shuttle traffic and occasional westbound traffic flow on 16th Street to accommodate safe and efficient shuttle loading and departure.
- Coordinating with PCOs located along 16th Street so that they stop pedestrian crossings of 16th Street during the same windows of time that vehicles are released from the Event Center garage onto east- and westbound 16th Street
- Maintaining vehicle access to garages for the 409 and 499 Illinois Street buildings, as well as future UCSF buildings on Blocks 33 and 34, from 16th Street and Illinois Street.

To extend the effective length of the westbound left turn pocket at the 16th Street / 3rd Street intersection, temporary cones will be placed to close the eastbound left turn lane on 16th Street into the Event Center garage entrance after a game, if necessary, extending the turn pocket to 160 feet. The extended turn pocket will be used for westbound vehicles making a left turn onto southbound 3rd Street. Motorists wishing to enter the Event Center garage from eastbound 16th Street will be able to make a left turn from the eastbound through lane.

Southbound traffic exiting the Event Center garage will be advised to travel west on 16th Street to southbound Owens Street to access I-280. Any traffic heading to the north from the parking garage will be advised to travel west on 16th Street to northbound 7th Street due to the temporary northbound closure on 3rd Street.

3rd Street / 16th Street

PCOs will be stationed at the intersection of 3rd Street and 16th Street to facilitate the flow of vehicles from westbound 16th Street from the parking garages, along with Muni trains, bicyclists, and pedestrians while preventing event traffic from going north on 3rd Street. They will work in conjunction with the PCO at the garage entrance to stop pedestrians crossing 16th Street during the same window that vehicles are exiting the garage on 16th Street, and prohibit northbound traffic from accessing 3rd Street north of 16th Street due to the temporary lane closures and direct traffic to northbound Terry François Boulevard.

Temporary Lane Closures

Up to 17 PCOs will be stationed at key locations to redirect traffic due to the temporary lane closures. The PCO station located on South Street east of 3rd Street will manage the temporary South Street lane closure as well as Bridgeview Way. The PCOs will direct all traffic exiting the 450 South Street (office and retail employees) and Event Center (event attendees) garages to Terry François Boulevard via eastbound South Street, and restrict

northbound traffic from using Bridgeview Way, except for neighborhood traffic. These PCOs will also direct any southbound traffic on Bridgeview Way left onto eastbound South Street.

PCOs will also be stationed at the Terry François Boulevard / South Street intersection to manage traffic exiting the garages on South Street. They will direct traffic either north or south on Terry François Boulevard, and restrict vehicle access onto westbound South Street. They will also manage alternating flows of pedestrian crossings of South Street and vehicles turning onto Terry François Boulevard. PCOs will also allow for local traffic to access garages on 16th Street and Illinois Street.

PCOs will be stationed on 3rd Street at Mariposa Street to direct no-event northbound traffic to alternate routes in advance of the temporary closure on northbound 3rd Street to reduce congestion at the intersection of 3rd Street / 16th Street. Northbound traffic will be redirected east along Mariposa Street to northbound Terry François Boulevard. Variable message signs (VMSs) will also direct traffic to Terry François Boulevard in advance of the intersection of 3rd Street / Mariposa Street. VMSs and detour signs will be programmed and/or placed well in advance of the temporary closures to notify drivers of alternate routes, including those depicted in **Figure 6-10**. Permanent Variable Message Signs will be placed at the following locations to notify drivers of detours in advance:

- Northbound 3rd Street – South of Mariposa (existing VMS)
- Westbound 16th Street – East of I-280 (proposed VMS)
- Southbound 3rd Street – South of Lefty O’Doul Bridge (proposed VMS)
- Eastbound Mariposa Street – East of I-280 (proposed VMS)

All PCOs stationed at locations along 3rd Street will also assist emergency vehicles and autos needing emergency access to the UCSF Medical Center to navigate congested conditions and utilize closed travel lanes as needed.

Temporary Turn Restrictions

Temporary turn restrictions will be in place post-event to discourage vehicles traveling westbound on 16th Street from turning left onto 3rd Street, Owens Street or Mississippi Street. PCOs will be responsible for coning off left turn pockets at these three intersections and enforcing left-turn restrictions. Signage will be provided inside event garages to direct vehicles destined for I-280 to use Terry François Boulevard to Mariposa Street as the primary access.

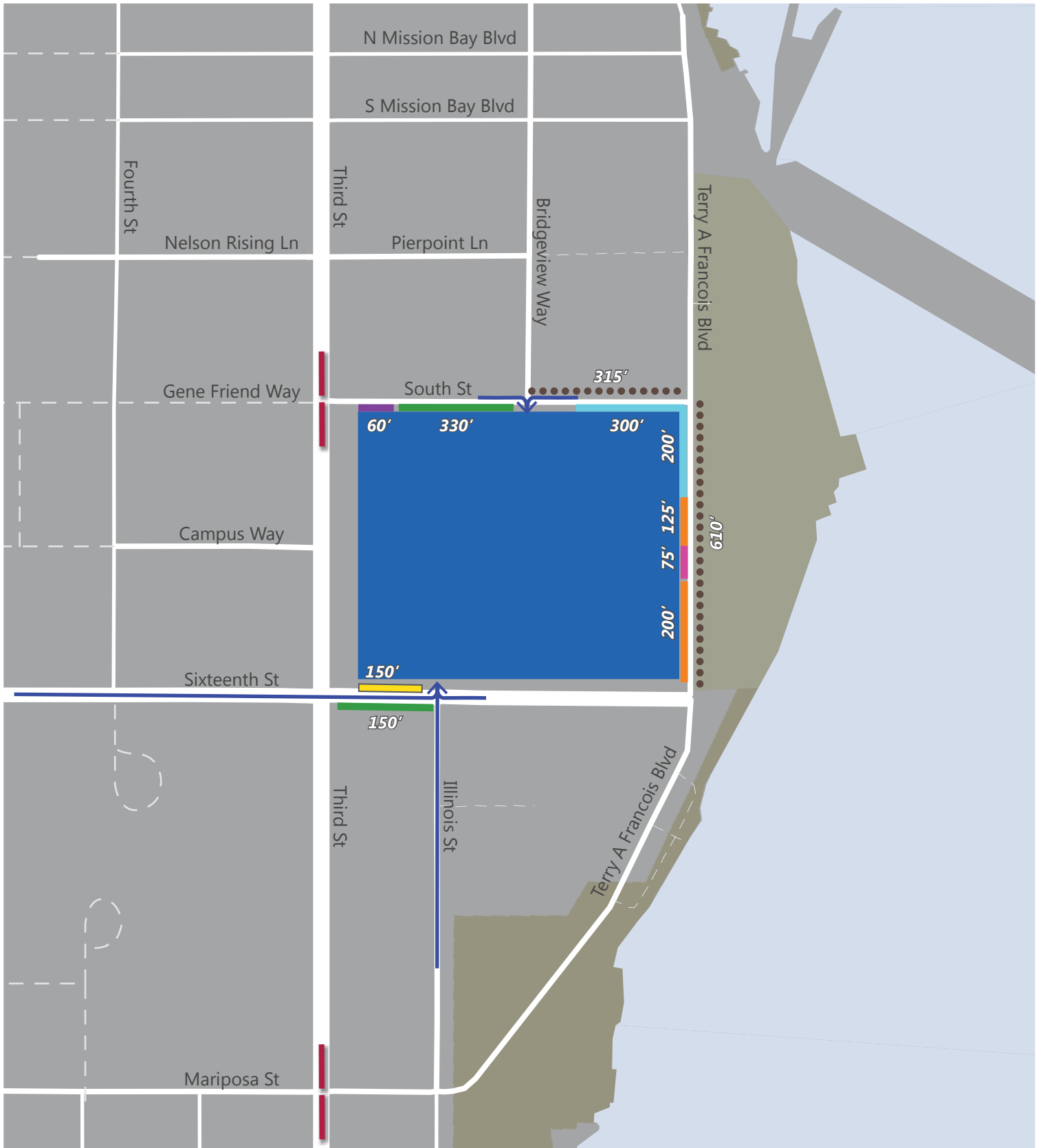
Passenger Pick-Up on Terry François Boulevard

The passenger pick-up location will be the same as the pre-event drop-off location – on the west side of Terry François Boulevard. This location will also include Paratransit loading.

Terry François and 16th Intersection

PCOs will be stationed at the intersection of Terry François Boulevard and 16th Street following a game’s end to manage bicycle and pedestrian flows, detour traffic from the temporary lane closures on South Street and 3rd Street, as well as event traffic from nearby parking facilities. Traffic will be directed mostly north and south on Terry François Boulevard to avoid adding to the congestion on 16th Street and to avoid conflicts with shuttle buses.

- Project Site
- MUNI Platform
- TMA Shuttles
- Taxi
- Buses
- Media Trucks
- Paratransit Bus
- Lane Closure
- Passenger Drop-off
- Black Car
- Approximate Storage Length
- On-Street Metered Parking
- Garage Entry



Not to Scale



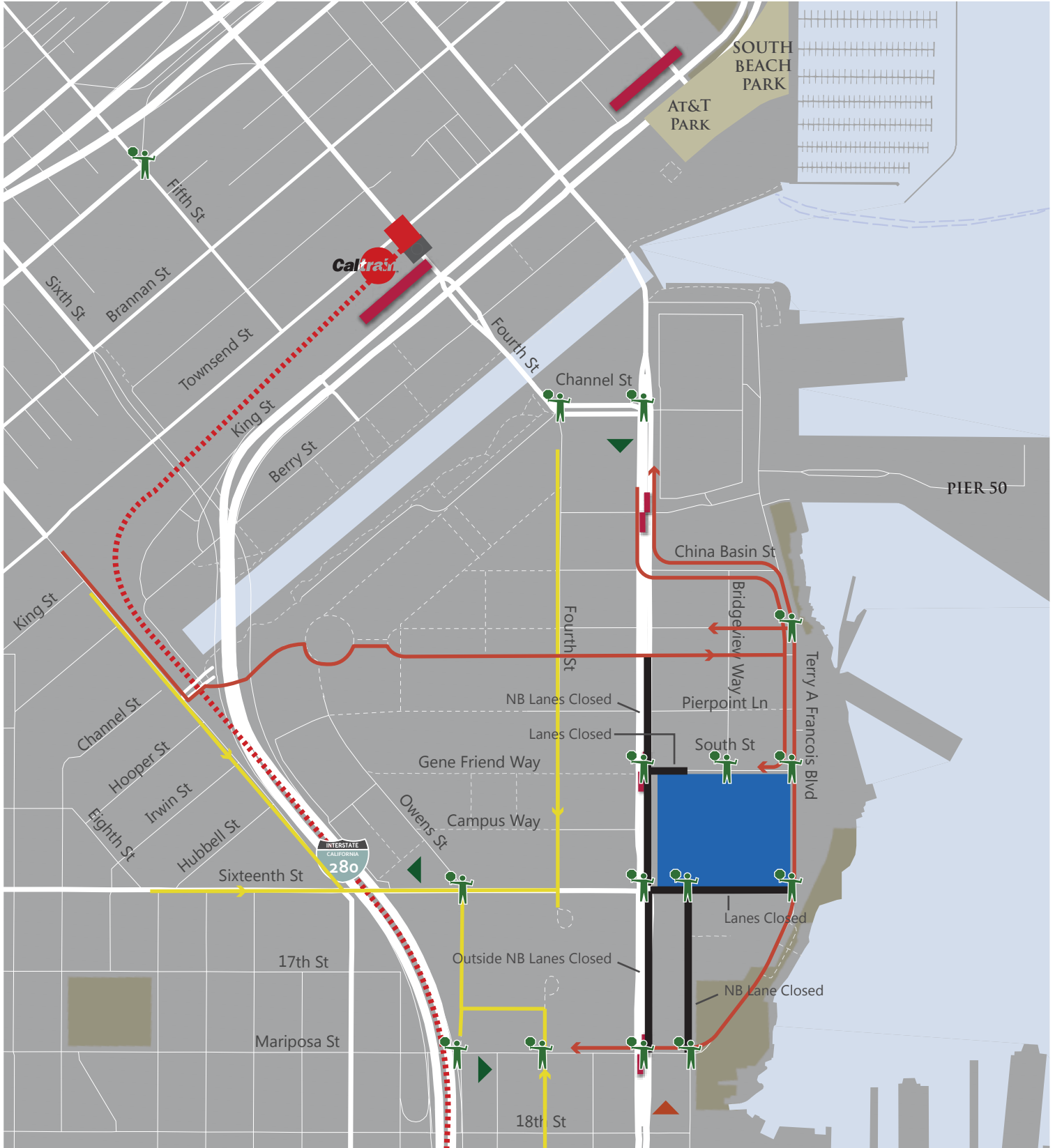
Not to Scale

- Project Site
- MUNI Platform
- TMA Shuttles
- Buses
- Media Trucks
- Taxi
- Paratransit Bus
- Lane Closure
- Passenger Pick-up
- Black Car
- Approximate Storage Length
- On-Street Metered Parking
- Garage Exit



Not to Scale

- MUNI Platform
- Caltrain Line
- Project Site
- PCO Station
- Existing VMS
- Lane Closure
- Detour Routes for Local Traffic
- Alternate Routes for Hospital and other Traffic
- Proposed New VMS



PEAK EVENT: POST-EVENT CONTROLS

6.5 CONTROLS FOR PEAK EVENT COINCIDING WITH AT&T PARK EVENT SCENARIO

See Section 2.2 for a description of the scenario in which a peak Event Center event coincides with an AT&T Park event.

6.5.1 General

On days where Event Center events coincide with AT&T Park events, pedestrian, bicycle, and vehicle volumes along Terry François Boulevard and 3rd Street will be greater. Controls implemented as part of the Event Center TMP will not change, but should be coordinated with controls implemented as part of the AT&T Park standard TMP so that:

- Efforts are not duplicated; and
- Controls are complementary rather than contradictory.

The Warriors support the formation of a working group, comprised of the Warriors, Giants, SFMTA, Mission Bay CAC, UCSF, MBBTCC, and other stakeholders, to regularly discuss potential overlaps and the resulting traffic and transit conditions, and to propose solutions on an individual event basis. For example, if the AT&T Park TMP includes PCO control at any PCO intersections listed in this document and events' start or end times coincide, no additional PCOs will be necessary at that location. **Figures 6-11** and **6-12** show where PCOs would be stationed pre- and post-event during a dual event scenario, including a new post-event dual event location for a PCO at Mariposa Street and Fourth Street.

Transit loading may also be monitored by Transit Fare Inspectors (TFIs) and SFMTA Passenger Assistance Program staff (MTAPs) stationed at Muni platforms.

- MUNI Platform
- Caltrain Line
- Project Site
- Existing VMS
- Lane Closure
- GSW PCO
- AT&T PCO
- Proposed New VMS



Not to Scale

DUAL EVENT WITH AT&T: PRE-EVENT CONTROLS

- MUNI Platform
- Caltrain Line
- Project Site
- Existing VMS
- Lane Closure
- GSW PCO
- AT&T PCO
- Proposed New VMS





Not to Scale

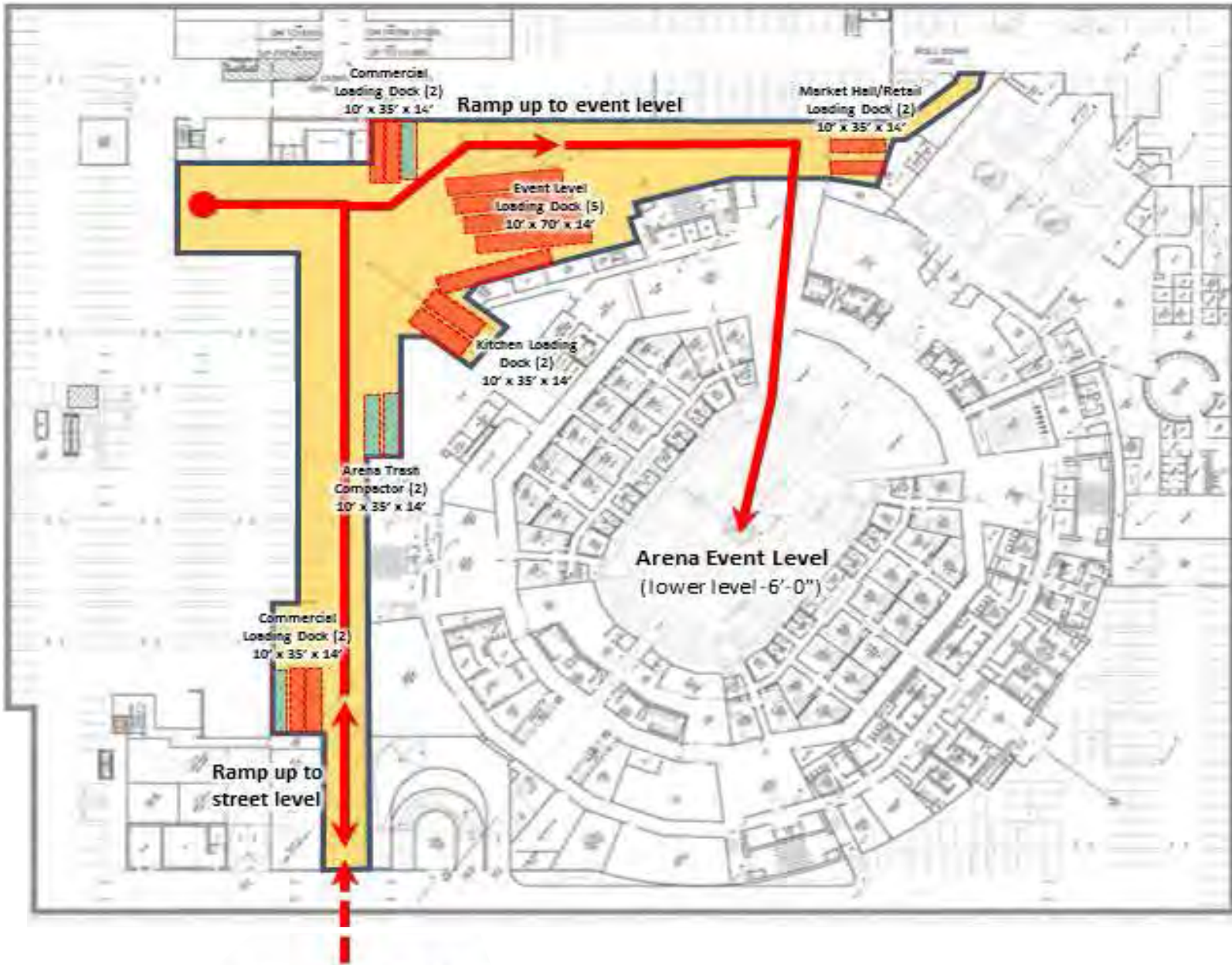
CHAPTER 7. FREIGHT LOADING

7.1 FREIGHT ACCESS FOR EVENT CENTER DEVELOPMENT (BLOCKS 29-32)

Freight access to the Event Center Development site located on Blocks 29-32 will be provided as described below and as shown on **Figure 7-1**.

- Event Center Loading Docks – A formal truck loading area will be located on the lower level of the parking structure. Trucks will enter and exit the loading dock via access-controlled truck-only lanes in the parking structure’s driveway on 16th Street at Illinois Street. All trucks that service events at the Event Center, including semi-trailer trucks, single unit trucks, and trash trucks, will use the loading dock area. The loading area will provide a “hammerhead” turnaround area so that trucks can easily maneuver into and out of the loading slips. Truck access will be limited to the extent feasible during pre- and post-event times to minimize potential conflicts with vehicles arriving or departing the garage.
- Retail Truck Loading Docks – Smaller loading docks for single unit trucks will be located on the Lower Level of the parking structure. This area will be available for use by the visitor-serving retail uses. Trucks will enter and exit the loading area via the access-controlled truck-only lanes in the driveway on 16th Street at Illinois Street.
- Office Truck Loading Docks – Loading docks for the office towers will be located on the Lower Level of the parking structure in two areas. Three loading docks for the South Street office tower will be provided in the northwest corner of the loading area and one loading dock for the 16th Street office tower will be located in the southwest corner of the loading area, just to the left of the first garage ramp. Both loading areas will also include trash compactors for the office towers. Trucks will enter and exit the loading area via the access-controlled truck-only lanes in the driveway on 16th Street at Illinois Street.
- South Street and Terry François Boulevard Commercial Curbside Loading – Parking along portions of the Event Center Development frontage will be designated for commercial truck deliveries for retail uses. On-street commercial loading zones will be designated as active loading zones all hours.
- Market Hall Loading – There will also be a small separate loading area, exclusive to the Market Hall uses, for which small delivery vehicles will enter via the South Street garage entrance.

-  Trash Compactors
-  Loading Slips



Garage Access from Above



Not to Scale

CHAPTER 8. EMERGENCY VEHICLE ACCESS

The Event Center Development is served by the San Francisco Fire Department (SFFD) and the San Francisco Police Department (SFPD). A new SFFD fire house and SFPD headquarters building is being constructed at Block 8 in the Mission Bay South area on China Basin Street east of 3rd Street.

The Event Center Development project also anticipates installing on-site generators capable of providing up to three megawatts (MW) of emergency, standby and optional power in the case of temporary loss of normal utility power. The on-site generators would provide power to the Transportation Management Center (TMC) during such an emergency to facilitate efficient communication between TMC staff and emergency service personnel.

8.1 EMERGENCY VEHICLE ACCESS FOR EVENT CENTER




Emergency vehicle access to the Event Center Development site will be provided as described below and shown on **Figure 8-1**.

- SFFD vehicles from the new fire house on China Basin Street would access the Event Center Development via southbound 3rd Street or Terry François Boulevard. Direct access to the Event Center Arena will be provided via the southeast corner plaza on the corner of Terry François Boulevard and 16th Street. Fire Department vehicles traveling south on 3rd Street would make a left at 16th Street. Fire Department vehicles traveling south on Terry François Boulevard would make a right turn onto 16th Street. Emergency vehicles servicing office buildings will use either 16th Street or South Street. SFPD vehicles or supplemental SFFD vehicles from other fire houses would access the western plaza via 3rd Street either from 16th Street (for vehicles traveling from the west via 16th Street) or from 3rd Street (for vehicles traveling from the north or from the south via 3rd Street). Exclusive transit rights-of-way along 3rd Street and 16th Street will accommodate emergency vehicles when traffic congestion might otherwise impair access, and emergency vehicles will be permitted on closed-streets as needed.

Staff in the TMC will also closely coordinate with emergency service personnel to facilitate access as needed.

8.2 EMERGENCY VEHICLE ACCESS FOR UCSF HOSPITAL

The UCSF Women's Cancer & Children's Hospital, scheduled to open on February 1, 2015, is located on the west side of 3rd Street between 16th Street and Mariposa Street. Access to the hospital will be provided from both 16th Street and Mariposa Street via extensions of 4th Street. Pre- and Post-event curb management and controls as related to the UCSF Hospital access for patients and staff are described in Chapter 6.

-  New Fire/Police Station
-  Emergency Vehicle Route to Project Site
-  Project Site



Not to Scale

CHAPTER 9. COMMUNICATION

9.1 OUTREACH

Outreach can provide useful trip planning information to guests and employees, in order to minimize confusion and risk of conflicts by providing advanced information on transportation choices for accessing the Event Center; and by alerting attendees to the location and purpose of temporary controls and measures. The following is an outreach strategy to accompany Event Center events. Outreach about transportation will promote use of non-auto modes to the Event Center.

Ticket purchase confirmation will include the following information:

- In addition to the option to pre-purchase parking at the Event Center, all attendees will receive a statement explaining that parking will be extremely limited on site and may not be available, an explanation of transit and bicycle resources, and detailed information about options for getting to the Event Center, including:
 - List of transit options available, including links to trip planning tools, schedules, fare information, and forms of payment (i.e. Clipper card brochure)
 - Location of real time transit information displays on the Event Center site
 - Reminder that Muni fares will be checked on the street, prior to walking up the Muni platform; that Muni tickets must be purchased ahead of time, and that they may be purchased at the Event Center box office
 - Links to web-based trip planning tools and resources (by transit, walking, bicycling, and driving)
 - Information on how to use transit (fare and payment information), best stops and stations for accessing the Event Center, walking routes to the Event Center from transit hubs
 - Recommended walking paths to the Event Center from transit hubs and other origins
 - Information on bicycle routes (i.e. link to San Francisco's Bicycle and Walking Map) and free bicycle valet services
 - Directions to general pick-up/drop-off location along Terry François Boulevard
 - Information on TMA shuttles (routes, times, stop locations)
 - Information on parking availability and pricing, and ability to pre-purchase parking at event center [this should be last on our list, as it will be last on our customers']
- For attendees who do purchase parking in the garage with their ticket:
 - Directions to the Event Center from different origins and instructions describing the best path to access the Event Center garage
 - Information on controls that will be in place following game's end and how to most effectively exit the Event Center garage towards desired destinations

9.2 WAYFINDING

Wayfinding can support easy, safe walking and bicycling trips, and reduce the risk of conflicts for all modes by directing people away from potential conflict points. The following is a wayfinding strategy to accompany Event Center events.

9.2.1 Pre-Event Wayfinding

- Signage, in accordance with San Francisco standards, directing visitors to arena, transit, taxi stands, identifying bikeways, locations of bicycle parking, bike share pods, etc. within ¼ mile of arena
- Build a base of permanent, intuitive wayfinding network that highlights local transit hubs and major destinations, and includes estimates of walking times along the most comfortable pedestrian corridors.
- Wayfinding efforts will be increased or emphasized during playoff NBA games due to these events attracting out of town attendees who will presumably be unfamiliar with the transportation network and transit options. These efforts may include additional temporary signage in the Event Center vicinity.
- Signage at all corners of the site directing walk-up attendees to Event Center entrances along routes that minimize pedestrian crossings of the Event Center garage driveway.
- Signage directing bicyclists to the indoor bicycle valet parking or temporary bicycle corrals. Signage will be placed at the following locations:
 - Northbound Illinois Street before the entry to the garage
 - Northbound and Southbound Terry François Boulevard just before the site
 - Eastbound 16th Street just before the site
- Signage directing eastbound bicyclists along 16th Street to walk up the sidewalk on the east side of 3rd Street to access bicycle rack parking located in the west plaza.
- Signage that directs vehicles towards the event center garage or other nearby garages/lots, including wayfinding signage on I-280 to direct vehicles to the best exit to access the site.

9.2.2 Post-Event Wayfinding

- Signage at Event Center exits that directs pedestrians leaving the site away from the Event Center garage driveway and towards key destinations such as BART (west and north), Caltrain (north), 22 Fillmore bus route (west) and Muni South Street stop (northwest corner).
- Signage outside bicycle valet parking directing bicyclists to use the Blue Greenway along Terry François Boulevard.
- Signage that directs vehicles towards the suggested post-event route, including garage exit wayfinding.

CHAPTER 10. MONITORING, REFINEMENT, AND PERFORMANCE STANDARDS

The Golden State Warriors will monitor and refine the TMP in conjunction with the City of San Francisco and the various transit providers throughout the life of the project through monitoring during the project's first four years of operations and an annual surveying and reporting program thereafter. The TDM plan will be continually refined by improving existing measures and introducing new strategies.

10.1 PURPOSE

The monitoring and refinement of the TMP will be conducted to accomplish the following objectives.

1. Weekday Event Auto Mode Share: Targeted average auto mode share should be no greater than 53 percent for weekday peak event arrivals (6:00 PM – 8:00PM).
2. Weekend Event auto Mode Share: Targeted average auto mode share should be no greater than 59 percent for weekend peak event arrivals (6:00 PM – 8:00PM).
3. Vehicle Queuing on City Streets: Traffic entering the parking garage from eastbound 16th Street does not spill back to 16th Street or into the Third Street intersection due to garage ingress.
4. Vehicle Queueing on City Streets: Event traffic does not block access to the UCSF emergency room entrance for emergency vehicles or patients on Mariposa Street between I-280 and Third Street.
5. Pedestrian Flows: Pedestrians do not spill out of sidewalks onto streets with moving vehicles, or out of crosswalks when crossing the street.
6. Bicycle Parking: Signage is clearly visible to direct bicyclists to event valet and other bicycle parking, and ensure that adequate bicycle parking supply is provided to accommodate a typical peak event.
7. Transit Mode Share: All Muni light rail and special event shuttle passengers are able to board their transit vehicle within 45 minutes following an event.
8. Good Neighbor: Mission Bay TMA shuttles continue to run and maintain capacity for simultaneous neighborhood use.

10.2 MONITORING METHODS

The following methods will be employed to monitor TMP strategies.

1. Quarterly Coordination Meetings – the on-site Transportation Coordinator and key Event Center staff will meet quarterly with the City's designated representative, SFMTA TDM Manager, other key City staff, and other transportation service providers to evaluate the TMP strategies throughout the life of the project.
2. Inaugural Event Monitoring – a designated team of Event Center and City staff will monitor pre-event and post-event transportation conditions at several of the first Warriors' games and concerts held at the Event Center, per Performance Standards described in Section 10.4 and relevant adopted City standards.

3. Subsequent Event Monitoring - a designated team of Event Center and City staff will monitor pre-event and post-event transportation conditions intermittently during the first four years of operation at the Event Center, per Performance Standards described in Section 10.4 and relevant adopted City standards.
4. Curb Pick-Up and Drop-Off Operations – the on-site Transportation Coordinator will regularly monitor curb operations during the first year of operation.
5. Event Attendee Surveys – annual travel surveys of at least 600 attendees⁵ will be conducted at five weekday evening games and at one of each other event type (including a dual-event scenario, if one occurs) at the Event Center. The surveys will identify such data as pre-event origin and post-event destination, arrival and departure times, arrival and departure modes, transit provider, parking location, number of vehicle occupants (auto mode), etc.
6. Event Center Development Employee Surveys – annual travel surveys of permanent and temporary employees will be conducted to identify the same travel information for Warrior employees as well as to determine their awareness of alternative modes and travel demand management programs that are available to them. Warriors will commit to a minimum of 60 percent survey completion rate.
7. Mission Bay Neighbor Surveys – travel surveys will be conducted during the initial year at the Event Center to identify the same travel information for local residents and employers, who will be contacted via the Mission Bay Citizens Advisory Committee (CAC) distribution list. The results of these surveys will be shared and discussed with the CAC as requested.
8. UCSF Surveys –travel surveys will be conducted during the initial year at the Event Center to identify the adequacy of access for emergency vehicles and personal to the UCSF hospital center and children’s emergency room. Surveys will include UCSF campus staff and emergency personnel.
9. Parking Strategies – data will be collected on parking utilization rates, and effectiveness of on-site and off-site remote parking strategies, for all event and no-event types.

10.3 MONITORING DOCUMENTATION

The results of the monitoring process will be documented as follows.

1. TMP Travel Survey Memo – a memorandum will be prepared within three months of the inaugural events (NBA game, concert, and convention) that documents the results of the travel surveys as well as ongoing event monitoring.
2. TMP Monitoring Report – a report will be developed and submitted to OCII annually, beginning at the end of the first year of operation of the Event Center Development, that addresses how effectively the TMP is meeting the monitoring objectives described above, while also proposing changes, adjustments, and improvements to the TMP and TDM as needed. The survey will be developed in coordination with SFMTA and OCII.

⁵ Comparable to surveys conducted at other new, urban multi-purpose venues (including Barclays Center in Brooklyn, NY).

10.4 PERFORMANCE STANDARDS

The TMP includes various performance measures once the project is in operation and initial monitoring results are available, the results will be measured against these criteria. If not achieved, the Warriors will be required to work with the appropriate agency or stakeholder group to ensure that the standards are met. The following performance standards have been developed:

1. Weekday Auto Mode Share: Targeted average auto mode share should be no greater than 53 percent for weekday peak event arrivals (6:00 PM – 8:00PM).
2. Weekend Auto Mode Share: Targeted average auto mode share should be no greater than 59 percent for weekend peak event arrivals (6:00 PM – 8:00PM).
3. Vehicle Queuing on City Streets: Traffic entering the parking garage from eastbound 16th Street does not spill back to 16th Street or back to the 3rd Street intersection due to garage ingress.
4. Vehicle Queuing on City Streets: Event traffic will not block access to the UCSF Emergency Room entrance for emergency vehicles or patients on Mariposa Street between I-280 and 3rd Street.
5. Pedestrian Flows: Pedestrians do not spill out of sidewalks onto streets with moving vehicles, or out of crosswalks when crossing the street.
6. Bicycle Parking: Signage is clearly visible to direct bicyclists to event valet and other bicycle parking, which has an adequate supply to accommodate a typical peak event.
7. Transit Mode Share: All Muni Metro and additional shuttle passengers are able to board their transit vehicle within 45 minutes following an event.⁶
8. Good Neighbor Policy: Mission Bay TMA shuttles continue to run and maintain capacity for simultaneous neighborhood use.

In the event that ongoing monitoring shows at any time that the performance standards outlined above are not being met, the Warriors will explore additional travel demand strategies, operational efforts, or minor redesigns to meet the goals of this TMP. Revisions to policy will be brought before the Mission Bay CAC, which includes representatives from UCSF, as requested by that body for public comment prior to implementation. A representative list of possible strategies is as follows:

1. Increase Warriors contribution to the Mission Bay TMA to directly fund incremental, event-only service, which may include additional shuttle bus purchases and/or expanded hours of operation.

⁶ 45 minutes has been deemed an appropriate period of time given the anticipated time patrons will spend egressing from the building, crossing the 3.2 acre plaza, locating the appropriate transit stop for their final destination, and queuing accordingly. It reflects anticipated delay by some patrons who may remain in the Event Center following an event's end to take advantage of promotions, watch post-game interviews, etc., and by other guests who may patronize the retail businesses located on-site following an event but prior to leaving Mission Bay.

2. Establish a partnership with a private shuttle provider for incremental, event-only service to and from satellite parking locations (if designated) or transit centers.
3. Facilitate charter bus/private shuttle program purchases for group ticket sales and/or suite purchases for events. Reduce the project parking demand through a variety of mechanisms, including pricing.
4. Explore partnerships with car-sharing services (e.g., Zipcar, City CarShare) for spaces on-site to reduce car ownership amongst employees.
5. Expand media campaigns, including in social media, which promote walking and/or bicycling to the event center.
6. Conduct cross-marketing strategies with event center businesses (e.g., 10 percent off merchandise/food if patrons arrive by transit and/or bike or on foot).
7. Carry out public education campaigns.
8. Offer special event ferry service to the closest ferry station to the project site (similar to the existing service provided between AT&T Park and Alameda, Marin and Solano Counties by Golden Gate Transit, Alameda/Oakland and Vallejo ferry service).
9. Provide transit fare subsidies to event ticket holders.
10. In consultation with the SFMTA, remove any street furniture or landscaping obstructing pedestrian paths of travel or Muni staging areas.
11. Cooperate with future City efforts for active interventions to effectively manage and price the parking supply in the project vicinity to reduce traffic congestion.

**APPENDIX A:
EVENT ACTIVITY SEQUENCES**

Typical Warriors Game Sequence (7:30 pm tip off)

Day Prior 2 to 4 pm	If the game is nationally televised (5-7 games per year), 1-2 TV trucks for the national broadcaster(s) will typically arrive the day before the game. Trucks are parked in the loading dock and technicians will begin to setup for game broadcast.
Game Day 7 am to noon	Game day food service deliveries at loading dock (scheduled around TV broadcast and team arrival and departures). Average Time of delivery is scheduled to avoid peak commute hours and other factors that may influence efficiency and impact. Average individual deliveries required per Warriors game is six. Most if not all are scheduled to occur the day prior.
9 am	<p>Food service prep team arrives. Typically 25 to 35 game day personnel plus approximately 30 baseline staff. Staff will arrive on foot and be encouraged to use public transit.</p> <p>Home and visiting team TV trucks (<i>2 trucks</i>) arrive and deploy in the loading dock. If trucks are in market and the dock is available, they may arrive the day before the event. Typical call is morning on game day. The trucks can arrive as late as early afternoon.</p>
10 am	<p>TV broadcasting crew arrives one hour following TV truck arrival and begins to prepare for the game broadcast. Typically 40 personnel total. The crew arrives via the loading dock.</p> <p>Pre-game shoot around. Visiting teams will in some cases use an off-site venue for shootaround. Specific times vary. The window is typically 10 am to 1 pm. Typically 25 personnel per team. Visiting team arrives in two buses. Home team arrives individually. After pre-game shoot around, visiting players and coaches and home team players will typically leave the building. The visiting team arrives and departs via the loading dock. The home team will either use the loading dock or segregated parking in the Event Center garage.</p>
1 pm	Building pre-cleaning crew arrives. This practice varies from building to building and is more common for outdoor venues. Personnel vary based on event type and general building practice. Likely 15 to 20 total. In some cases, there is no pre-clean. In others, the pre-clean happens early in the morning on game day. The crew will arrive at the staff entrance on foot and be encouraged to use public transit.
5 to 5:30 pm	Teams return for the game. The visiting team will arrive in two buses via the loading dock. The home team will either use the loading dock or segregated parking in the Event Center garage.
5 to 6 pm	Game day building staff arrives. Includes guest service and food service personnel. Typically 500 to 600 total. Staff will arrive at the staff entrance on foot and be encouraged to use public transit.
5:30 to 6 pm	Police, building security, and guest services personnel deploy to manage guest ingress approximately 30 minutes prior to doors.

6 to 6:30 pm	Doors open 60 to 90 minutes prior to tip off. Guests begin to arrive. We anticipate that approximately 80% of guests will access the building via the entrance at the main plaza. Arrival distribution varies slightly based on day of week and market dynamics. 80% to 90% of guests are in the building by tip off. Final guests typically enter by the end of the first quarter.
7:30	Tip off.
9:30 pm	Police, building security, and guest services personnel deploy to manage guest egress approximately 30 minutes prior to anticipated game end.
10 pm	Game ends. Broadcast technicians immediately begin load-out. Cleaning crew arrives and immediately begins post-show clean. Typically 25 to 50 personnel. The crew will arrive at the staff entrance on foot and be encouraged to use public transit. Change over crew arrives and immediately begins change over. Typically 20 personnel. The crew will arrive at the staff entrance on foot and be encouraged to use public transit.
11 to 11:30 pm	Venue clear of guests and all event staff.
Day After Game	
11:30 pm to 12 am	TV trucks leave the venue.
2 to 3 am	Post-game clean complete, cleaning crew leaves the building.
4 am	Change over complete. Crew leaves the building.

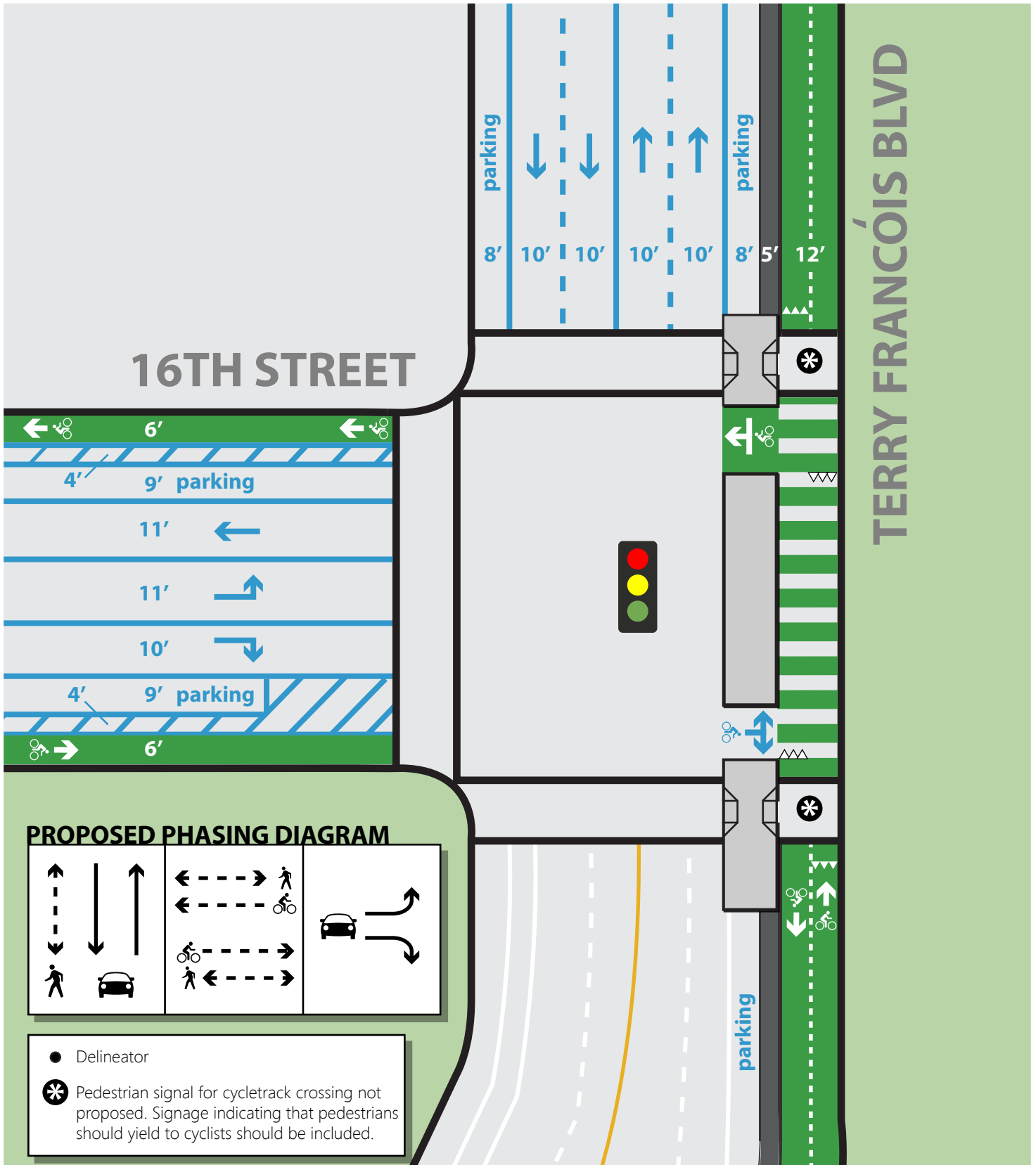
Typical Concert Sequence (7:30 pm Show Time)

Event Day 4 to 8 am	Show trucks (which carry all show components including the stage, sound equipment and controls, video equipment and controls, props) arrive in market. They will typically stage somewhere off site but close to the venue. The number of trucks varies based on the size and complexity of the show. An A list show will usually require approximately 20 trucks. Once trucks have been unloaded, they are driven off site and will not return until the show is complete and the load-out process begins.
6 to 8 am	The production team (15 to 30 personnel for A list shows) arrives at the venue as does the local stagehand crew. Initial production trucks access the loading dock and show load-in commences. The production team will arrive in tour buses and access the building via the loading dock. The stagehand crew will arrive on foot and be encouraged to use public transit. The show trucks enter and exit the venue as the show components are unloaded. Load-in typically occurs over approximately four to six hours.
7 am to noon	Event day food service deliveries at loading dock (scheduled around other event related arrivals and departures). Average individual deliveries required are six. Most if not all are scheduled to occur the day prior.
9 am	Food service prep team arrives. Typically 25 to 35 event day personnel plus approximately 30 baseline staff. Staff will arrive on foot and be encouraged to use public transit.
1 pm	Building pre-cleaning crew arrives. This practice varies from building to building and is more common for outdoor venues. Personnel vary based on event type and general building practice. Likely 15 to 20 total. In some cases, there is no pre-clean. In others, the pre-clean happens early in the morning on event day. The crew will arrive at the staff entrance on foot and be encouraged to use public transit.
2 to 4 pm	Performer(s) arrive(s) for sound check. Sound check typically lasts 30 to 60 minutes. The performer(s) will arrive in tour buses via the loading dock.
5 to 6 pm	Event day building staff arrives. Includes guest service and food service personnel. Typically 500 to 600 total and varies based on show type and expected attendance. Staff will arrive at the staff entrance on foot and be encouraged to use public transit.
5:30 to 6 pm	Police, building security, and guest services personnel deploy to manage guest ingress approximately 30 minutes prior to doors.
6 to 6:30 pm	Doors open 60 to 90 minutes prior to show time. Guests begin to arrive. We anticipate that approximately 80% of guests will access the building via the main entrance for Event Center shows, and 80% will access the building via the main theatre entrance for theatre shows. Arrival distribution varies slightly based on day of week and market dynamics. 90%+ of guests are in the building by show time. Final guests typically enter within another 30 minutes following show time.
7:30 pm	Show time.

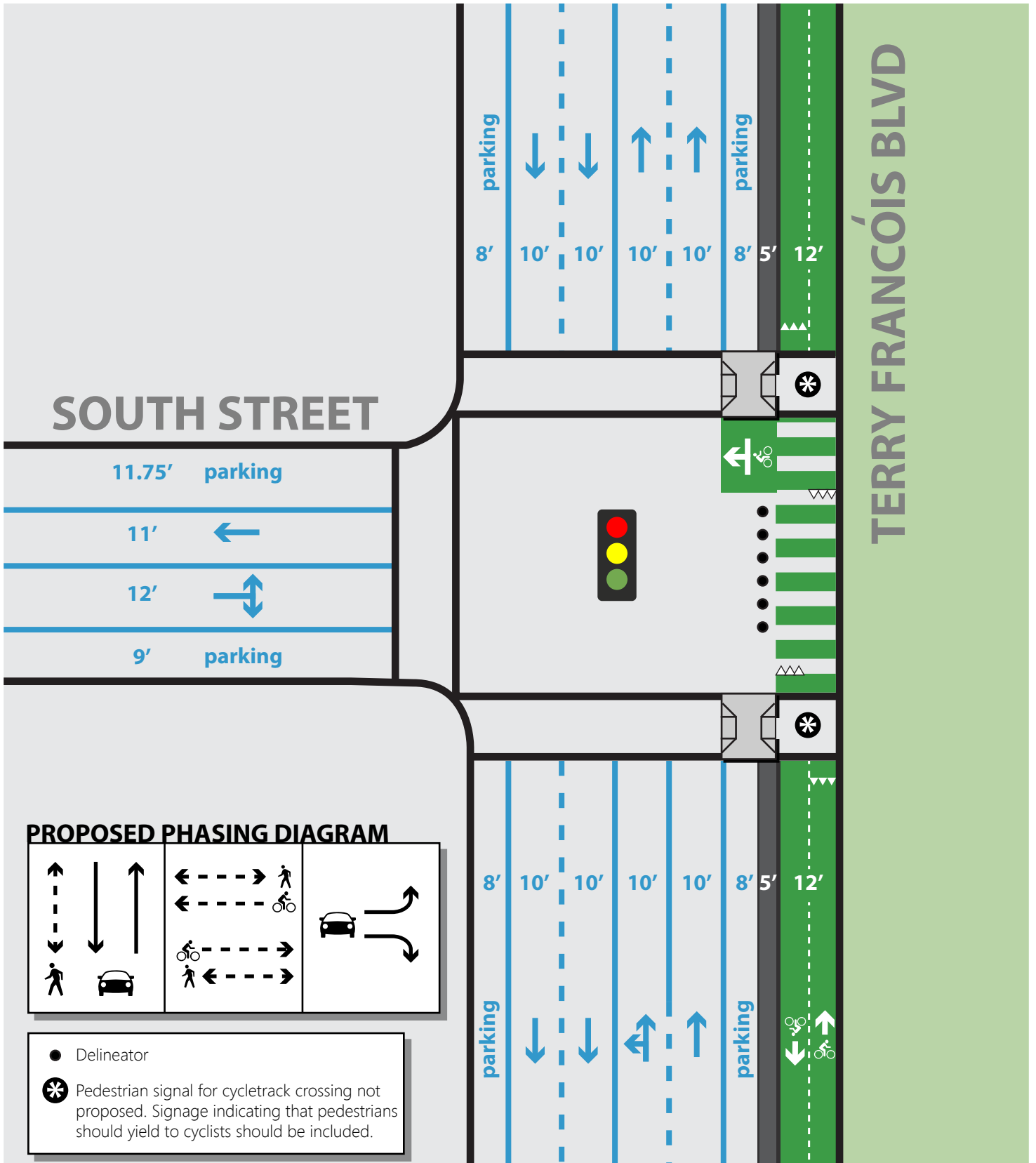
10 pm	Police, building security, and guest services personnel deploy to manage guest egress approximately 30 minutes prior to anticipated show end.
10:30 pm	Show ends. Production team immediately begins load-out. Cleaning crew arrives and immediately begins post-show clean. Typically 25 to 50 personnel. The crew will arrive at the staff entrance on foot and be encouraged to use public transit. Change over crew arrives. Typically 20 personnel. The crew will arrive at the staff entrance on foot and be encouraged to use public transit.
11:30 to 12 am	Venue clear of guests and all event staff.
Day After Event	
1 to 3 am	Show trucks leave the venue.
2 to 3 am	Post show clean complete, cleaning crew leaves the building.
4 am	Change over complete. Crew leaves the building.

**APPENDIX B:
INTERSECTION CONCEPT LEVEL FIGURES**





Not to Scale



Not to Scale

APPENDIX TR

Transportation Technical Appendix

APPENDIX TR

TRANSPORTATION TECHNICAL DATA

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TRANSPORTATION ANALYSIS SCOPE OF WORK



**SAN FRANCISCO
PLANNING DEPARTMENT**


**TRANSPORTATION STUDY
SCOPE OF WORK
ACKNOWLEDGEMENT AND APPROVAL**

Date: August 19, 2014

Transmittal To: LCW and Adavant Consultants, Transportation Consultants

The proposed scope of work for the Golden State Warriors Event Center and Mixed Use Development on Mission Bay Redevelopment Area Blocks 29-32, dated August 2014 is hereby

- Approved as submitted
- Approved as revised and resubmitted
- Approved subject to comments below
- Not approved, pending modifications specified below and resubmitted

Signed:  Transportation Planner
 Environmental Review Planner

Note: A copy of this approval and the final scope of work are to be appended to the transportation study. The Department advises consultants and project sponsors that review of the draft transportation report may identify issues or concerns of other City agencies not addressed in the scope of work hereby approved, and that the scope of work may need to be modified to accommodate such additional issues.

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Scope of Work

Transportation Analysis for the proposed Event Center and Mixed Use Development at Mission Bay South Area Blocks 29-32 EIR

Final: August 13, 2014

Adavant Consulting and LCW Consulting are pleased to submit this scope of work to prepare the transportation section of the Environmental Impact Report (EIR) for the proposed event center and sports arena to be located in the Mission Bay South Area of San Francisco. This scope of work follows the San Francisco Planning Department's "Transportation Impact Analysis Guidelines for Environmental Review, October 2002" (*SF Guidelines*), as applicable.

Task 1 – Conduct Project Scoping

The San Francisco Planning Department requires that the scope of work for the transportation analysis be reviewed and approved by the designated transportation planner and environmental staff coordinator prior to commencement of any work by the transportation consultants. The transportation consultants will meet and consult with Environmental Planning staff, the Office of Community Investment and Infrastructure (OCII), and other city agencies, as determined by Environmental Planning to review, discuss and modify the draft scope of work and define the required level of detail for the transportation analysis. The discussions will focus on items such as:

- Project definition and components, including alternatives;
- Data collection (traffic counts, locations, day of week, and time of day);
- Assumptions (study area, land use types, cumulative growth, etc.);
- Methodology (trip generation methodology and appropriate sources, travel forecasts, etc.);
- Analysis scenarios (future years, development and transportation network and transit service assumptions);
- Extent of analysis of the alternatives to the proposed project; and
- Transportation section schedule and deliverables.

Event Center at Mission Bay South Area Blocks 29-32
2012.0718E – Final Transportation Scope of Work

August 13, 2014
Page 1

Task 2 – Develop Project Description and Analysis Methodology

The transportation consultants will review the project definition, land use, and transportation circulation assumptions prepared by the project sponsor and will provide written request for clarification and additional data needs that might be necessary to conduct the transportation analysis.

The transportation consultants will meet with Environmental Planning staff to confirm the definition of analysis scenarios and direction on the analysis methodologies proposed for the transportation impact assessment. The travel demand analysis of the land use program of the proposed project (e.g., office, retail, restaurant, movie theater) will be conducted using the *SF Guidelines*, while the travel demand analysis for the arena and other ancillary sport uses will be conducted based on proposed arena seated capacity, travel characteristics at similar facilities (e.g., mode of travel, trip distribution, vehicle occupancy, parking demand, etc.), anticipated transportation infrastructure improvements, and proposed access and egress routes to and from the site. For the live theater use, the travel demand analysis will be based on the number of seats, sell-out conditions with one performance on weekdays and two performances (one matinee and one evening) on a Saturday. The analysis will assume movie theater and live theater functions taking place concurrently with an event at the event center.

The transportation consultants will define the analysis scenarios in detail. Table 1 on the next page presents the list of transportation analysis scenarios for the proposed project components.

The transportation consultants will prepare a technical memorandum documenting the travel demand methodology, and assumptions for the arena and other proposed uses. The memorandum will include a description of each of the analysis scenarios and assumptions used for the impact analysis, including land use, background, project-related transportation improvements, background traffic assumptions, and parking assumptions. The proposed project travel demand will be presented for each analysis scenario. This technical memorandum will be presented to the Planning Department for review and approval prior to proceeding with the transportation impact analysis. It is anticipated that SFMTA will also review and provide feedback on this technical memorandum.

The transportation consultants will work with Environmental Planning and the project sponsor to develop the definition of the project alternatives.

Table 1 - Scenarios for Transportation Analysis
Event Center at Mission Bay Blocks 29-32

SCENARIOS	WEEKDAY PERIODS						SATURDAY		Number of Analysis Scenarios
	PM COMMUTE (4 To 6 PM)		EVENING (6 to 8 PM)		LATE PM (9 - 11 PM)		EVENING PERIOD (7 to 9 PM)		
	w/out SF Giants Game	with SF Giants Game	w/out SF Giants Game	with SF Giants Game	w/out SF Giants Game	with SF Giants Game	w/out SF Giants Game	with SF Giants Game	
Existing Scenarios									
Existing	1	1	1	1	1	1	1	1	8
Project Scenarios									
Existing + Project w/out events at arena	1						1		2
Existing + Project w/ Basketball Game	1	1	1	1	1	1	1	1	8
Existing + Project w/ Convention Event	1								1
Future Year 2040 Cumulative									
Project - No Event at arena	1						1		2
Project – with Event at arena									
- with Basketball Game	1						1		2
- with Convention Event	1								1
TOTAL	7	2	2	2	2	2	5	2	24

Task 3 – Data Collection

Traffic, pedestrian, bicycle and off-street parking data collection will be conducted for the following time periods:

- Weekday p.m. peak commute period (4 to 6 p.m.) with no event at AT&T Park
- Weekday evening period (6 to 8 p.m.) with no event at AT&T Park
- Weekday late evening period (9 to 11 p.m.) with no event at AT&T Park
- Saturday evening (7 to 9 p.m.) with no event at AT&T Park
- Weekday p.m. peak commute period (4 to 6 p.m.) with game at AT&T Park
- Weekday evening period (6 to 8 p.m.) with game at AT&T Park
- Weekday late evening period (9 to 11 p.m.) with game at AT&T Park
- Saturday evening (7 to 9 p.m.) with game at AT&T Park

Traffic: The transportation consultants will obtain intersection turning movement volume counts at the 21 study intersections listed in Table 2a for the proposed project site from previously collected traffic count efforts, supplemented with new counts performed in May (May 15th, 20th, 21st, 27th, 29th, and 31st) and June (June 7th and 11th) 2014, as appropriate (and previously approved by the Planning Department).

Table 2a - Intersection Analysis Locations

Location	Location
1 King St/Third St	11 Terry Francois Blvd/16 th St ^[a]
2 King St/Fourth St	12 Illinois St/16 th St
3 King St/Fifth St/I-280 on/off-ramps	13 Third St/16 th St
4 Fifth/Harrison/I-80 WB off-ramp	14 Fourth St/16 th St
5 Fifth/Bryant/I-80 EB on-ramp	15 Owens St/16 th St
6 Third St/Channel St	16 Seventh St/Mississippi St/16 th St
7 Fourth St/Channel St	17 Illinois St/Mariposa St
8 Seventh St/Mission Bay Drive	18 Third St/Mariposa St
9 Terry Francois Blvd/South St	19 Mariposa St/I-280 NB off-ramp
10 Third St/South St	20 Mariposa St/I-280 SB on-ramp
	21 Third St/Cesar Chavez St

Note:
 [a] Future analysis location - not currently an intersection. Sixteenth Street is not continuous between Illinois Street and Terry François Boulevard and will be extended from Illinois Street to Terry François Boulevard as part of the proposed project.

The transportation consultants will also gather on-ramp and off-ramp traffic data from Caltrans and from peak period turning movement volume counts at ramp touchdown intersections for the I-80 and I-280 ramp locations shown in Table 2b. Freeway on-ramps and off-ramps will be analyzed based on peak hour volumes. Freeway ramp volume data will be obtained from the intersection traffic counts listed in Table 2a and supplemented, as necessary.

Table 2b – Freeway Ramp Analysis Locations

Location	Location
1 I-80 EB on-ramp at Sterling/Bryant	4 I-280 SB on-ramp at Pennsylvania
2 I-80 EB on-ramp at Fifth/Bryant	5 I-280 NB off-ramp at Mariposa
3 I-80 WB off-ramp at Fifth/Harrison	6 I-280 SB on-ramp at Mariposa

Transit: Transit data will be obtained from SFMTA and regional transit operators, as appropriate, for weekday p.m., evening, late evening, and Saturday evening conditions. The transportation

consultants will compile data on all Muni bus routes and rail lines (including motor coach, trolley coach, and light rail service) and stop locations within a study area generally bounded by Townsend Street, Seventh Street, Mississippi Street, and 18th Street.

This work will include a description of Muni’s transit route service hours, peak periods, stops and headways on weekdays and Saturdays for the bus routes and rail lines within the study area. The latest available weekday p.m., weekday evening, late evening, and Saturday evening peak hour ridership and capacity utilization at the maximum load points (MLP) for the Muni routes and lines serving the transportation study area will be requested from Muni for the days and time periods listed in Table 1 (p. 3).

Existing ridership and capacity utilization information for the Muni bus routes and rail lines will be provided individually, as well as combined, based on access between the transportation study area and the four San Francisco superdistricts.

Preliminary corridor grouping of Muni routes and lines for the project site (subject to discussion with the SFMTA):

- North/South: K Ingleside, T Third, N Judah, 30 Stockton, 45 Union Stockton.
- East/West: 10 Townsend, 22 Fillmore, 47 Van Ness.

The transportation consultants will also compile data on regional transit operators (BART, AC Transit, Golden Gate Transit bus and ferry service, SamTrans and Caltrain) including the nearest transit stop location within the study area boundary and the latest scheduled operations on weekdays and Saturdays. Weekday and Saturday ridership and capacity utilization for the regional service providers for the analysis periods identified in Table 1 (p. 3) will be obtained from the regional operators.

The two existing shuttle systems (i.e., the Mission Bay Transportation Management Association and the UCSF shuttle systems) in the vicinity of the project site will be described (e.g., routes, headways, hours of operation, restrictions on use, and ridership and capacity, if available).

Existing Muni and regional service provider weekday p.m. peak hour screenlines will be obtained from the Planning Department.

Pedestrians: The transportation consultants will collect pedestrian counts at 15-minute intervals for the days and time periods listed in Table 1 (p. 3) at the locations shown in Table 3, with the exception that weekday late evening period (9 to 11 p.m.) without a game at AT&T Park will not be conducted because very few pedestrians are present at the study locations during the late evening period. Effective sidewalk widths will be measured at each sidewalk analysis location, and in the vicinity of the project site.

Table 3 - Crosswalk and Sidewalk Analysis Locations ^[a]

Location	Location
Crosswalk Analysis ^[a]	Sidewalk Analysis
1 Third St/South St	1 Both sides of Third St between South and 16 th streets
2 Third St/16 th St	2 North side of 16 th St ^[b]
3 Terry Francois Blvd/South St ^[b]	3 South side of South St ^[b]

Notes:
 [a] All crosswalks at the listed intersections.
 [b] Future analysis location.

Bicycles: The transportation consultants will conduct bicycle counts at 15-minute intervals for the days and time periods listed in Table 1 (p. 3) at the locations shown in Table 4, with the exception that weekday late evening period (9 to 11 p.m.) counts without a game at AT&T Park will not be conducted because very few bicyclists are present at the study locations during the late evening period.

Table 4 - Bicycle Analysis Locations

Location
1 Both sides of Third Street between South and 16 th streets
2 Both sides of 16 th Street between Third and Fourth streets
3 Terry Francois Boulevard between South and 16 th streets

Parking: The parking study area is generally bounded by Townsend Street, Seventh Street, Mississippi Street, and 18th Street. The transportation consultants will collect off-street public parking supply and occupancy for the days and time periods listed in Table 1 (p. 3) from available sources such as the SFpark, SFMTA, data previously collected for the Piers 30-32 site, and other project technical studies, and conduct additional surveys for facilities and time periods for which parking supply and occupancy data is not available. Current hours of operation and characteristics such as whether they are publicly accessible, of the off-street facilities will be identified.

The transportation consultants will also document current on-street parking regulations and illegal parking on the blocks adjacent to the proposed project, and generally describe the on-street parking regulations and parking occupancy within the parking study area. Any loading observations will also be noted.

Task 4 – Document Existing Conditions

Using the data collected in Task 3, the transportation consultants will document existing traffic, transit, parking, pedestrian, bicycle, loading, and emergency vehicle access conditions within the transportation study areas and at the study intersections shown in Table 2a, including:

- A base map and text for the study area, describing the street designations, street names, number of lanes and traffic flow directions;
- A description of existing uses and vehicular access to the project site;
- An assessment of existing parking operations at the project site, including hours of operation, supply and hourly utilization;
- Intersection level of service (LOS) conditions during the peak hours at the study intersections identified in Table 2a using the 2000 Highway Capacity Manual operations methodology (HCM 2000) and the Synchro traffic analysis software;
- Freeway on-ramp and off-ramp LOS conditions during the peak hours at the study locations identified in Table 2b using the 2000 HCM methodology and the HCS analysis software. Freeway on-ramp junctions will be quantitatively evaluated based on the HCM 2000 merge/diverge methodology. Vehicle queuing at freeway off-ramps will be quantitatively assessed based on field observations and intersection HCM 2000 LOS results.
- Graphics indicating the existing peak hour traffic volumes and lane configuration at the study intersections identified in Table 2a;
- A map and discussion of Muni and regional transit services within the transportation study area, including bus routes and bus stop locations, as well as conditions at each route’s maximum load point. A quantitative description of weekday p.m. commute period, weekday evening, weekday late evening and Saturday evening peak hour transit conditions will be provided for Muni and the regional transit service as available. Planned changes to Muni service in the Transit Effectiveness Program (TEP) will also be described. Identification of any operational conflicts between buses or streetcars and other vehicles will be described.
- Pedestrian LOS analyses at the study locations identified in Table 3 using the HCM 2000 methodology. A qualitative assessment of pedestrian conditions (conflicts, safety and operational issues) will also be conducted;
- Bicycle flows at the study locations identified in Table 4, and a qualitative discussion of general bicycle circulation conditions and the identification of any safety and right-of-way issues in the vicinity of the project site, including the description and mapping of bicycle routes. A description of changes to the bicycle network within the transportation study area being considered by the San Francisco Bicycle Plan and other City proposals;
- A qualitative assessment of existing weekday and Saturday on-street commercial loading conditions within the transportation study area;
- A description of the existing emergency vehicle access routes to the project site;
- Passenger loading, including disabled loading and parking; and

- Quantitative assessment of off-street parking supply and utilization within the parking study area, and qualitative discussion of on-street parking regulations and utilization.

Task 5 – Determine Project and Project Alternatives Travel Demand

The future travel demand estimates will be developed by the transportation consultant, and reviewed and approved by Planning Department staff prior to use in the transportation impact assessment. Travel demand estimates will be provided for vehicular, transit, pedestrian, and bicycle modes, and will include internal and external trips for each project component listed in Table 1, as appropriate.

Sports Arena: Since sports arenas are considered “special generators,” each with unique trip generation and travel behavior patterns, the analysis of their impact cannot follow some of the methodologies presented in the *SF Guidelines*. Thus, the travel demand analysis for the operation of basketball games, conventions, and other events will be conducted based on proposed arena seated capacity, typical weekday and weekend start times of the games/events, available travel characteristics of other venues such as AT&T Park and other comparable venues (e.g., mode split, trip distribution, vehicle assignment, parking demand, transit demand), anticipated transportation infrastructure improvements, and proposed ingress and egress routes for the new arena. Loading demand for the arena will be based on information obtained from the project sponsor.

Other Project Land Uses: The transportation consultants will estimate the travel demand for standard proposed land uses (i.e., retail, office, restaurant, movie theater) using the methodology and information provided in the *SF Guidelines* (trip generation rates, mode splits, trip distribution, loading demand, parking demand). For the live theater use, trip generation will be based on the number of seats, sell-out conditions with one performance on weekdays and two performances (one matinee and one evening) on a Saturday. Since the *SF Guidelines* only provide trip generation rates for the weekday p.m. peak hour, weekday evening and weekday late evening travel demand will be estimated based on temporal distribution patterns contained within Pushkarev and Zupan’s *Urban Space for Pedestrians*, as well as other sources, as determined appropriate by the Planning Department. To determine Saturday evening travel demand appropriate adjustments will be made to obtain similar factors for the Saturday daily based on the Saturday to weekday daily ratio from *ITE Trip Generation Report, 9th Edition*, Pushkarev and Zupan’s *Urban Space for Pedestrians*, as well as other sources, as determined appropriate by the Planning Department.

The transportation consultants will estimate the number of vehicle trips associated with the existing parking lots located at the project site using the methodology described in the *SF Guidelines* (i.e., actual traffic data collected as part of Task 3, rather than trip generation estimates). Vehicles currently utilizing the existing surface parking facilities will be redistributed to park at other nearby off-street facilities based on their existing parking availability data obtained in Task 3.

Documentation: The transportation consultants will prepare a technical memorandum describing the assumptions, methodology and results of the travel demand for the proposed project component listed in Table 1 (p. 3). The technical memorandum will summarize the data sources, methodologies and recommended rates and factors to be used in the trip generation, mode choice, vehicle occupancies and parking demand analyses. The technical memorandum will summarize the travel demand estimates for the proposed project by land use type, mode of travel and place of origin. A graphic showing vehicle-trip distributions and assignments will also be included. This technical memorandum will be submitted to Planning Department staff in paper and electronic format for their

review and approval prior to performing the transportation impact analyses (Task 6 – Transportation Impacts Analysis). It is anticipated that this document will also be reviewed by OCII and SFMTA staff, as appropriate.

Alternatives: Travel demand estimates for up to two alternatives to the proposed project will be developed based on the methodology presented above for the proposed project uses. The scenarios and time periods of analysis will be based on the types and quantities of the land uses included in the alternative (e.g., trip generation for Saturday daily and evening peak hour conditions will not be prepared for an alternative including primarily office uses). The travel demand for the alternatives will be documented in a separate technical memorandum, and will be reviewed by Planning Department, OCII and SFMTA staff. See Task 8 for alternatives analysis.

Task 6 – Transportation Impact Analysis

The transportation consultants will identify the transportation impacts associated with the proposed project listed in Table 1 (p. 3). This will include impacts on the study intersections, impacts on transit (capacity utilization and operation), pedestrian circulation, bicycle circulation, passenger and freight loading supply and demand conditions, construction related activities, and emergency vehicle access to the site. A parking supply and demand analysis will also be presented for informational purposes.

The transportation impact analysis will reflect planned improvements to the transportation network (e.g., relocation and realignment of Terry Francois Boulevard with the eastern edge of Blocks 30 and 32), any changes/features included as part of the proposed project (e.g., wider sidewalks, plazas, adjacent bicycle lanes), as well as the draft Transportation Management Plan for events at the proposed arena.

TASK 6.1 – TRAFFIC IMPACTS

The transportation consultants will calculate peak hour intersection and freeway ramp LOS using the HCM 2000 methodology for the study intersections identified in Table 2a for the following overall scenarios:

- Existing plus Project
- Future year 2040 Cumulative - no Event
- Future year 2040 Cumulative - with Event

Table 1 on page 3 details the number of Existing plus Project and cumulative scenarios and the time periods of analysis.

The traffic volumes at the study intersection and freeway ramps for the 2040 Cumulative conditions will be based on the estimates from the latest travel demand forecasting data available from the San Francisco County Transportation Authority (SFCTA). The future cumulative traffic conditions at the study intersections and ramps will account for the vehicle trips generated by the proposed project, as well as the general increase in activity in the area.

The proposed project’s contribution to the traffic volumes at the study intersections and freeway ramps will be shown in an Existing plus Project traffic volume figure for each analysis period/scenario, which will also identify the critical movement at each location. Based on this

information and the estimated growth in traffic volumes between existing and year 2040 conditions, the transportation consultants will calculate the proposed project contribution to future cumulative conditions at those intersections operating at LOS E or LOS F under 2040 Cumulative conditions, as specified in Table 1 (p. 3). A series of 2040 Cumulative volume figures will then be prepared, identifying the critical movements at each intersection for the various cumulative scenarios.

A vehicle queuing analysis will be conducted at the entrance(s) to the on-site parking facilities, or other nearby off-street parking locations for Existing plus Project scenarios.

Freeway on-ramp junctions will be quantitatively evaluated based on the HCM 2000 merge/diverge methodology. Vehicle queuing at freeway off-ramps will also be quantitatively assessed based on field observations and intersection HCM 2000 LOS results at the freeway off-ramp intersections listed in Table 2b. The analysis will discuss the potential for project to exacerbate existing queuing; project's contributions to traffic on- and off-ramps will be summarized. Because these on-ramps are frequently operating over-capacity during the peak hours, the transportation team will work with the Planning Department to identify a methodology for describing the project's contribution to these conditions.

TASK 6.2 – TRANSIT IMPACTS

The transportation consultants will calculate transit capacity utilization for Muni and the regional transit providers for the following overall scenarios:

- Existing plus Project
- Future year 2040 Cumulative - no Event
- Future year 2040 Cumulative – with Event

Table 1 on page 3 details the number of Existing plus Project and cumulative scenarios and the time periods of analysis.

A transit impact analysis will be conducted for:

- Muni and regional screenlines – weekday p.m. commute peak hour
- Muni and regional routes serving the transportation study area, by individual route/line and by corridor – weekday p.m., weekday evening, weekday late evening and Saturday evening

The transit ridership and capacity for the 2040 Cumulative conditions will be based on the estimates from the latest travel demand forecasting data available from the San Francisco County Transportation Authority (SFCTA), as obtained from the Planning Department and SFMTA. The future cumulative transit conditions will account for the transit ridership generated by the proposed project, as well as the general increase in activity in the area.

The proposed project's contribution to the transit capacity utilization will be estimated, and contributions where 2040 Cumulative conditions exceed the transit operator capacity utilization standard will be identified.

A qualitative assessment of Existing plus Project conditions at the Muni Metro platform on Third Street at South Street will be conducted before and after weekday basketball and non-basketball events, subject to discussion with SFMTA.

TASK 6.3 – PEDESTRIAN IMPACTS

The transportation consultants will perform peak hour pedestrian LOS analyses of Existing plus Project conditions listed in Table 1 (p. 3) at the study locations identified in Table 3 using the HCM 2000 Methodology based on the number of new pedestrians that will be added to the network. Potential pedestrian safety issues will be identified, including vehicular-pedestrian conflicts, interruption of pedestrian circulation and potential safety issues. A qualitative discussion of the project's compliance with the Mission Bay South Area Plan will also be included. Future year 2040 Cumulative pedestrian conditions will be assessed qualitatively.

TASK 6.4 – BICYCLE IMPACTS

The transportation consultants will qualitatively evaluate bicycle conditions for the Existing plus Project scenarios listed in Table 1 (p. 3) at the study locations identified in Table 4. Potential bicycle circulation safety issues will be identified, including bicyclist-vehicular conflicts, interruption of bicycle flow and potential safety issues at the project site, as well as the effect on existing and proposed nearby bicycle routes. In addition, the Mission Bay South Area Design for Development (D4D)¹ requirements for bicycle parking and related facilities will be identified and compared to the proposed supply. Future year 2040 Cumulative bicycle conditions will be assessed qualitatively.

TASK 6.5 – LOADING IMPACTS

The transportation consultants will prepare a loading supply/demand analysis for the proposed project. The proposed on-site loading supply will be compared to the Mission Bay South Area D4D in terms of their location, number of spaces and minimum dimensions, as applicable. The loading supply will also be compared to the estimated demand generated by the proposed project. Additionally, the transportation consultant will assess the proposed loading facilities in terms of their operational characteristics, including truck movement (including truck turning pathways into the loading area), location of trash compactor, storage and removal of garbage.

Passenger loading/unloading, including taxis, charter buses, limousines, and private autos, before and after events at the proposed arena passenger loading/unloading facilities will be assessed.

TASK 6.6 – EMERGENCY ACCESS IMPACTS

The transportation consultants will assess any potential impacts to the emergency access that could result from the proposed project.

TASK 6.7 – CONSTRUCTION IMPACTS

The transportation consultants will qualitatively assess any potential temporary construction-related transportation impacts that would be generated by the proposed project. Construction impact

¹ In combination with the Development Plan, the Mission Bay South Area Design for Development (D4D) document supersedes the San Francisco *Planning Code* for the Mission Bay South Area Development Plan.

evaluation will address displacement of existing parking, the staging and duration of construction activity, truck routings, estimated daily truck volumes, street and/or sidewalk closures, impacts on Muni operations, and construction worker parking.

TASK 6.8 – PARKING IMPACTS

The transportation consultants will prepare a parking supply/code/demand analysis for the proposed project. Handicapped-accessible, bicycle and carshare spaces supplied by the proposed project will be identified. The proposed parking supply will be compared to the requirements of the Mission Bay South Area D4D. Any exceptions to the Mission Bay South Area D4D will be noted.

Any deficit or surplus of parking spaces will be quantified, and discussed in relation to the effect on the parking supply in the area surrounding the project sites. The design of the access to the proposed project's parking facilities will be assessed in terms of operational characteristics.

As described in Task 6.1, a vehicle queuing analysis will be conducted at the project entrance(s) to any proposed parking facility on site other nearby off-street parking locations.

Task 7 – Develop Mitigation/Improvement Measures

Mitigation measures will be proposed to improve operations if significant project-related impacts have been identified, and improvement measures may be proposed where no significant impacts have been identified. In accordance with City guidelines, the report will clearly distinguish between mitigation measures required under CEQA, and transportation improvement measures not related to CEQA significant impacts, such as pedestrian improvement measures, parking access operations, traffic, parking and pedestrian enforcement etc. Responsibility for implementation of identified measures will be identified, where possible.

Task 8 – Alternative Analysis

The No Project Alternative (approved Mission Bay Plan uses on the project site) and a Lesser Intensity Alternative will be assessed qualitatively for various transportation scenarios. Depending on definition of the alternatives and the outcome of the travel demand memo, the Planning Department may require a later time limited quantitative analysis. The scenarios and time periods of analysis will be based on the types and quantities of the land uses included in the alternative (e.g., trip generation for Saturday daily and evening peak hour conditions will not be prepared for an alternative including primarily office uses). The scenarios will be developed in conjunction with development of the alternatives in consultation with the Planning Department and OCII. The analysis will cover all transportation topics. Travel demand estimates will be prepared for each alternative based on the travel demand methodology presented in Task 5.

Task 9 – Transportation Section of the EIR

The transportation consultants will prepare the transportation setting and impact analysis sections for inclusion in the EIR document. The transportation discussion will follow the format specified by Planning Department staff, and will include setting, methodology, impact assessment, and mitigation and improvement measures. A discussion of the underlying environmental review document (e.g., 1998 SEIR) will also be provided, as needed. An Administrative Draft 1 of the transportation chapter will be submitted to the Planning Department for review by Planning, SFMTA and OCII staff.

All stand-alone submittals of the transportation section of the Draft EIR will be in paper copies (five copies), along with an electronic version. Transportation section versions included as part of the overall Administrative Draft EIR will follow the distribution format determined for the EIR.

As part of the transportation section submittal, the transportation consultants will prepare a comprehensive technical appendix that will include, but not be limited to, the following:

- Proposed project access and internal/external circulation plans;
- Lane geometries at the study intersections;
- Traffic summaries showing turning movement volumes at the study intersections for all periods and scenarios listed in Table 1;
- Intersection and freeway ramp LOS analysis for the periods and scenarios listed in Table 1;
- Transit capacity utilization calculations for Muni and regional transit providers for all the periods and scenarios listed in Table 1;
- Travel demand calculations for the proposed project and alternatives to the project;
- Travel demand analysis Technical Memorandum;
- Pedestrian counts and LOS, and bicycle counts at all study locations;
- Existing and Existing plus Project parking supply and utilization; and
- Draft Transportation Management Plan (to be developed by project sponsor).

Two paper copies and an electronic copy of the draft technical appendix will be submitted to the Planning Department for review by Planning, SFMTA and OCII staff for Preliminary Draft 1 and Preliminary Draft 2 submittals.

Task 10 – Prepare Data for Air Quality and Noise Analysis

The transportation consultants will summarize and package the Existing, Existing plus Project, and 2040 Cumulative traffic volumes developed in the previous tasks for submittal to the noise and air quality analysts for their studies.

Task 11 – Attendance at Meetings

The transportation consultants will meet with the Planning Department, OCII, and other city agencies, as appropriate, to work out details related to transportation scope of work, impact assumptions, methodology, and development of improvement and/or mitigation measures.

Task 12 – Draft EIR Response to Comments

The transportation consultant will prepare responses to comments made by public agencies and members of the public at large related to the transportation section of the Draft EIR.

TR-2

TRAVEL DEMAND ANALYSIS

PROPOSED PROJECT TRAVEL DEMAND MEMORANDUM



LCW Consulting



LCW Consulting



Memorandum

To: Brett Bollinger/Chris Kern/Viktoriya Wise/Kansai Uchida – SF Planning Department
 Catherine Reilly – SF Office of Community Investment and Infrastructure

From: José I. Farrán – Advant Consulting; Luba C. Wyznyckj – LCW Consulting

Date: May 22, 2015 Final Memorandum (2nd update)

Re: Travel, Parking, and Loading Demand Estimates for the Proposed Event Center & Mixed-Use Development at Mission Bay Blocks 29-32 – Case No. 2014.1441E

This technical memorandum describes the methodology and assumptions used to determine the travel demand for the proposed event center and mixed-use development at Mission Bay Blocks 29-32, and presents the estimate of project-generated person and vehicle trips that would travel to and from the proposed project. Parking and commercial/service loading demand estimates for the proposed uses are also presented. Detailed travel demand calculation and supporting data are included in the attached Appendix.

INTRODUCTION AND BACKGROUND

GSW Arena LLC (GSW), an affiliate of Golden State Warriors, LLC, which owns and operates the Golden State Warriors National Basketball Association (NBA) team, proposes to develop an approximately 12-acre project located in San Francisco on land referred to as Blocks 29-32 in the Mission Bay South Plan Area. The proposed project consists of a new approximately 18,000-seat multi-purpose event center and ancillary development including multiple office buildings, retail, restaurants, structured parking, plaza areas, and other amenities. The event center would host the Golden State Warriors basketball team during the NBA season, as well as provide a year-round venue for a variety of other uses, including concerts, family shows, other sporting events, cultural events, conferences and conventions. The rectangular site is bound by Third Street to the west, South Street to the north, Terry François Boulevard to the east, and 16th Street to the south, as shown in an aerial map of the project site in Figure 1. It should be noted that as part of the buildout of Mission Bay, Terry François Boulevard will be relocated to align with the eastern edge of Blocks 30 and 32¹.

¹ Relocation of Terry François Boulevard will be implemented as part of the Mission Bay Area South Infrastructure Plan by FOCL-Mission Bay, the entity serving as master developer of the remaining development rights within the Mission Bay South Plan project area.



Figure 1
Proposed Project Site Location
 Source: ESA, Google – 2014

PROPOSED PROJECT LAND USES

The proposed project includes a multi-purpose event center, office,² retail, and restaurant uses (including both quick service and more formal sit-down restaurants) on Blocks 29-32.³ The event center building would include a variety of supporting uses, including office space, practice facilities, event hall, and other event-related uses. Table 1 provides a summary overview of the key characteristics of the project development.

**Table 1
Summary of Proposed Project for Travel Demand Analysis^[a]**

Project Component	Characteristics	
	Gross Square Feet (GSF) / Attendance for Travel Demand Analysis	Event Center Employment Characteristics
Event Center	750,000 GSF	
- No Event		105 employees
- GS Warriors Game	18,064 attendees (maximum)	1,000 employees
- Convention	9,000 attendees (average)	675 employees
GSW Office (Administration & Mgmt.)	25,000 GSF	[c]
Office	580,000 GSF	[c]
Retail ^[b]	62,500 GSF	[c]
Quick Service Restaurant	11,000 GSF	[c]
Sit-down Restaurant	51,500 GSF	[c]

Notes:

- [a] This table presents the characteristics of the proposed project uses as they are defined for travel demand analysis purposes.
- [b] The Retail use encompasses general and specialty retail, as well as food-related retail.
- [c] Employment information is not required for travel demand analysis purposes; travel demand for these uses is calculated based on the amount of square footage provided, in accordance with the *SF Guidelines*.

Source: Golden State Warriors and Strada Investment Group – November 2014

² The Mission Bay South Redevelopment Plan allows for general office as well as research and development uses at the project site. According to the 1998 Mission Bay SEIR, the daily travel demand per 1000 gsf for an office use is approximately 2.3 times the daily demand for R&D (Table V.E.6, p. V.E.58), thus the travel demand analysis conservatively assumes office use at the site.

³ Quick service restaurants consist of full-service eating establishments with typical duration of stay of approximately one hour, while more formal sit-down restaurants have a typical duration of stay of at least one hour and generally do not serve breakfast (Source: *Trip Generation Manual – 9th Edition*, Institute of Transportation Engineers, Washington DC, 2012).

EVENT CENTER ATTENDANCE

An event center is a special trip generator for which travel demand characteristics (i.e., trip generation rates, peak hour factors, etc.) are not available from standard sources used for development projects in San Francisco, such as the *Transportation Impact Analysis Guidelines for Environmental Review (SF Guidelines)*⁴ or the Institute of Transportation Engineers' *Trip Generation Manual*.⁵ As such, the transportation planning characteristics of the proposed event center were evaluated taking into account the expected attendance for various events at the proposed event center.

Average and maximum attendance estimates by type of event for the proposed event center were prepared by the project sponsor and are summarized in Table 2; Appendix A (pp. A-7 through A-11) provides additional information about the survey data.⁶ The expected attendance would vary depending on the type of event held (e.g., basketball game, concert, non-sports event), but will be expected to be similar on weekdays and on weekends (both weekday and weekend scenarios are included in this analysis). In the case of sporting events, the expected attendance would also depend on the interest in competing teams, and, in the case of concerts, on the popularity of the performing artists.

Average visitor attendance for the proposed event center is projected to range between 5,000 attendees for a family show event, to between 17,000 and 18,000 attendees for a regular season or post season basketball home game; concert average attendance is estimated to range between 3,000 attendees for arena theater concerts to 12,500 attendees for the typical end-stage full arena configuration, and average convention attendance is estimated at 9,000 attendees.⁷ As shown in Table 2, there would be up to 225 event days in any given year. Table 2 also provides a summary of event center employment according to the type of event.

Transportation planning analyses of special generators such as event centers typically use the 85th percentile, and sometimes the 90th percentile, of the daily attendance throughout a period of one or more years, to define the attendance for the analysis.

⁴ *Transportation Impact Analysis Guidelines for Environmental Review*, San Francisco Planning Department, October 2002.

⁵ *Trip Generation Manual – 9th Edition*, Institute of Transportation Engineers, 2012.

⁶ Event types and characteristics provided by the project sponsor were based on the current event mix at the Oracle Arena in Oakland and SAP Center in San Jose, as well as information from the Barclays Center in Brooklyn, New York. The project sponsor considers the Barclays Center to be a relevant comparable, as it is the most recently completed entertainment venue hosting an NBA team, is a single-tenant arena, and is in an urban setting. Attendance estimates for conferences, corporate events, and other rentals were validated through discussion with San Francisco Travel.

⁷ Event Center and Mixed-Use Development at Mission Bay Blocks 29-32, Initial Study, November 19, 2014.

**Table 2
Event Characteristics at Proposed Event Center**

Event Type	Annual Number of Event Days at the Event Center	Event Attendance ^(a) Average Maximum	Event Center Day-of-Game/Event Employment Characteristics ^(a)	Season	Event Temporal Characteristics
Golden State Warriors Basketball Home Games	2 to 3 preseason home games	11,000 18,064	1,000 ^(b)	two weeks mid-October	Regular season game time: 7:30 to ~9:40 p.m. ^(b) Pre-season/Pre-season game time variable.
	41 regular season home games	17,000 18,064	1,000 ^(b)	late October to mid-April	Monthly Distribution: ~7 home games per month Weekly Distribution: 50%/50% weekdays/weekends
	0 to 16 post season home games	18,000 18,064	1,000 ^(b)	mid-April to mid-June	Monday-Thursday: 2 to 6 home games/month Friday: 1 to 3 home games/month Saturday: 1 to 3 home games/month Sunday: 0 to 1 home games/month
Concerts	Approximately 30 Full Arena Concerts	12,500 14,000 to 18,500 ^(a)	775 ^(c)	major concert season is Fall, Winter and early Spring.	Concert time: typically 7:30 p.m. to 10:30 p.m. Weekly distribution: primarily Friday and Saturday evenings
	Approximately 15 Arena Theater Concerts	3,000 4,000	675 ^(c)	Summer is the slow season	
Family Shows ^(f)	Approximately 55	5,000 8,200	675 ^(c)	distributed throughout the year	Family Show characteristics: typically 10 shows over 5 days (Wednesday to Sunday): Wednesday: 1 show, 7:30 p.m. to 9:00 p.m. Thursday: 1 show, 7:30 p.m. to 9:00 p.m. Friday: 2 shows, 10:30 a.m. to 12:00 p.m.; and 7:30 p.m. to 9:00 p.m. Saturday: 3 shows, 11:00 a.m. to 12:30 p.m.; 3:00 p.m. to 4:30 p.m.; and 7:00 p.m. to 8:30 p.m. Sunday: 3 shows, 11:00 a.m. to 12:30 p.m.; 3:00 p.m. to 4:30 p.m.; and 7:00 p.m. to 8:30 p.m.
Other Sporting Events ^(d)	Approximately 30	7,000 18,064	675 ^(c)	distributed throughout the year	distributed throughout the year; times variable
Conventions/ Corporate Events ^(e)	Approximately 31	9,000 18,500 ^(h)	675 ^(c)	distributed throughout the year	distributed throughout the year; times variable

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Case No. 2014.1441E

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LCW Consulting



Notes:

- [a] The event center attendance and employment estimates used for travel demand calculations and analysis are shown in bold and italics.
- [b] This estimate includes approximately 900 event center day-of-game non-GS Warriors employees, and approximately 100 GS Warriors employees that would work at the Warriors games. The estimate does not include GS Warriors employees that would occupy the team management offices in the event center during the day and non-GS Warriors employees of the retail and office buildings at Mission Bay Blocks 29-32; all of these employees are accounted for under the GS Warriors administration and management office space, general office, retail, and restaurant land use categories shown in Table 1 (p. 3) of this technical memorandum. This estimate does not include the visiting team/event performers and their support staff at the event center during a game, but they are considered “de minimis” for travel demand analysis purposes.
- [c] These event employee estimates refer to non-GS Warriors employees. These estimates do not include the 105 Event Center GSW employees, including electricians or facilities staff, who would also be present on No Event days.
- [d] The large majority of GS Warriors regular season home games would start at 7:30 p.m. For example, over the course of the most recent full three NBA regular seasons (2010-11, 2012-13, and 2013-14; the 2011-12 NBA season was shortened due to delays in signing of a collective bargaining agreement between NBA owners and players and consequently is not included), 90 percent of GS Warriors home games started at 7:30 p.m., 6 percent of homes games started at 6:00 p.m., and the balance (accounting for one home game or less per season) started at either 1:00 p.m. (on Martin Luther King holiday), 5:00 p.m., or 7:00 p.m.
- [e] Nearly 90 percent of annual arena concerts at the event center would be with maximum end-stage concert configuration attendance of 14,000, and 10 percent (no more than four arena concerts annually) would be with a 360-degree configuration which would allow for a maximum attendance of about 18,500.
- [f] Examples of family shows include Disney on Ice, Disney Live, Harlem Globetrotters, and Sesame Street Live.
- [g] Examples of non-GS Warriors Sporting Events include college basketball, hockey, boxing, figure skating, arena football, gymnastics, lacrosse, tennis, and mixed martial arts. These could be professional, collegiate, amateur, high school/youth, local, regional, or international competition.
- [h] Examples of Conventions/Corporate Events include conventions, conferences, cultural events, and corporate events. It is anticipated that the event center would only act as a satellite venue for conventions/conferences held primarily at the Moscone Center when an event or speaker cannot be accommodated at that location.
- [i] The maximum attendance of 18,500 represents the maximum number of conference attendees that could be accommodated at the event center in a configuration similar to a center stage concert (see footnote [a] above). However, the event center is expected to typically serve as a satellite venue for conventions/conferences held primarily at the Moscone Center, with an attendance of 9,000 people.

Sources: Golden State Warriors, Strada Investment Group based on current event mix at the Oracle Arena in Oakland and the SAP Center in San Jose, as well as information provided for the recently completed Barclays Center in Brooklyn, New York – 2014

For the analysis of the proposed event center, the use of the maximum attendance presented in [Table 2](#) for basketball games was analyzed, as it the most conservative approach that assumes that the event center would be filled to capacity (i.e., 18,064 attendees).⁸

In addition to a sell-out basketball game event, the transportation analysis also includes a convention/corporate event at the event center. For convention/corporate events, a 9,000-attendee event was analyzed, as this attendance level represents the average attendance (i.e., the average attendance for events would be 9,000) for about 50 percent of the events that would occur at the proposed event center (i.e., the convention events, family shows, and other sporting events).⁹

The travel demand for concerts, family shows and other sporting events was not estimated quantitatively because as shown in [Table 2](#) these types of events are expected to attract a lower attendance and require fewer employees than a basketball game. In addition, arrival and departure travel patterns for these types of events would also be expected to be similar to those of basketball game. As such, the transportation infrastructure (roadways, transit vehicles, stations, sidewalks, etc.) would be expected to operate similar to or better before and after concerts than before or after a sold-out basketball game.

TRAVEL DEMAND

Travel demand refers to the new vehicle, transit, pedestrian and bicycle trips generated by the proposed project. The methods commonly used for forecasting travel demand for development projects in San Francisco are based on person-trip generation rates, trip distribution information, and mode splits data described in the *SF Guidelines*, and which are based on a number of detailed travel behavior surveys conducted within San Francisco. The data in the *SF Guidelines* are generally accepted as more appropriate for use in transportation impact analyses for San Francisco development projects than conventional transportation planning data because of the unique mix of uses, density, availability of transit, and cost of parking in San Francisco.

However, as noted above, the *SF Guidelines* do not include travel demand estimates for the specialized uses (e.g., sports events, conventions, and other events) that would take place at the proposed event center. Similarly, standard trip generation resources, such as the *Trip Generation Manual – 9th Edition*, 2012, Institute of Transportation Engineers (ITE), do not include sufficiently detailed trip generation data for such specialized uses. Therefore, the travel demand for the event center component of the proposed project was based on the estimated attendance described in the previous section.¹⁰

⁸ 2013-14 was the ninth GS Warriors season averaging more than 18,000 attendees per game with a sellout season-ending average attendance (GS Warriors press release, April 14, 2014); the maximum capacity for a basketball game at the Oracle Arena is approximately 19,600 seats (Event Center and Mixed-Use Development at Mission Bay Blocks 29-32, Initial Study, November 19, 2014).

⁹ The event center is expected to typically serve as a satellite venue for conventions/conferences held primarily at the Moscone Center, with an attendance of 9,000 people. The maximum attendance of 18,500 shown in [Table 2](#) represents the maximum number of conference attendees that could be accommodated in a 360-degree center stage configuration, which would be infrequent.

¹⁰ Survey and other relevant data supplied by the project sponsor are included in [Appendix A \(pp. A-7 to A-11\)](#).

In addition, the trips generation rates presented in the *SF Guidelines* and ITE's *Trip Generation Manual* cannot be directly applied to some development projects, such as the proposed project, because of its large scale, unique location and mixed-use character (restaurant and retail uses supporting an event center as an anchor use). Thus, appropriate adjustments have been made to account for these factors, as described later in this memorandum.

The weekday daily PM peak hour travel demand for standard project land uses, such as office, retail, and restaurant uses were developed in accordance with the *SF Guidelines*, which provides PM peak hour trip generation rates and modal split, trip distribution and average vehicle occupancy data specific to the southeast quadrant of San Francisco (Superdistrict 3) where the project site is located. The modal split and trip distribution assumptions presented in the *SF Guidelines* for work trips into and out of Superdistrict 3 were further refined using more recent travel pattern data of actual Mission Bay employees collected by the Mission Bay Transportation Management Association (MB TMA) in 2012, 2013 and 2014.

Travel demand was also determined, as described in the following section, for weekday evening and late evening and for Saturday daily and evening conditions based on adjusted trip generation rates developed for the office, retail, and restaurant uses using information obtained from ITE's *Trip Generation Manual*, the Urban Land Institute's *Shared Parking* (2nd Edition), and Pushkarev and Zupan's, *Urban Space for Pedestrians*. [Appendix A \(pp. A-14 through A-16, and A-23 through A-62\)](#) contains the travel demand calculations and assumptions. For the office, retail, and restaurant uses, a weekday-to-Saturday ratio was obtained from the trip generation rates presented in ITE's *Trip Generation Manual* for the proposed project uses, which was then applied to the weekday daily trip generation rates presented in the *SF Guidelines* in order to obtain the weekend daily rates. For the office, retail, and restaurant uses, data from the Pushkarev and Zupan and ULI studies was used to estimate the percentage of daily trips that would occur during the weekday evening, weekday late evening and Saturday evening peak hours.

PROJECT SCENARIOS AND TIME PERIODS OF ANALYSIS

Travel demand for the proposed event center and mixed-use development on Blocks 29-32 presented in this document evaluates three different event scenarios:

- No event at the event center;
- Basketball game at the event center; and,¹¹
- Convention event at the event center.

¹¹ The game day analysis for weekday PM (4 to 6 PM), evening (6 to 8 PM), late evening (9 to 11 PM), and Saturday evening (7 to 9 PM) will also include the evaluation of transportation conditions when a SF Giants home game occurs concurrently with a basketball game, although because there is a lack of overlap of the basketball and baseball seasons such that concurrent events would be uncommon, limited primarily to post-season play situations.

The expected start and end times of these project events and other characteristics are presented in [Table 2 \(p. 5\)](#). The travel demand for the three scenarios has been estimated for the following six time periods:

- Weekday all day;
- Weekday PM peak period (highest 60-minute period between 4 and 6 PM);
- Weekday evening peak period (highest 60-minute period between 6 and 8 PM);
- Weekday late evening period (highest 60-minute period between 9 and 11 PM);
- Saturday all day; and
- Saturday evening period (highest 60-minute period between 7 and 9 PM).

Each event scenario was evaluated for the particular time periods during which the specific event would occur. For example, convention events are not anticipated to occur in the weekday evening and late evening peak hours or on weekends, and therefore, analysis of convention events during these time periods was not conducted.

- The weekday PM peak period (from 4 to 6 PM) was selected because it represents the period during which weekday background traffic in the area is highest. Approximately 5 percent of attendees are projected to arrive at the event center between 5 and 6 PM.
- The weekday evening peak period (from 6 to 8 PM) was selected because basketball games typically start at 7:30 PM and therefore, a higher percentage of inbound event attendees would travel to the event center during the 6 to 8 PM period than during the 4 to 6 PM commute peak period; see [Table 3](#). Approximately 65 percent of attendees are projected to arrive at the event center during the 7 to 8 PM peak hour.
- The weekday late evening period (from 9 to 11 PM) was selected because it represents the period during which the highest outbound event trips would occur after a basketball game or concert event. Approximately 70 percent of attendees are projected to depart the event center during the 9 to 10 PM peak hour.
- The Saturday evening period (from 7 to 9 PM) was selected because it represents the period during which the highest inbound event trips would occur. Approximately 65 percent of attendees are projected to arrive at the event center during the 7 to 8 PM peak hour.

Table 3
Estimated Basketball Game Attendee Arrival and Departure Patterns ^[a]
For 7:30 PM Start Time and 9:40 PM End Time

Time Period	by Hour	Cumulative
Arrivals		
5:00 to 5:30 PM	1.0%	1.0%
5:30 to 6:00 PM	4.0%	5.0%
6:00 to 6:30 PM	10.5%	15.5%
6:30 to 7:00 PM	19.5%	35%
7:00 to 7:30 PM	32.5%	67.5%
7:30 to 8:00 PM	32.5%	100%
Departures		
9:00 to 9:30 PM	30%	30%
9:30 to 10:00 PM	40%	70%
10:00 to 10:30 PM	30%	100%

Note:

[a] Based on basketball game arrival and departure information provided by the Golden State Warriors for Oracle Arena, as well as recent arrival/departure data for other NBA facilities to account for the increased availability of retail and restaurant uses at the proposed project site compared to Oracle Arena in Oakland. Arrival patterns were adjusted to account for availability of retail/restaurant uses at the proposed project site. A summary of this data is provided in [Appendix A](#).

Source: Golden State Warriors, Advant Consulting – January 2015

The “No Event” conditions reflect travel demand associated with the office uses at the event center, plus the travel demand associated with the office, retail, and restaurant (both quick service and sit-down) uses for the weekday PM commute peak hour of analysis and the Saturday evening peak hour. [Table 4](#) provides a cross-tabulation of proposed scenarios and time periods for which the project travel demand was estimated.

**Table 4
Proposed Project Scenarios and Time Periods
for Travel Demand Estimation**

Project Scenario	Time Period [a]					
	Weekday				Saturday	
	Daily	PM Peak Hour (4 to 6 PM)	Evening Peak Hour (6 to 8 PM)	Late Evening Peak Hour (9 to 11 PM)	Daily	Evening Peak Hour (7 to 9 PM)
No Event	√	√			√	√
Basketball Game	√	√ [b]	√ [b]	√ [b]	√	√ [b]
Convention Event	√	√				

Notes:

- [a] The time periods presented in this table are those for which the project travel demand is being estimated because that is the time period during which trip volumes would be highest; they do not represent the only time periods during which an event could take place at the proposed event center.
- [b] The basketball game day analysis also includes the evaluation of peak hour transportation conditions when a SF Giants home game occurs concurrently with a basketball game.

Source: Advant Consulting/LCW Consulting – August 2014

Overall, the travel demand was calculated for seven combinations of project scenarios and peak hour time periods, five peak hour scenarios on a weekday and two peak hour scenarios on a Saturday. In addition, the transportation impact analysis of basketball game conditions was performed for three peak hour scenarios (weekday PM, weekday evening, and Saturday evening) that also includes the evaluation of transportation conditions with the travel demand generated by a concurrent SF Giants baseball game at AT&T Park, however, this does not affect the calculation of the proposed project travel demand estimates presented in this document.

TRIP GENERATION

The person-trip generation for the proposed project includes trips made by event attendees, employees, and other visitors to the project site and are based on the appropriate rates as described in a previous section and summarized in Table 5. Detailed calculations for the development of these rates are provided in Appendix A (pp. A-5 through A-22). The rates shown in Table 5 were then applied, as appropriate, to the number of expected event attendees, 1,000 GSF of office, retail and restaurant uses in order to obtain the number of person trips generated by each land use.

**Table 5
Proposed Project Person Trip Generation Rates by Land Use and Time Period [a]**

Land Use Type	Daily Rate	Weekday			Saturday						
		P1M Peak Hour of the 4 to 6 PM period [b] % of Daily	Evening Peak Hour of the 6 to 8 PM period [b] % of Daily	Late Evening Peak Hour of the 9 to 11 PM period [c] % of Daily	Daily % of Weekday	Evening Peak Hour of the 7 to 9 PM period [b] % of Daily	Rate				
Event Center (per attendee)	2.1	4.8%	0.10	30.9%	0.65	33.8%	0.71	100%	2.1	30.9%	0.65
Basketball Game	3.2	10.9%	0.35	N.A. [e]	N.A. [e]	N.A. [e]	N.A. [e]	N.A. [e]	N.A. [e]	N.A. [e]	N.A. [e]
Convention Event [d]	18.1	8.5%	1.54	1.7%	0.31	0.4%	0.08	22%	4.0	1.1%	0.04
Office (per 1,000 GSF)	150.0	9.0%	13.5	6.8%	10.13	3.2%	4.73	117%	175.5	4.0%	7.02
Restaurant (per 1,000 GSF)	600.0	13.5%	81.0	20.3%	121.5	20.3%	121.5	125%	747.3	24.0%	179.3
Quick Service Rest. (no event) [f]	600.0	13.5%	81.0	20.3%	121.5	20.3%	121.5	125%	747.3	24.0%	179.3
Quick Service Rest. (event) [f]	200.0	13.5%	27.0	20.3%	40.5	20.3%	40.5	125%	249.1	24.0%	59.8
Sit-down Restaurant											

Notes:

- [a] See Appendix B (pp. A-23 through A-62) for detailed trip generation rate calculations.
- [b] Pre-event analysis period.
- [c] Post-event analysis period.
- [d] The average person trip rate per attendee depends in part on the number of employees working at the event; a convention event has the lowest attendee-to-employee ratio (13) compared to a basketball game (18); in addition, it is assumed that 25 percent of the employees and 50 percent of the attendees during a convention would leave the project site during the day for lunch, shopping, errands, etc., resulting in a higher average daily person trip rate than a basketball game.
- [e] Not applicable; not part of the travel demand analysis because other scenarios would capture the potential transportation impacts during this period.
- [f] The project sponsor anticipates that the quick service restaurants would be open similar hours for event and no-event days alike.

Source: SF Guidelines, Institute of Transportation Engineers, Urban Land Institute, Pushkarev and Zupan, Advant Consulting – January 2015.

It should be noted that the rates presented in [Table 5](#) represent the number of person trips that would be generated by each project component as a standalone use. Some of the visitor trips entering/exiting the project retail and restaurant uses would be made by individuals destined to either nearby uses or to other components of the proposed project (referred to as visitor linked trips), such as the event center or the nearby residential, research and development, office or UCSF uses.

Thus, to account for the linked visitor trips, based on studies of non-work (visitor) trips conducted along the San Francisco waterfront and the type of retail and restaurant uses accessory to the event center,¹² a daily 67 percent linked trips reduction was applied to non-work (visitor) trips for retail and restaurant uses during an event day (i.e., 33 percent of the visitor trips are considered new trips to the area unrelated to other nearby uses). On the other hand, because it is likely that more people would come to the area to specifically visit the project retail and restaurant uses on a no event day, the daily linked trip factor was reduced to 33 percent for the sit-down restaurant and retail uses when no events are planned to take place at the site (i.e., 67 percent of the visitor trips are new trips to the site and to the area on non-event days). These assumptions are consistent with and more conservative (i.e., generates more trips) than the data obtained from a survey of shoppers conducted in the vicinity of the San Francisco Center at Powell and Market streets,¹³ which found a linked trip factor of 67 percent for retail uses.

Higher visitor linked trip ratios were assumed for the evening and late evening periods during an event, as shown in [Table 6](#), when the percent of visitors unrelated to nearby project uses would be expected to be lower. It was assumed that the visitor linked trip factor would generally be constant throughout the day during no event days. For event days, on the other hand, it was assumed that the linked trip factor would progressively increase as the event start time approaches, changing from the average daily value of 67 percent before 6 PM, to 95 percent immediately before, during and after the event. No linked trip factors were assumed under any scenario for visitors to the office and movie uses.

¹² San Francisco Boudin Bakery and Café at Fisherman’s Wharf Transportation Study, prepared by Wilbur Smith Associates for the San Francisco Planning Department, Case Number 2003.0186, September 19, 2003.

¹³ City Place Cross Shopping Survey Results, Technical memorandum prepared by AECOM for the SF Planning Department, October 18, 2007 (a copy of this document is included in [Appendix E](#), p. A-75.).

Table 6
Proposed Linked Visitor Trip Reduction Factors ^[a]
by Type of Land Use

Land Use ^[b]	Time Period					
	Daily		Before 6 PM		After 6 PM	
	Event	No Event	Event	No Event	Event	No Event
Retail	67%	33%	67%	33%	95%	33%
Quick Service Restaurant	67%	67%	67%	67%	95%	67%
Sit-down Restaurant	67%	33%	67%	33%	95%	33%

Notes:

[a] As an example, a 67 percent linked trip reduction factor means that 33 percent of the visitor trips are considered new trips to the area unrelated to other project or nearby uses. No linked trip reduction factors were applied to employee work trips for any of the proposed land uses as the trip credit is already being taken on the non-work (visitor/customer) end of the retail or restaurant trip.

[b] No linked trip factors were assumed under any scenario for visitors/customers to the office uses.

Source: Advant Consulting – November 2014

[Table 7 on the next page](#) presents the resulting number of person trips generated by the proposed project uses for the weekday and Saturday daily and peak hour analysis periods, once the trip rates presented in [Table 5](#) and the linked trip factors shown in [Table 6](#) were applied to the proposed project land uses and event attendances presented in [Tables 1 and 2](#), respectively; the calculations and adjustments for each individual land use are shown in [Appendix B \(pp. A-50 through A-62\)](#).

No Event

As shown in [Table 7](#), the overall daily person trip generation would be lower on a Saturday than on a weekday, due to the higher trip generation associated with the office use on a weekday.

- On a weekday without an event, the proposed project would generate 26,998 daily person trips (inbound plus outbound), and 2,796 person trips during the weekday PM peak hour.
- On a Saturday without an event the proposed project would generate 21,883 daily person trips and 3,130 person trips during the Saturday evening peak hour.

Table 7
Proposed Project Person Trip Generation by Land Use and Time Period ^[a]

Land Use Type	Weekday				Saturday	
	Daily	PM Peak Hour of the 4 to 6 PM period	Evening Peak Hour of the 6 to 8 PM period	Late Evening Peak Hour of the 9 to 11 PM period	Daily	Evening Peak Hour of the 7 to 9 PM period
No Event						
Event Center ^[b]	263	22			263	0
Office	10,951	931			2,442	27
Retail	6,405	576			7,496	300
Quick Service Restaurant ^[d]	2,376	321			2,959	710
Sit-down Restaurant ^[d]	7,004	946			8,724	2,093
Total person trips w/out event	26,998	2,796	N.A. ^[c]	N.A. ^[c]	21,883	3,130
With Event						
Basketball Game	38,128	1,803	11,742	12,845	38,128	11,742
Convention Event	28,688	3,113	N.A. ^[c]	N.A. ^[c]	N.A. ^[c]	N.A. ^[c]
Office	10,951	931	186	47	2,442	27
Retail ^[d]	3,375	304	56	26	3,950	39
Quick Service Restaurant ^[d]	2,376	321	118	118	2,959	174
Sit-down Restaurant ^[d]	3,708	501	184	184	4,618	271
Total person trips w/ event						
Basketball Game	58,538	3,859	12,285	13,218	52,098	12,252
Convention Event	49,097	5,169	N.A. ^[c]	N.A. ^[c]	N.A. ^[c]	N.A. ^[c]

Notes:

- [a] Numbers may not sum to total due to rounding to the nearest person-trip. See Appendix B (pp. A-50 through A-62) for detailed trip generation calculations for each individual land use.
- [b] 105 employees would work at the event center on no-event days.
- [c] Not applicable; not part of the travel demand analysis.
- [d] Includes linked trip reductions as appropriate.

Source: Advant Consulting – January 2015.

With Event

The total number of daily person trips generated on a weekday event day with a basketball game would be 58,538 trips. Of these, 3,859 person trips would be during the PM peak hour, 12,285 person trips during the evening peak hour, and 13,218 person trips during the weekday late evening peak hour. The total number of daily person trips generated on a Saturday with a basketball game would be 52,098 for a basketball game, of which 12,252 person trips would occur during the evening peak hour.

Convention events would generate fewer daily person trips than a basketball game (38,128 person trips for a basketball game versus 28,688 person trips for a convention event), however, the proportion of convention event trips during the weekday PM peak hour would be greater than during a basketball game. This is because it is anticipated that many people would leave the convention during the weekday PM peak hour while the majority of basketball fans arrive after the end of the PM peak hour (6 PM). The total number of daily person trips generated on a weekday event day with a convention event would be 49,097 trips, of which 5,169 person trips would occur during the PM peak hour.

TRIP DISTRIBUTION

The directional distribution is based on the origins and destinations of trips for each specific land use, which are then assigned to the four quadrants of San Francisco (Superdistricts 1 through 4), East Bay, North Bay, South Bay and Out of Region (a map of the San Francisco Superdistricts is included in Appendix A, p. A-21).

The directional distribution of visitor trips for the proposed office, restaurant, and retail uses was obtained from the *SF Guidelines* for Superdistrict 3¹⁴ (SD3), in which the project is located. The distribution of convention/corporate events attendees was based on data provided by the Moscone Center Operator and documented in the Moscone Center Expansion EIR.¹⁵ The distribution of basketball game attendees was derived from information provided by Golden State Warriors (based on a market study assessment conducted by the project sponsor for the previously-proposed project location at Piers 30-32 in San Francisco; see Appendix A, p. A-7) for basketball events.

The directional distribution of employee trips for all proposed project uses was obtained from information provided by the Mission Bay TMA derived from transportation surveys of residents and employees in Mission Bay conducted in 2012, 2013, and 2014.¹⁶ The trip distribution percentages are summarized in Table 8.

¹⁴ Superdistricts are travel analysis zones established by the Metropolitan Transportation Commission (MTC). These Superdistricts provide geographic subareas for planning purposes in San Francisco; a map with the Superdistrict boundaries is included in Appendix A (p. A-25).

¹⁵ *Moscone Center Expansion Project – Estimation of Travel Demand*, Advant Consulting, January 9, 2014. Appendix C of Moscone Center Expansion Project EIR, April 2014. A copy of this document is available for review at the SF Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2013.0154E.

¹⁶ Annual surveys conducted by the MB TMA in 2012, 2013, and 2014. Online surveys were sent in September-October to residential and commercial property managers in the Mission Bay area for distribution to their tenants or employees; the online survey remained open for 10 to 15 days. Typical rates of response were 4 to 8 percent based on the total employment and residential population at Mission Bay (Wendy Silvani, consultant for Mission Bay TMA, October 14, 2014). More than 1,000 survey responses were used in the travel demand analysis, which are summarized in Appendix A, page 17.

**Table 8
Proposed Project Trip Distribution Patterns by Land Use [a]**

Place of Trip Origin/Destination	Basketball Event		Convention Event		Retail		Office/Restaurant	
	Workers [b]	Visitors [c] Weekday Inbound	Workers [b]	Visitors [c] All Other [a]	Workers [b]	Visitors [c]	Workers [b]	Visitors [c]
San Francisco	7.7%	14.8%	7.7%	11.1%	7.7%	6.0%	7.7%	13.0%
Superdistrict 1	9.9%	4.6%	9.9%	3.4%	9.9%	9.0%	9.9%	14.0%
Superdistrict 2	22.3%	5.5%	22.3%	4.2%	22.3%	61.0%	22.3%	44.0%
Superdistrict 3	7.4%	4.4%	7.4%	3.3%	7.4%	5.0%	7.4%	7.0%
Superdistrict 4	27.7%	31.1%	27.7%	33.0%	27.7%	3.0%	27.7%	9.0%
East Bay	3.5%	8.9%	3.5%	13.0%	3.5%	2.0%	3.5%	1.0%
North Bay	19.0%	26.7%	19.0%	28.0%	19.0%	9.0%	19.0%	9.0%
South Bay	2.5%	4.0%	2.5%	4.0%	2.5%	5.0%	2.5%	3.0%
Out of Region	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

- [a] Percentages may not sum to 100 due to rounding.
 - [b] Based on Mission Bay TMA Transportation surveys of residents and employees in Mission Bay conducted in 2012, 2013, and 2014 (see Appendix A, p. 17).
 - [c] Adjusted for trips starting at the place of employment rather than at home for a weekday evening event based on Golden State Warriors survey data (see Appendix A, p. A-7).
 - [d] All Other includes the distribution pattern for weekday outbound trips, and Saturday inbound and outbound trips, and reflects trips starting and ending at the place of residence, rather than the place of employment (see footnote C regarding distribution of weekday inbound trips). Based on Golden State Warriors survey data for a San Francisco arena (see Appendix A, p. A-9).
 - [e] Based on Moscone Center Expansion Project EIR data.
 - [f] SF Guidelines, Appendix E - Table E-14 Visitor Trips to SD3 (Retail).
 - [g] SF Guidelines, Appendix E - Table E-15 Visitor Trips to SD3 (All Other).
- Sources: SF Guidelines, GS Warriors, MB TMA, Moscone Center, Adavant Consulting – November 2014.

For worker trips to all land uses, the majority would be to/from San Francisco (47.3 percent), with the greatest proportion within SD3 (22.3 percent), followed by East Bay (27.7 percent), and then South Bay (19.0 percent) origins/destinations. For visitor trips to a basketball game, the majority of trips would be to/from East Bay origins/destinations (31.1 to 33.0 percent), followed by the South Bay (26.7 to 28.0 percent), and then San Francisco (22.0 to 29.3 percent) origins/destinations.

The origin/destination distribution range for a weekday basketball game reflects an adjustment for event attendees who would travel to the event center directly from work rather than from their place of residence. The adjustment was based on a survey of Golden State Warriors season ticket holders, which is provided in Appendix A (p. A-7). As shown in Table 8 and in the appendix, the number of trips starting in San Francisco on a weekday would increase by approximately 7.5 percentage points, with the corresponding reductions in trips arriving from the East Bay (2 percentage points), North Bay (4 percentage points), and South Bay (1.5 percentage points) areas.

The majority of visitor trips to a convention event, retail, office, and restaurant uses would be from within San Francisco (70 to 81 percent), followed by South Bay (9 to 10 percent), and then East Bay (3 to 9 percent) origins/destinations.

MODE OF TRAVEL

The estimated daily, PM peak hour, evening peak hour, and late evening peak hour person trips were allocated to travel modes in order to determine the number of auto, transit, taxi, TNC vehicles, motor coaches, bicycle, walk, and other trips. For event center basketball games, the “other” category includes motorcycles and non-conventional travel modes such as pedicabs, while for the no-event related uses of the proposed project (office, retail, and restaurant) “other” includes bicycles, motorcycles, and taxis. The bicycle trips generated by a basketball game were calculated as a separate mode of travel (see Appendix A, pp. A-35 through A-46), but have been aggregated with those under the “other” category in the summary tables presented in this technical memorandum.

Travel mode splits of visitor trips for the non-event related uses were estimated from information in the SF Guidelines to the southeastern waterfront (SD3), where the project site is located. Travel mode splits of all employee trips (including event employees at basketball games and conventions) were estimated from information provided by the Mission Bay TMA based on transportation surveys conducted in 2012, 2013, and 2014.

Mode split assumptions for convention/corporate events attendees were based on data provided by the Moscone Center Operator and documented in the Moscone Center Expansion EIR,¹⁷ with some adjustments to account for the SD3 location of the proposed project. Specifically, it was assumed that the overall auto usage would be twice the Moscone Center (20

¹⁷ Moscone Center Expansion Project – Estimation of Travel Demand, Adavant Consulting, January 9, 2014. Appendix C of Moscone Center Expansion Project EIR, April 2014. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2013.0154E. A summary table is included in Appendix A (p. A-19).

No Event

On a weekday with no event, the proposed project would generate 1,344 person trips by automobile (48 percent), 881 person trips by transit (32 percent), and 570 person trips by other modes (20 percent) during the PM peak hour. On a Saturday with no event, the proposed project would generate 1,707 person trips by automobile (55 percent), 673 person trips by transit (22 percent), and 750 person trips by other modes (24 percent) during the evening peak hour.

With Event

The person trips by mode generated by the proposed project on a weekday with a basketball game would be as follows:

- The overall project would generate 1,645 person trips by automobile (43 percent), 1,625 person trips by transit (42 percent), and 590 person trips by other modes (15 percent) during the weekday PM peak hour.
- The overall project would generate 6,546 person trips by automobile (53 percent), 4,371 person trips by transit (36 percent), and 1,368 person trips by other modes (11 percent) during the weekday evening peak hour.
- The overall project would generate 7,280 person trips by automobile (55 percent), 4,680 person trips by transit (35 percent), and 1,258 person trips by other modes (10 percent) during the weekday late evening peak hour.

On a Saturday with a basketball game, the proposed project would generate 7,261 person trips by automobile (59 percent), 4,310 person trips by transit (35 percent), and 681 person trips by other modes (6 percent). On a Saturday event day during the evening peak hour, the project would generate a higher percentage of auto trips than on a weekday event day (59 percent on a Saturday, as compared to 43 percent on a weekday), as a result of the typically lower transit service available, combined with a greater number of attendees arriving from outside San Francisco.

On a weekday with a convention event, during the PM peak hour the proposed project would generate a relatively low percentage of weekday auto trips (30 percent for a convention event compared to 41 percent for a basketball game), since about 80 percent of the convention trips would be expected to arrive by transit, taxi or convention shuttle bus service. Approximately 2 percent of the convention attendees are expected to walk to the site.

VEHICLE OCCUPANCIES AND VEHICLE TRIPS BY PLACE OF ORIGIN

To determine the number of vehicle trips generated by the proposed project under various scenarios, an average vehicle occupancy rate was applied to the number of person trips by automobile mode. Average vehicle occupancies for a convention event as well as for standard project land uses, such as office, retail, and restaurant uses were estimated in accordance with the methodologies in the *SF Guidelines*.

Average Vehicle Occupancy: Vehicle occupancy data for the basketball games at the event center was developed based on information from surveys conducted by the SF Giants in 2007; data from 2007 was used because the 2012 SF Giants survey used to derive the modal split ratios did not include information about vehicle occupancy. More detailed information from the 2007 SF Giants survey is included in [Appendix A \(p. A-12\)](#). The average vehicle occupancy for attendees for a weekday and Saturday evening event derived from the SF Giants survey (2.7 passengers per vehicle) is comparable to data obtained from other similar transportation planning studies for arenas in urban settings, which estimated average vehicle occupancies between 2.35 and 2.8 passengers per vehicle, with the higher values being observed on weekends.¹⁸

[Table 10](#) summarizes the average vehicle occupancy rates and number of vehicles for project trips by place of origin/destination and time period. When combined with employee trips and trips to/from other on-site uses the overall average vehicle occupancy during a convention event and a basketball would range between 1.5 and 3.6 passengers per vehicle, depending on the type, day of the event, and peak hour.

During the weekday PM peak hour without and with a basketball game, the average vehicle occupancy would be about 1.9 passengers per vehicle, which generally reflects the overall peak period commute average vehicle occupancies of the other project land uses (i.e., the proportion of basketball game attendees who travel to the event center during the PM peak hour would be low – about 5 percent of arrivals, as presented in [Table 3](#)). During the weekday evening and late evening peak hours, the average vehicle occupancy would increase to 2.5 and 2.6 persons per vehicle, as the majority of trips would be event-related. During the Saturday evening peak hour for no event conditions, the average vehicle occupancy would be higher than on weekdays, at 2.2 persons per vehicle, reflecting the generally higher average vehicle occupancy for entertainment uses (i.e., the sit-down restaurant), while with a basketball game the average vehicle occupancy would increase to 2.6 persons per vehicle reflecting the greater number of attendees that would travel to the event center by auto mode on a Saturday as compared to a weekday game.

The average vehicle occupancy during a convention event during the weekday PM peak hour (3.3 persons per vehicle overall, 8.1 persons per vehicle for SD1) includes trips by convention shuttle bus with an average occupancy of 25 passengers per vehicle.

¹⁸ Table 2, p. 5; *Transportation Planning Assumptions for the Atlantic Yards Arena and Redevelopment*, Technical Memorandum, Philip Habib and Associates, May 4, 2006, and Table 10, p. 6, *Madison Square Garden Relocation and Expansion Transportation Planning Assumptions*, Technical Memorandum from PB Team to New York City Department of City Planning, November 11, 2003; copies of these two documents are included in [Appendix E](#), starting on pages A-79 and A-97, respectively.

Table 10
Project Average Vehicle Occupancies and Vehicle Trips by Place of Origin and Time Period ^(a, b, c)

Place of Trip Origin/ Destination	Weekday						Saturday			
	PM Peak Hour of the 4 to 6 PM period			Evening Peak Hour of the 6 to 8 PM period			Late Evening Peak Hour of the 9 to 11 PM period		Evening Peak Hour of the 7 to 9 PM period	
	No Event	Basketball Game	Convention Event ^(d)	Basketball Game	Basketball Game	Basketball Game	No Event	Basketball Game	No Event	Basketball Game
	Avg. Veh. Occup.	Avg. Veh. Trips	Avg. Veh. Occup.	Avg. Veh. Trips	Avg. Veh. Occup.	Avg. Veh. Trips	Avg. Veh. Occup.	Avg. Veh. Trips	Avg. Veh. Occup.	Avg. Veh. Trips
San Francisco	1.9	46	8.1 ^(d)	161	2.2	286	2.2	217	2.0	66
Superdistrict 1	1.8	101	1.7	93	2.3	128	2.3	106	1.9	141
Superdistrict 2	2.1	236	1.9	193	2.4	162	2.4	136	2.3	266
Superdistrict 3	2.0	52	2.0	63	2.4	161	2.5	133	2.4	59
Superdistrict 4	2.1	70	2.2	146	2.6	787	2.6	898	2.4	74
East Bay	2.0	19	2.2	46	2.7	286	2.7	446	3.5	10
North Bay	1.6	148	1.7	261	2.6	907	2.5	1,024	2.1	129
South Bay	1.7	30	2.0	27	3.7	55	3.6	59	1.7	40
Out of Region	1.9	702	1.9	886	2.5	2,752	2.6	3,018	2.2	785
Total Vehicles		255	524	266	2,553	2,553	134	367	47%	2,687
Inbound		36%	59%	28%	93%	93%	4%	47%	47%	95%
Outbound		64%	362	663	198	2,863	2,863	418	53%	128
			41%	72%	7%	7%	96%	53%		5%

Notes:

- [a] Numbers may not sum due to rounding.
- [b] Average vehicle occupancy rates vary depending on the time of day (i.e., analysis periods) as the proportion of trips generated by the various land uses components of the project, each one with a different average vehicle occupancy rate, is different depending on the time of the day. See Appendix B (pp. A-50 through A-62) for detailed vehicle occupancy and vehicle trip demand calculations for each individual land use.
- [c] For all analysis scenarios, the average vehicle occupancies and vehicle trips include the proposed office, retail, and restaurant uses, as well as an event or no event at the event center, depending on the analysis scenario (i.e., No Event, Basketball Game, Convention Event, etc.).
- [d] The average vehicle occupancy rate for a convention event includes trips by shuttle bus service with an average occupancy of 25 passengers per vehicle, per the Moscone Center Expansion Project EIR.

Source: Advant Consulting – January 2015.

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Vehicle Trips: The overall number of vehicle trips generated by the proposed project by origin and destination is also presented in [Table 10](#).

No Event

During the weekday PM peak hour without an event, the proposed project land uses would generate 702 vehicle trips. On Saturdays without an event, the number of vehicle trips during the Saturday evening peak hour (785 vehicle trips) would be higher but comparable to those occurring during the weekday PM peak hour (702 vehicle trips). The number of vehicle trips would be higher because trip generation associated with the office uses would be minimal on a Saturday, and the reduction in office trip generation (with a higher transit than auto mode split) would be offset by a greater trip generation for the retail and restaurant uses (with a higher auto than transit mode split) on a Saturday than on a weekday.

With Event

On weekdays with a basketball game, the proposed project would generate 886 vehicle trips during the PM peak hour, and the number of vehicle trips would increase to 2,752 vehicle trips during the evening peak hour (mostly arrivals to the event center), and to 3,018 vehicle trips during the late evening peak hour (mostly departures from the event center). More vehicle trips would be generated by a basketball game during the weekday late evening peak hour than during the PM peak hour because arrivals (inbound trips) tend to be spread out over a longer period of time as sport fans shop, buy food or meet on their way to their seats, whereas departures (outbound trips) are typically concentrated within the one hour immediately following the conclusion of an event.

On Saturdays with a basketball game, the proposed project would generate 2,815 vehicle trips during the evening peak hour. As indicated in [Table 10](#), there would be a somewhat greater vehicle trip generation for a Saturday basketball game (2,815 vehicle trips) than for a weekday basketball game (2,752 vehicle trips) as more people tend to drive on weekends because of the typically lighter traffic, more parking availability, and less transit service (e.g., fewer routes and/or longer headways between buses on Saturdays than on weekdays). In addition, retail, and restaurant uses would generate more vehicle trips on a Saturday than on a weekday.

On weekdays with a convention event, the proposed project would generate 919 vehicle trips during the PM peak hour. A convention event would generate fewer weekday PM peak hour vehicles trips than a basketball game, as convention events would have both a lower event attendance (9,000 attendees for a convention event as compared to 18,064 attendees for a basketball game) and a higher non-automobile event-only mode share (70 percent transit/other mode for a convention event during the PM peak hour, as compared to 59 percent transit/other mode share for a basketball game during the PM peak hour; see [Table 9, p. 20](#)).

TRANSIT TRIPS BY PLACE OF ORIGIN

[Table 11](#) summarizes the transit trips generated by the proposed project for the various scenarios and time periods.

Table 11
Project Transit (Muni and Regional) Trips by Place of Origin and Time Period [a, b]

Place of Trip Origin/Destination	Weekday				Saturday	
	PM Peak Hour of the 4 to 6 PM period		Evening Peak Hour of the 6 to 8 PM period	Late Evening Peak Hour of the 9 to 11 PM period	Evening Peak Hour of the 7 to 9 PM period	
	No Event	Basketball Game	Convention Event	Basketball Game	No Event	Basketball Game
San Francisco	88	177	467	834	681	82
Superdistrict 1	93	149	99	184	157	72
Superdistrict 2	261	311	228	188	167	290
Superdistrict 3	61	104	81	125	107	43
Superdistrict 4	237	535	387	1,663	1,898	124
East Bay	18	55	19	295	460	5
North Bay	94	236	139	855	967	34
South Bay	30	57	104	227	244	23
Out of Region						
Total Transit Trips	881	1,625	1,524	4,371	4,680	673
Inbound	157	944	212	4,138	0	261
Outbound	724	681	1,312	232	4,680	413
	82%	42%	86%	5%	100%	61%
						4%

Note:

[a] Numbers may not sum due to rounding.

[b] For all analysis scenarios, the transit trips include the proposed office, retail, and restaurant uses, as well as an event or no event at the event center, depending on the analysis scenario (i.e., No Event, Basketball Game, Convention Event).

Source: Advant Consulting – January 2015.

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LCW Consulting



No Event

During the weekday PM peak hour without an event, the proposed project land uses would generate 881 transit trips. On Saturdays without an event, the number of transit trips during the Saturday evening peak hour (673 transit trips) would be less than during the weekday PM peak hour (881 transit trips) due to the higher trip generation and greater transit mode share of the office use on a weekday.

With Event

On weekdays with a basketball game, the proposed project would generate 1,625 transit trips during the PM peak hour, and the number of transit trips would increase to 4,371 transit trips during the evening peak hour (mostly arrivals to the event center), and to 4,680 transit trips during the late evening peak hour (primarily departures from the event center). On Saturdays with a basketball game, the proposed project would generate 4,310 transit trips during the evening peak hour.

On weekdays with a convention event, the proposed project would generate 1,524 transit trips during the PM peak hour.

WALK/OTHER TRIPS BY PLACE OF ORIGIN

Table 12 summarizes the walk/other trips (i.e., walk, bicycle, motorcycle, taxi, and other modes) generated by the proposed project.

No Event

During the weekday PM peak hour without an event, the proposed project land uses would generate 570 walk/other trips. On Saturdays without an event, the number of walk/other trips during the Saturday evening peak hour (750 walk/other trips) would be more than during the weekday PM peak hour (570 walk/other trips) due to the higher trip generation of the restaurant uses on a Saturday at the later hour.

With Event

On weekdays with a basketball game, the proposed project would generate 590 walk/other trips during the PM peak hour, and the number of walk/other trips would increase to 1,368 walk/other trips during the evening peak hour (mostly arrivals to the event center), and to 1,258 walk/other trips during the late evening peak hour (primarily departures from the event center). On Saturdays with a basketball game, the proposed project would generate 681 walk/other trips during the evening peak hour.

On weekdays with a convention event, the proposed project would generate 2,098 walk/other trips during the PM peak hour.

Table 12
Project Walk/Other Trips by Place of Origin and Time Period (a, b, c)

Place of Trip Origin/Destination	Weekday				Saturday	
	PM Peak Hour of the 4 to 6 PM period		Evening Peak Hour of the 6 to 8 PM period	Late Evening Peak Hour of the 9 to 11 PM period	Evening Peak Hour of the 7 to 9 PM period	
	No Event	Basketball Game	Convention Event	Basketball Game	No Event	Basketball Game
San Francisco						
Superdistrict 1	104	124	1,250	464	161	211
Superdistrict 2	55	62	167	149	71	69
Superdistrict 3	365	321	385	257	467	146
Superdistrict 4	20	22	127	66	31	27
East Bay	9	26	8	174	7	98
North Bay	1	3	2	1	0	0
South Bay	6	16	4	139	6	69
Out of Region	10	16	155	119	8	60
Total Walk/Other Trips	570	590	2,098	1,368	750	681
Inbound	233	339	322	1,304	361	620
	41%	58%	15%	95%	48%	91%
Outbound	337	251	1,777	64	389	61
	59%	42%	85%	5%	52%	9%

Notes:
 [a] Other trips include walk, bicycle, motorcycle, taxi and other modes.
 [b] Numbers may not sum due to rounding.

[c] For all analysis scenarios, the walk/other trips include the proposed office, retail, and restaurant uses, as well as an event or no event at the event center, depending on the analysis scenario (i.e., No Event, Basketball Game, Convention Event).
 Source: Advant Consulting – January 2015.

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PARKING DEMAND

Weekday and Saturday parking demand for the proposed project was determined based on methodologies presented in the *SF Guidelines*, supplemented with data obtained from the Urban Land Institute¹⁹ and the project sponsor on the characteristics of the event center, described above. Parking demand consists of both long-term demand (typically employees) and short-term demand (typically visitors).

Peak parking demand was estimated for the midday period (1 to 3 PM) when parking occupancy is typically greatest for office and retail uses, and for the late evening (7 to 9 PM) period when parking demand is greater for the basketball game and restaurant uses.

Long-term parking demand for the office, retail, and restaurant uses was estimated by applying the average mode split and vehicle occupancy from the trip generation estimation to the number of employees for each of the proposed land uses. Short-term parking for these uses was estimated based on the total daily vehicle visitor trips and an average daily parking turnover rate of 5.5 vehicles per space per day for the office, retail, and restaurant uses.²⁰

Parking demand for attendees at a basketball game and convention event were estimated based on the total number of attendee vehicle trips expected at each event (i.e., the maximum number of vehicles arriving for the event, not just during the analysis hours) and an average daily parking turnover rate (1 vehicle per space per day for all basketball games on weekdays and Saturdays, and 1.5 vehicles per space per day for convention events).²¹ Event employee parking demand was estimated by applying the average mode split and vehicle occupancy from the trip generation estimation described in the previous sections to the number of employees expected at each event.

Table 13 summarizes the estimated weekday and Saturday parking demand for the proposed project during the midday and late evening periods. Detailed parking demand calculations are presented in Appendix C (p. A-63).

¹⁹ Table 2-5 and Table 2-6 (pp. 16 and 17); Shared Parking, Urban Land Institute, Second Edition, 2005.

²⁰ Based on the *SF Guidelines*, Appendix G, page G-1. A turnover of 5.5 means that each parking is utilized by an average of 5.5 vehicles during the day.

²¹ See Appendix C, p. A-63.

Table 14
Project Delivery/Service Vehicle Trips and Loading Space Demand

Land Use	GSF	Daily Trucks/ Service Vehicle Trip Generation	Loading Space Demand	
			Average Hour Loading Spaces	Peak Hour Loading Spaces
Event Center ^[a]	750,000	30	7	7
Office	605,000	127	6	7
Retail	62,500	14	1	1
Restaurant	62,500	225	10	13
Total		396	24	28

Note:

[a] Represents maximum loading demand associated with non-GS Warriors events.

Source: *SF Guidelines*, GS Warriors, LCW Consulting – November 2014

In addition, as indicated in [Table 14](#), the event center would generate a demand of up to 30 delivery and service vehicle trips on the day prior to an event. Non-GS Warriors events would generate a greater number of delivery and service vehicle trips associated with show components (e.g., stage, sound equipment and controls, video equipment and controls, and props), as well as food and beverage trucks, than basketball games. As indicated in [Table 14](#), the event center would generate a loading space demand for seven loading spaces during the average and peak hour of loading activity. The loading space demand for seven loading spaces takes into consideration that the loading demand would occur over a shorter period (i.e., over a period of about four hours, rather than 9-hour period for the office, retail, and restaurant uses), and some loading spaces would be occupied for one or more days (e.g., TV crew trucks).

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APPENDIX A

TRAVEL DEMAND ASSUMPTIONS

ORIGIN/DESTINATION DATA FROM GS WARRIORS
(Used to estimate event attendee O/D trip distribution)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
Estimated Origin-Destination for GS Warriors and non-basketball Events at a San Francisco facility

PLACE OF RESIDENCE BY ZIP CODE		Super District	Percentage
Zip Code	Location		
94102	Hayes Valley/Tendron/North of Market	SD1	27.1%
94103	South of Market	SD1	4.0%
94104	Downtown	SD1	3.4%
94105	North of Market	SD1	6.4%
94107	South of Market	SD1	5.9%
94108	Chinatown	SD1	3.8%
94109	Poik/Russian Hill	SD1	4.2%
94111	Downtown/South of Market	SD1	11.1%
94119	Rincon Center	SD1	2.1%
94133	North Beach/Chinatown	SD1	4.2%
94141	South of Market	SD1	0.2%
TOTAL SD1			59.4%
94115	Western Addition/Jugtown	SD2	1.9%
94116	Highland/University	SD2	1.7%
94118	Inner Richmond	SD2	3.2%
94121	Outer Richmond	SD2	3.8%
94123	Marina	SD2	4.4%
94129	Presidio	SD2	0.6%
TOTAL SD2			15.6%
94110	Inner Mission/Bernal Heights	SD3	3.1%
94112	Ingleside-Excelsior/Orocker Amazon	SD3	4.6%
94114	Castro/Noe Valley	SD3	2.3%
94124	Bayview-Hunter's Point	SD3	2.3%
94128	SFO Peaks/Clare Park	SD3	0.2%
94134	Inner Mission/Noe Valley/Sumgale	SD3	1.9%
94158	Mission Bay	SD3	1.7%
94188	India Basin	SD3	0.4%
TOTAL SD3			18.9%
94116	Parkside/Forest Hill	SD4	2.9%
94122	Sunset	SD4	5.5%
94127	St Francis Wood/Miraflores/West Portal	SD4	4.2%
94132	Lake Merced	SD4	2.5%
TOTAL SD4			15.1%
TOTAL SAN FRANCISCO			100.0%

Source: Market study for SF location, GS Warriors, 2013

GS WARRIORS SEASON TICKET HOLDERS

Place of Residence	Place of Employment				Total
	San Francisco	East Bay	North Bay	South Bay	
San Francisco	21	3	0	4	28
East Bay	15	91	0	0	117
North Bay	8	2	10	0	16
South Bay	0	1	0	40	50
Outside Bay Area	0	2	1	0	7
Total All Areas	49	98	10	53	220

LOCATION	Place of residence for GS Warriors season ticket holders who work in San Francisco
San Francisco	21 75.0% of SF residents
East Bay	15 12.8% of East Bay residents
North Bay	5 31.3% of North Bay residents
South Bay	0 100% of South Bay residents
Outside Bay Area	0 0% of Outside Bay Area residents
Total All Areas	49 22.3% of all residents

LOCATION	Place of employment for GS Warriors season ticket holders who live in San Francisco
San Francisco	21 75.0% of SF residents
East Bay	3 10.7% of SF residents
North Bay	0 0.0% of SF residents
South Bay	4 14.3% of SF residents
Outside Bay Area	0 0.0% of SF residents
Total All Areas	28 100.0% of SF residents

LOCATION	Weekday Trip Origin Adjustment for Live/Work Locations			Change
	Original Unadjusted	SF Read. work else.	Interim work in SF	
SD1	11.1%	-2.8%	8.3%	6.4%
SD2	3.4%	-0.9%	2.6%	2.0%
SD3	4.2%	-1.0%	3.1%	2.4%
SD4	3.3%	-0.8%	2.5%	1.9%
East Bay	33.0%	2.4%	35.4%	4.1%
North Bay	13.0%	0.0%	13.0%	0.0%
South Bay	28.0%	3.1%	31.1%	4.5%
Outside Bay Area	0.0%	0.0%	0.0%	0.0%
Total All Areas	100.0%	0.0%	100.0%	0.0%

TEMPORAL DISTRIBUTION OF EVENT ATTENDEES
 (Used to estimate event attendee arrival patterns)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
TEMPORAL DISTRIBUTION OF EVENT ATTENDEE ARRIVALS

Time Period	GSW (Oracle)	Icon Venue Group	Houston 2015	Phoenix Jan 2015	Sacramento 2012	Brooklyn 2013-14	Brooklyn 2014-15	GSW @ SF MB
Within 2½ hours and 2 hours prior to start	1.0%	incl. below	incl. below	incl. below	incl. below	2.0%	4.1%	1.0%
Within 2 hours and 1½ hours prior to start	11.0%	9.2%	12.0%	9.6%	14.0%	12.6%	11.3%	4.0%
Within 1½ hours and 1 hour prior to start	20.0%	21.5%	18.0%	21.9%	22.7%	20.5%	22.4%	10.5%
Within 1 hour and ½ hour prior to start	34.0%	32.3%	32.0%	35.2%	44.7%	32.3%	33.6%	19.5%
Within ½ hour prior to start								32.5%
Within ½ hour after start	34.0%	37.0%	30.0%	25.6%	18.6%	24.8%	22.5%	
Within 1 hour and 1 hour after start			5.0%	6.5%		5.8%	4.6%	
Within 1 hour and 1½ hours after start			3.0%	1.1%		2.0%	1.6%	
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.1%	100.0%

GS Warriors Trip Gen 2015 01 20 v6.xlsx

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Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

	WEEKDAY		SATURDAY		Person trips Estimated by model	WEEKDAY % of Estimated by model
	Vehicles Estimated by model	% of Daily from GSW Attendee Data	Vehicles Estimated by model	% of Daily from GSW Attendee Data		
ARENA ATTENDEES						
Basketball Game						
Total daily vehicle trips (in+out)	8,183		8,581		38,128	
Inbound daily vehicle trips	4,092		4,291		19,064	
Estimated Inbound peak hour of 4 to 6 PM period	379	9.3%			1,803	9.5%
Estimated Inbound peak hour of 6 to 8 PM period	2,489	60.8%			11,742	61.6%
Estimated Inbound peak hour of 7 to 9 PM period			2,653	61.8%		
Estimated Outbound peak hour of 9 to 11 PM period	2,797	68.4%			12,845	67.4%

GS WARRIORS DATA

Arrivals		Start time: 7:30 PM	
Time Period		Time Period	
5:00 PM	5:30 PM	5:30 PM	1%
5:30 PM	6:00 PM	6:00 PM	4%
6:00 PM	6:30 PM	6:30 PM	11%
6:30 PM	7:00 PM	7:00 PM	20%
7:00 PM	7:30 PM	7:30 PM	33%
7:30 PM	8:00 PM	8:00 PM	33%
TOTAL			100%

Departures		End time: 9:40 PM	
Time Period		Time Period	
9:00 PM	9:30 PM	9:30 PM	30%
9:30 PM	10:00 PM	10:00 PM	40%
10:00 PM	10:30 PM	10:30 PM	30%

GS Warriors Trip Gen 2015 01 20 v6.xlsx

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SAN FRANCISCO GIANTS SPECTATOR TRAVEL SURVEYS
(Used to estimate event travel mode & vehicle occupancy)

Adavant Consulting

SF GIANTS BALLPARK TRANSPORTATION SUMMARY

	2000 SURVEY			2007 SURVEY			2012 SURVEY			ALL DAYS COMBINED														
	WEEKDAY		WEEKEND	WEEKDAY		WEEKEND	WEEKDAY		WEEKEND															
	Afternoon	Evening	Afternoon	Evening	Afternoon	Evening	Afternoon	Evening	Afternoon		Evening													
ORIGIN OF TRIP																								
Home	68.0%	72.0%	97.0%	79.0%	76.5%	76.0%	77.0%	81.5%	84.2%	71.7%	91.0%	91.1%	84.2%	71.7%	71.7%	91.0%	91.1%	84.2%	71.7%	71.7%	91.0%	91.1%	84.2%	
Work	32.0%	28.0%	3.0%	21.0%	19.0%	20.0%	19.0%	14.5%	6.5%	7.1%	6.8%	6.0%	6.5%	7.1%	7.1%	6.8%	6.0%	6.5%	7.1%	7.1%	6.8%	6.0%	6.5%	
Other			included in home		4.5%	4.0%	4.0%	4.0%	9.3%	21.2%	2.2%	2.8%	9.3%	21.2%	21.2%	2.2%	2.8%	9.3%	21.2%	21.2%	2.2%	2.8%	9.3%	
All Origins	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
San Francisco																								
East Bay																								
North Bay																								
South Bay																								
All Origins																								
26.7%	40.4%	24.8%	27.0%	29.0%	29.0%	20.5%	27.6%	26.6%	26.7%	40.4%	24.8%	27.0%	26.7%	40.4%	24.8%	27.0%	26.6%	26.7%	40.4%	24.8%	27.0%	26.6%	26.7%	
19.4%	10.8%	17.6%	14.8%	19.4%	19.4%	10.8%	17.6%	14.8%	19.4%	10.8%	17.6%	14.8%	19.4%	10.8%	17.6%	14.8%	14.8%	19.4%	10.8%	17.6%	14.8%	15.6%	15.6%	
24.9%	28.3%	30.0%	31.7%	24.9%	24.9%	28.3%	30.0%	31.7%	24.9%	28.3%	30.0%	31.7%	24.9%	28.3%	30.0%	31.7%	28.7%	24.9%	28.3%	30.0%	31.7%	28.7%	28.7%	
All Origins	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
MODE OF TRAVEL																								
Auto	48.8%	54.0%	59.0%	53.0%	48.8%	54.0%	53.0%	53.9%	40.9%	33.0%	51.8%	51.3%	40.9%	33.0%	33.0%	51.8%	51.3%	40.9%	33.0%	33.0%	51.8%	51.3%	40.9%	
Charter bus	included above		included above		included above		included above		0.7%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	
Muni	10.9%	11.6%	11.0%	9.8%	10.9%	11.6%	9.8%	10.8%	11.0%	19.2%	7.7%	9.7%	11.0%	19.2%	19.2%	7.7%	9.7%	11.0%	19.2%	19.2%	7.7%	9.7%	11.9%	
BART	12.8%	10.3%	11.9%	14.4%	12.8%	10.3%	14.4%	12.3%	20.3%	15.3%	13.4%	13.1%	20.3%	15.3%	15.3%	13.4%	13.1%	20.3%	15.3%	15.3%	13.4%	13.1%	15.5%	
Caltrain	12.2%	11.6%	9.5%	9.4%	12.2%	11.6%	9.4%	10.7%	9.6%	12.8%	12.7%	12.4%	9.6%	12.8%	12.8%	12.7%	12.4%	9.6%	12.8%	12.8%	12.7%	12.4%	11.9%	
Ferry	5.5%	3.0%	4.1%	6.2%	5.5%	3.0%	6.2%	4.7%	7.6%	6.9%	8.1%	3.7%	7.6%	6.9%	6.9%	8.1%	3.7%	7.6%	6.9%	6.9%	8.1%	3.7%	6.6%	
Taxi	0.8%	1.5%	0.9%	1.2%	0.8%	1.5%	1.2%	1.1%	2.0%	2.0%	0.4%	2.3%	2.0%	2.0%	2.0%	0.4%	2.3%	2.0%	2.0%	2.0%	0.4%	2.3%	1.7%	
Walk	6.0%	5.0%	2.0%	6.0%	6.0%	5.0%	6.0%	4.8%	3.3%	6.4%	2.1%	2.7%	3.3%	6.4%	6.4%	2.1%	2.7%	3.3%	6.4%	6.4%	2.1%	2.7%	3.6%	
Bike	included above		included above		included above		included above		2.0%	2.7%	1.4%	1.7%	2.0%	2.7%	2.7%	1.4%	1.7%	2.0%	2.7%	2.7%	1.4%	1.7%	1.5%	
Other	2.0%	3.0%	1.5%	0.0%	2.0%	3.0%	0.0%	1.6%	2.7%	3.4%	2.1%	3.0%	2.7%	3.4%	3.4%	2.1%	3.0%	2.7%	3.4%	3.4%	2.1%	3.0%	2.8%	
All Modes	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Auto	48.0%	50.0%	57.5%	51.8%	49.8%	54.0%	53.0%	53.9%	40.9%	33.0%	51.8%	51.3%	40.9%	33.0%	33.0%	51.8%	51.3%	40.9%	33.0%	33.0%	51.8%	51.3%	40.9%	
Transit	41.0%	37.0%	33.5%	37.2%	41.4%	36.5%	39.8%	38.6%	49.2%	54.2%	42.3%	46.1%	46.2%	49.2%	54.2%	42.3%	46.1%	46.2%	49.2%	54.2%	42.3%	46.1%	46.2%	
Taxi	8.0%	7.0%	5.0%	6.7%	8.0%	7.0%	6.7%	6.7%	2.0%	2.0%	0.8%	1.2%	2.0%	2.0%	2.0%	0.8%	1.2%	2.0%	2.0%	2.0%	0.8%	1.2%	1.7%	
Walk	3.0%	6.0%	4.0%	4.3%	2.0%	3.0%	1.5%	1.6%	3.3%	4.7%	4.4%	4.7%	3.3%	4.7%	4.7%	4.4%	4.7%	3.3%	4.7%	4.7%	4.4%	4.7%	4.3%	
All Modes	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
PARKING LOCATION																								
SF Giants facilities	76.0%	60.0%	61.0%	65.7%	40.0%	33.0%	38.0%	38.1%	45.6%	31.5%	35.9%	24.8%	34.5%	31.5%	31.5%	35.9%	24.8%	34.5%	31.5%	31.5%	35.9%	24.8%	34.5%	
On-street					21.0%	36.0%	38.0%	31.1%	12.8%	30.1%	20.5%	26.1%	22.2%	12.8%	30.1%	20.5%	26.1%	22.2%	12.8%	30.1%	20.5%	26.1%	22.2%	
Other off-street facilities					39.0%	31.0%	37.4%	32.8%	41.6%	38.4%	43.6%	49.1%	43.2%	41.6%	38.4%	43.6%	49.1%	43.2%	41.6%	38.4%	43.6%	49.1%	43.2%	
All parking locations	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Avg. number of people in car				2.80	2.48	2.67	2.67	2.57	45.6%	31.5%	35.9%	24.8%	34.5%	31.5%	31.5%	35.9%	24.8%	34.5%	31.5%	31.5%	35.9%	24.8%	34.5%	
Avg. time of arrival before start					36 min	35 min	37 min	37 min	42 min	42 min	42 min	37 min	37 min	42 min	42 min	42 min	37 min	37 min	42 min	42 min	42 min	37 min	37 min	

Sources:
San Francisco's New Downtown Ballpark: A home run for public transit; G. Robbins, A. Felder, W. Hurrell; 2001 Institute of Transportation Engineers Annual Meeting.
San Francisco Giants Transportation Survey; SF Giants; August 2007.
San Francisco Giants Transportation Survey; SF Giants; October 2012.

TEMPORAL DISTRIBUTION OF PROJECT LAND USES
(Used to estimate non-event land use arrival patterns)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION

TABLE 1 CALCULATION OF TRIP GENERATION RATES FOR WEEKDAY & SATURDAY CONDITIONS LAND USES	WEEKDAY		SATURDAY	
	PM Peak Hour of 4-6 PM Period SF Guidelines Rates	Proposed Late PM Peak Hour Rates	ITE Weekday- to-Saturday Trip Gen Factor (from Table 2)	Proposed Daily and Late PM Peak Hour Rates
OFFICE				
Daily trips per 1000 gsf	18.1		0.22	4.0
Peak Hour of 4-6 PM period as a % of Daily	8.5%			11.0%
Peak Hour of 4-6 PM period trips per 1000 gsf	1.54		0.29	0.44
Peak Hour of 6-8 PM period as a % of PM peak hour (Table 3a)		0.20		
Peak Hour of 6-8 PM period as a % of daily (calculated)		1.7%		
Peak Hour of 6-8 PM period trips per 1000 gsf		0.31		
Peak Hour of 7-9 PM period as a % of PM peak hour (Table 3a)				0.10
Peak Hour of 7-9 PM period as a % of daily				1.1%
Peak Hour of 7-9 PM period trips per 1000 gsf				0.04
Peak Hour of 9-11 PM period as a % of PM peak hour (Table 3a)		0.05		
Peak Hour of 9-11 PM period as a % of daily		0.4%		
Peak Hour of 9-11 PM period trips per 1000 gsf		0.08		
RETAIL				
Daily trips per 1000 gsf	150.0		1.17	175.5
Peak Hour of 4-6 PM period as a % of Daily	9.0%			10.0%
Peak Hour of 4-6 PM period trips per 1000 gsf	13.5		1.30	17.5
Peak Hour of 6-8 PM period as a % of PM peak hour (Table 3a)		0.75		
Peak Hour of 6-8 PM period as a % of daily (calculated)		6.8%		
Peak Hour of 6-8 PM period trips per 1000 gsf		10.13		
Peak Hour of 7-9 PM period as a % of PM peak hour (Table 3a)				0.40
Peak Hour of 7-9 PM period as a % of daily				4.0%
Peak Hour of 7-9 PM period trips per 1000 gsf				7.02
Peak Hour of 9-11 PM period as a % of PM peak hour (Table 3a)		0.35		
Peak Hour of 9-11 PM period as a % of daily		3.2%		
Peak Hour of 9-11 PM period trips per 1000 gsf		4.73		
SIT-DOWN RESTAURANT				
Daily trips per 1000 gsf	200.0		1.25	249.1
Peak Hour of 4-6 PM period as a % of Daily	13.5%			15.5%
Peak Hour of 4-6 PM period trips per 1000 gsf	27.0		1.43	38.6
Peak Hour of 6-8 PM period as a % of PM peak hour (Table 3a)		1.50		
Peak Hour of 6-8 PM period as a % of daily (calculated)		20.3%		
Peak Hour of 6-8 PM period trips per 1000 gsf		40.50		
Peak Hour of 7-9 PM period as a % of PM peak hour (Table 3a)				1.55
Peak Hour of 7-9 PM period as a % of daily				24.0%
Peak Hour of 7-9 PM period trips per 1000 gsf				59.78
Peak Hour of 9-11 PM period as a % of PM peak hour (Table 3a)		1.50		
Peak Hour of 9-11 PM period as a % of daily		20.3%		
Peak Hour of 9-11 PM period trips per 1000 gsf		40.50		
QUICK SERVICE RESTAURANT				
Daily trips per 1000 gsf (Composite rate)	600.0		1.25	747.3
Peak Hour of 4-6 PM period as a % of Daily	13.5%			15.5%
Peak Hour of 4-6 PM period trips per 1000 gsf	81.0		1.43	115.7
Peak Hour of 6-8 PM period as a % of PM peak hour (closed except during events)		1.50		
Peak Hour of 6-8 PM period as a % of daily (calculated)		20.3%		
Peak Hour of 6-8 PM period trips per 1000 gsf		121.50		
Peak Hour of 7-9 PM period as a % of PM peak hour (closed except during events)				1.55
Peak Hour of 7-9 PM period as a % of daily				24.0%
Peak Hour of 7-9 PM period trips per 1000 gsf				179.34
Peak Hour of 9-11 PM period as a % of PM peak hour (closed except during events)		1.50		
Peak Hour of 9-11 PM period as a % of daily		20.3%		
Peak Hour of 9-11 PM period trips per 1000 gsf		121.50		

MISSION BAY TRANSPORTATION MANAGEMENT ASSOCIATION
RESIDENT AND EMPLOYEE TRAVEL SURVEYS RESULTS –
2012, 2013 & 2014
(Used to estimate work travel modes and origins/destinations)

TABLE 2

ITE OFFICE LAND USE 710 General Office Building	Vehicle-trips per 1000 gsf		Weekday-to-Sat. factor
	Weekday	Saturday	
Daily	11.03	2.46	0.22
Peak Hour of 4-6 PM period	1.49	0.43	0.29
Peak Hour of 4-6 PM period as a % of Daily	13.5%	17.5%	1.29

ITE RETAIL LAND USE 820 Shopping Center	Vehicle-trips per 1000 gsf		Weekday-to-Sat. factor
	Weekday	Saturday	
Daily	42.70	49.97	1.17
Peak Hour of 4-6 PM period	3.71	4.82	1.30
Peak Hour of 4-6 PM period as a % of Daily	8.7%	9.6%	1.11

ITE RESTAURANT LAND USE 932 High-Turnover Sit-Down	Vehicle-trips per 1000 gsf		Weekday-to-Sat. factor
	Weekday	Saturday	
Daily	127.15	158.37	1.25
Peak Hour of 4-6 PM period	9.85	14.07	1.43
Peak Hour of 4-6 PM period as a % of Daily	7.7%	8.9%	1.15

Source: Institute of Transportation Engineers, Trip Generation Report, 9th Edition, 2012

TABLE 3 (Summary of Table 3a)

Source: Pushkarev and Zupan, Urban Space for Pedestrians

LAND USE	Start Time						PM to Late Evening Adjustment Ratios for						
	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	6-8 period over 4-6 period		7-9 period over 4-6 period		9-11 period over 4-6 period		
	Calculated	Selected	Calculated	Selected	Calculated	Selected	Calculated	Selected	Calculated	Selected	Calculated	Selected	
Office (flat peak)	15.2%	8.5%	2.9%	0.4%	1.5%	0.8%	0.0%	0.19	0.20	0.10	0.10	0.05	0.05
Office (sharp peak)	8.3%	13.4%	2.6%	0.5%	1.3%	0.9%	0.0%	0.20	0.09	0.09	0.10	0.07	0.07
Retail	6.2%	8.9%	6.4%	2.7%	3.6%	3.0%	1.4%	0.72	0.75	0.41	0.40	0.34	0.35
Restaurant	4.1%	6.3%	9.2%	8.9%	9.6%	9.3%	6.6%	1.47	1.50	1.53	1.55	1.48	1.50

TABLE 3a

Percent of weekday 24-hour in and out trips during each hour by type of land use

Source: Pushkarev and Zupan, Urban Space for Pedestrians

Weekday Time Period	Office (flat peak)			Office (sharp peak)			Retail	Restaurant	
	In	Out	Two-way	In	Out	Two-way	Two-way	Two-way	
12:00 AM	1:00 AM								
1:00 AM	2:00 AM								
2:00 AM	3:00 AM								
3:00 AM	4:00 AM								
4:00 AM	5:00 AM								
5:00 AM	6:00 AM								
6:00 AM	7:00 AM								
7:00 AM	8:00 AM	3.9	0.6	2.2	1.9	0.2	1.1	0.0	0.0
8:00 AM	9:00 AM	25.6	2.3	13.9	22.5	0.9	11.5	0.0	0.0
9:00 AM	10:00 AM	10.9	3.5	7.2	20.5	2.2	11.3	0.9	0.0
10:00 AM	11:00 AM	5.8	4.0	4.9	4.4	3.2	3.7	3.8	2.1
11:00 AM	12:00 PM	5.3	7.8	6.5	3.5	9.3	6.4	6.7	4.4
12:00 PM	1:00 PM	12.6	16.6	14.7	8.0	20.0	14.2	20.1	14.0
1:00 PM	2:00 PM	10.7	7.8	9.2	20.8	8.2	14.4	19.9	15.1
2:00 PM	3:00 PM	8.4	5.3	6.8	9.5	4.5	7.0	9.9	7.6
3:00 PM	4:00 PM	4.2	6.3	5.3	3.4	3.6	3.4	6.3	2.9
4:00 PM	5:00 PM	5.3	24.9	15.2	2.3	14.1	8.3	6.2	4.1
5:00 PM	6:00 PM	3.6	13.2	8.5	1.3	25.3	13.4	8.9	6.3
6:00 PM	7:00 PM	2.0	3.9	2.9	0.9	4.3	2.6	6.4	9.2
7:00 PM	8:00 PM	0.1	0.8	0.4	0.2	0.8	0.5	2.7	8.9
8:00 PM	9:00 PM	1.0	1.8	1.5	0.5	2.1	1.3	3.6	9.6
9:00 PM	10:00 PM	0.4	1.3	0.8	0.3	1.4	0.9	3.0	9.3
10:00 PM	11:00 PM	0.0	0.0	0.0	0.0	0.0	0.0	1.4	6.6
11:00 PM	12:00 AM								
TOTAL		100	100	100	100	100	100	100	100

MISSION BAY AREA
TRANSPORTATION SURVEY OF MISSION BAY EMPLOYEES
Source: Mission Bay TMA 2012, 2013 & 2014

PLACE OF ORIGIN & MODE OF TRAVEL
FOR THE MOSCONE CONVENTION CENTER
(Used to estimate convention trip distribution and mode of travel)

Mode of travel most frequently used	PLACE OF RESIDENCE							MISSION BAY	
	Mission Bay	SF, not MB	East Bay	North Bay	South Bay	40+ miles	Total	MB Residents	Reside elsewhere
Drive alone	22	82	41	12	106	5	268	22	246
Carpool or Get Dropped Off	6	13	30	8	15	2	74	6	68
Walk or Bike	55	66	4	1	0	0	126	55	71
BART plus Mission Bay Shuttle	5	10	222	1	3	6	247	5	242
Caltrain plus Mission Bay Shuttle	11	0	2	0	61	4	78	11	67
MUNI plus Mission Bay Shuttle	34	51	1	0	0	0	86	34	52
Other Transit plus Mission Bay Shuttle	4	3	5	1	0	1	14	4	10
Caltrain plus Walk	16	0	0	1	51	7	75	16	59
MUNI plus Walk	24	41	13	4	0	1	83	24	59
Walk plus MB shuttle	34	19	0	0	0	0	53	34	19
UCSF or China Basin or GAP Shuttle	29	59	0	0	1	1	90	29	61
Motorcycle	2	8	3	1	2	2	18	2	16
Other transit plus walk or bike	1	0	33	16	2	3	55	1	54
MB Shuttle only	2	1	0	0	1	0	4	2	2
Corporate shuttles (2013 and 2014)	3	0	0	0	0	0	3	3	0
Uber/Lyft/Taxi (2014)	0	3	0	0	0	0	3	0	3
Total	248	356	354	45	242	32	1,277	248	1,029
Drive alone	22	82	41	12	106	5	268	22	246
Carpool or Get Dropped Off	6	16	30	8	15	2	77	6	71
Transit plus MB shuttle	54	64	230	2	64	11	425	54	371
Transit plus Walk	41	41	46	21	53	11	213	41	172
MB Shuttle only	36	20	0	0	1	0	57	36	21
Other shuttle	32	59	0	0	1	1	93	32	61
Motorcycle	2	8	3	1	2	2	18	2	16
Walk or Bike	55	66	4	1	0	0	126	55	71
Total	248	356	354	45	242	32	1,277	248	1,029
Drive alone	8.9%	23.0%	11.6%	26.7%	43.8%	15.6%	21.0%	8.9%	23.9%
Carpool or Get Dropped Off	2.4%	4.5%	8.5%	17.8%	6.2%	6.3%	6.0%	2.4%	6.9%
Transit plus MB shuttle	21.8%	18.0%	65.0%	4.4%	26.4%	34.4%	33.3%	21.8%	36.1%
Transit plus Walk	16.5%	11.5%	13.0%	46.7%	21.9%	34.4%	16.7%	16.5%	16.7%
MB Shuttle only	14.5%	5.6%	0.0%	0.0%	0.4%	0.0%	4.5%	14.5%	2.0%
Other shuttle	12.9%	16.6%	0.0%	0.0%	0.4%	3.1%	7.3%	12.9%	5.9%
Motorcycle	0.8%	2.2%	0.8%	2.2%	0.8%	6.3%	1.4%	0.8%	1.6%
Walk or Bike	22.2%	18.5%	1.1%	2.2%	0.0%	0.0%	9.9%	22.2%	6.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Auto	28	98	71	20	121	7	345	28	317
Transit	163	184	276	23	119	23	788	163	625
Walk/Bike/Other	57	74	7	2	2	2	144	57	87
Total	248	356	354	45	242	32	1,277	248	1,029
Auto	11.3%	27.5%	20.1%	44.4%	50.0%	21.9%	27.0%	11.3%	30.8%
Transit	65.7%	51.7%	78.0%	51.1%	49.2%	71.9%	61.7%	65.7%	60.7%
Walk/Bike/Other	23.0%	20.8%	2.0%	4.4%	0.8%	6.3%	11.3%	23.0%	8.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
PLACE OF ORIGIN AND MODE OF TRAVEL PATTERNS FOR THE MOSCONE CONVENTION CENTER

Place of Origin	Attendees	Employees
San Francisco	70% [1]	50%
Other Bay Area	20%	50%
Out of Region	10%	0%
TOTAL	100%	100%

[1] Approximately 656,000 convention attendees or 72% of the total annual attendance at Moscone Center (907,990) stayed at SF hotels in 2011; Source: Moscone Expansion Project - Fiscal Responsibility & Feasibility Report, Table II, p. 6, San Francisco Office of Economic and Workforce Development, January 2013.

Source: Table 18, p. 89, Moscone Center Expansion Project Transportation Impact Study Final Report, April 24, 2014, Case No. 2013.0154E

Mode of Travel	Attendees	Employees
Auto	10%	30%
Public Transit	5%	60%
Event Shuttle Bus	50%	N.A. [2]
Walk	30%	8%
Other [1]	5%	2%
TOTAL	100%	100%

[1] Other includes bicycle, motorcycle, and additional modes such as taxis or limousines

[2] N.A. = Not Applicable

Source: Table 19, p. 89, Moscone Center Expansion Project Transportation Impact Study Final Report, April 24, 2014, Case No. 2013.0154E

San Francisco Superdistrict Boundaries



The boundaries of the four San Francisco Superdistricts are based on the travel analysis zones established by the Metropolitan Transportation Commission (MTC). The four Superdistricts shown in this figure are aggregations of the MTC's 1454 Regional Travel Analysis Zones (May 2002) that encompasses the nine-county San Francisco Bay Area. MTC's 1454-zone system fits within the year 2000 U.S. Census tracts.

PROPOSED PROJECT LAND USE SUMMARY

Event Center & Mixed-Use Development at Mission Bay Blocks 29-3
 PROJECT SUMMARY
 September 11, 2014

	Total Project
Event Center	710,486 gsf
- no event	100 employees
- basketball game	18,064 attendees (maximum attendance)
	925 employees
- convention event	9,000 attendees (typical large attendance)
	675 employees
Commercial Uses	
- Retail	55,500 gsf
- Quick Service Restaurant	18,500 gsf
- Sit-down Restaurant	37,000 gsf
Total commercial	111,000 gsf
Live Theater	- seats - gsf - employees
Movie Theater	420 seats 39,000 gsf
Office	
- GSW Admin. & Mngmnt.	20,000 gsf
- General Office	509,210 gsf
Total office	529,210 gsf
Vehicle parking	
- non-residential standard	TBD spaces
- non-residential attendant	TBD spaces
- residential	TBD spaces
- car share	TBD spaces
Total vehicle parking	- spaces
Bicycle parking	
- non-residential Class 1	TBD spaces
- non-residential Class 2	TBD spaces
- residential Class 1	TBD spaces
- residential Class 2	TBD spaces
Total bicycle parking	- spaces

PROJECT TRAVEL DEMAND SUMMARY FOR ALL SCENARIOS

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRAVEL DEMAND SUMMARY BY SCENARIO

	No Event		Basketball Game		Convention Event		No Event		Basketball Game	
	Total All Day	Peak Hour of the 4 to 6 PM Period	Total All Day	Peak Hour of the 6 to 8 PM Period	Total All Day	Peak Hour of the 4 to 6 PM Period	Total All Day	Peak Hour of the 7 to 9 PM Period	Total All Day	Peak Hour of the 7 to 9 PM Period
Auto person-trips	14,100	1,344	30,636	1,645	16,100	1,547	11,681	1,707	29,252	7,261
Transit person-trips	6,896	881	19,627	1,625	13,014	1,524	5,318	673	17,851	4,310
Taxi/Coach person trips (event)	-	-	1,277	33	13,491	1,484	-	-	434	141
Bike/Walk/Other person-trips	6,002	570	6,997	556	6,493	614	4,884	750	4,562	540
Total Person-trips	26,998	2,796	58,538	3,859	49,097	5,169	21,883	3,130	52,098	12,252
Auto person-trips	52%	48%	52%	43%	33%	30%	53%	55%	56%	59%
Transit person-trips	26%	32%	34%	42%	27%	29%	24%	22%	34%	35%
Taxi/Coach (event)	0%	0%	2%	1%	27%	29%	0%	0%	1%	1%
Bike/Walk/Other person-trips	22%	20%	12%	14%	13%	12%	22%	24%	9%	4%
Vehicle trips	6,990	702	13,691	886	9,023	919	5,876	785	12,331	2,815
- Inbound	3,495	255	6,846	524	4,511	256	2,938	367	6,165	2,687
- Outbound	3,495	447	6,846	362	4,511	663	2,938	418	6,165	128
Average vehicle occupancy	2.02	1.91	2.33	1.89	3.28	3.30	1.99	2.17	2.41	2.63

NO EVENT SUMMARY
 WEEKDAY: 4 PM TO 6 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees 105 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips									PM Peak Hour Trips								Percent of Daily during PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	71	3,965	1,256	3,810	0	0	4,997	14,100	52%	6	357	170	514	0	0	298	1,344	48%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	6.0%	9.5%
Transit	162	936	559	1,491	0	0	3,748	6,896	26%	14	84	75	201	0	0	506	881	32%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	13.5%	12.8%
Taxi/Coach (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	21	1,380	373	1,130	0	0	1,477	4,381	16%	2	124	50	153	0	0	87	416	15%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	5.9%	9.5%
Other	9	124	188	572	0	0	728	1,621	6%	1	11	25	77	0	0	40	154	6%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	5.5%	9.5%
Total	263	6,405	2,376	7,004	0	0	10,951	26,998	100%	22	576	321	946	0	0	931	2,796	100%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	10.4%
	1%	24%	9%	28%	0%	0%	41%	100%		1%	21%	11%	34%	0%	0%	33%	100%		8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	10.4%
Vehicle Trips	55	2,116	573	1,704	0	0	2,542	6,990		5	190	77	230	0	0	200	702		8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	7.9%	10.0%
	1%	30%	8%	24%	0%	0%	36%	100%		1%	27%	11%	33%	0%	0%	28%	100%									
Avg. veh. occupancy	1.30	1.87	2.19	2.24	0.00	0.00	1.97	2.02		1.30	1.87	2.19	2.24	0.00	0.00	1.49	1.91									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips								PM Peak Hour Transit-Trips								PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	2,811	2	35	40	120	0	0	80	277	1	11	9	25	0	0	42	88	0	9	7	21	0	0	9	46	7%	1.87
Superdistrict 2	3,262	2	52	43	130	0	0	99	326	1	10	8	22	0	0	53	93	0	20	15	44	0	0	21	101	14%	1.77
Superdistrict 3	11,764	5	339	133	404	0	0	242	1,123	2	35	31	90	0	0	101	261	1	99	24	72	0	0	40	236	34%	2.10
Superdistrict 4	1,789	2	30	23	66	0	0	68	188	1	4	5	13	0	0	38	61	0	13	6	18	0	0	15	52	7%	2.05
East Bay	3,052	6	26	36	96	0	0	228	391	5	9	15	36	0	0	171	237	1	8	8	23	0	0	30	70	10%	2.07
North Bay	463	1	12	4	11	0	0	29	57	0	2	1	1	0	0	14	18	0	7	1	2	0	0	9	19	3%	2.01
South Bay	2,953	4	55	32	91	0	0	161	343	2	8	4	8	0	0	73	94	2	24	14	38	0	0	71	148	21%	1.64
Out of Region	905	1	28	9	28	0	0	24	90	0	5	2	7	0	0	15	30	0	10	4	12	0	0	5	30	4%	1.67
Total	26,998	22	576	321	946	0	0	931	2,796	14	84	75	201	0	0	506	881	5	190	77	230	0	0	200	702	100%	1.91

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	0	271	143	445	0	0	79	938	22	305	178	501	0	0	852	1,858	22	576	321	946	0	0	931	2,796
	0%	47%	44%	47%	0%	0%	9%	34%	100%	53%	56%	53%	0%	0%	92%	66%								
Transit Trips	0	32	27	84	0	0	15	157	14	53	49	118	0	0	492	724	14	84	75	201	0	0	506	881
	0%	38%	35%	41%	0%	0%	3%	18%	100%	62%	65%	59%	0%	0%	97%	82%								
Vehicle Trips	0	92	35	109	0	0	19	255	5	99	42	121	0	0	180	447	5	190	77	230	0	0	200	702
	0%	48%	45%	47%	0%	0%	10%	36%	100%	52%	55%	53%	0%	0%	90%	64%								

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	7	7	21	0	0	4	39	0	8	7	21	0	0	11	47	0	15	14	42	0	0	15	86
Superdistrict 2	0	15	14	43	0	0	8	79	0	16	14	44	0	0	24	99	0	31	28	87	0	0	32	178
Superdistrict 3	0	100	27	86	0	0	15	228	1	101	29	88	0	0	50	269	1	201	56	174	0	0	65	497
Superdistrict 4	0	11	7	21	0	0	4	43	1	12	8	22	0	0	21	64	1	24	14	43	0	0	25	107
East Bay	0	6	9	27	0	0	5	47	1	8	11	30	0	0	48	98	1	14	20	58	0	0	53	145
North Bay	0	5	1	4	0	0	1	11	0	5	2	5	0	0	13	26	0	10	3	10	0	0	14	37
South Bay	0	21	12	38	0	0	7	78	2	24	16	43	0	0	80	165	2	45	28	81	0	0	87	243
Out of Region	0	8	3	10	0	0	2	23	0	8	3	10	0	0	6	28	0	16	6	20	0	0	8	51
Total	0	174	80	250	0	0	44	548	6	183	90	265	0	0	253	796	6	357	170	514	0	0	298	1,344

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH NO EVENT

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	5	4	11	0	0	2	21	1	6	5	14	0	0	40	66	1	11	9	25	0	0	42	88
Superdistrict 2	0	4	3	9	0	0	2	17	1	6	5	13	0	0	51	76	1	10	8	22	0	0	53	93
Superdistrict 3	0	16	13	42	0	0	7	79	2	20	17	48	0	0	94	182	2	35	31	90	0	0	101	261
Superdistrict 4	0	1	2	5	0	0	1	9	1	3	3	8	0	0	37	52	1	4	5	13	0	0	38	61
East Bay	0	1	4	12	0	0	2	19	5	8	12	24	0	0	169	218	5	9	15	36	0	0	171	237
North Bay	0	1	0	0	0	0	0	1	0	1	1	1	0	0	14	17	0	2	1	1	0	0	14	18
South Bay	0	2	0	1	0	0	0	4	2	5	4	7	0	0	72	90	2	8	4	8	0	0	73	94
Out of Region	0	2	1	3	0	0	1	7	0	3	2	4	0	0	14	23	0	5	2	7	0	0	15	30
Total	0	32	27	84	0	0	15	157	14	53	49	118	0	0	492	724	14	84	75	201	0	0	506	881

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	4	8	26	0	0	5	43	0	5	9	27	0	0	19	61	0	9	17	53	0	0	24	104
Superdistrict 2	0	6	3	11	0	0	2	21	0	6	4	11	0	0	12	34	0	12	7	22	0	0	14	55
Superdistrict 3	0	50	22	68	0	0	12	152	1	52	24	72	0	0	63	213	1	102	46	140	0	0	76	365
Superdistrict 4	0	1	2	5	0	0	1	8	0	1	2	5	0	0	4	12	0	2	3	10	0	0	5	20
East Bay	0	1	0	1	0	0	0	2	0	1	0	1	0	0	4	7	0	2	1	2	0	0	4	9
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
South Bay	0	1	0	1	0	0	0	2	0	1	0	1	0	0	1	4	0	2	1	2	0	0	1	6
Out of Region	0	3	0	1	0	0	0	4	0	3	0	1	0	0	1	6	0	7	1	2	0	0	1	10
Total	0	66	36	112	0	0	20	233	3	70	40	118	0	0	107	337	3	135	76	230	0	0	127	570

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	16	19	58	0	0	10	103	2	19	21	62	0	0	70	174	2	35	40	120	0	0	80	277
Superdistrict 2	0	24	20	62	0	0	11	118	2	28	23	68	0	0	87	209	2	52	43	130	0	0	99	326
Superdistrict 3	0	166	63	196	0	0	35	459	5	173	71	208	0	0	207	664	5	339	133	404	0	0	242	1,123
Superdistrict 4	0	14	10	31	0	0	6	60	2	16	13	35	0	0	62	128	2	30	23	66	0	0	68	188
East Bay	0	8	13	40	0	0	7	68	6	17	23	55	0	0	221	323	6	26	36	96	0	0	228	391
North Bay	0	5	1	4	0	0	1	12	1	7	3	6	0	0	28	45	1	12	4	11	0	0	29	57
South Bay	0	24	13	40	0	0	7	84	4	31	20	51	0	0	154	259	4	55	32	91	0	0	161	343
Out of Region	0	14	4	13	0	0	2	34	1	14	5	15	0	0	22	57	1	28	9	28	0	0	24	90
Total	0	271	143	445	0	0	79	938	22	305	178	501	0	0	852	1,858	22	576	321	946	0	0	931	2,796

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	4	3	10	0	0	2	20	0	4	4	11	0	0	8	26	0	9	7	21	0	0	9	46
Superdistrict 2	0	10	7	22	0	0	4	42	0	11	8	23	0	0	17	58	0	20	15	44	0	0	21	101
Superdistrict 3	0	49	11	35	0	0	6	102	1	50	13	37	0	0	34	135	1	99	24	72	0	0	40	236
Superdistrict 4	0	6	3	8	0	0	1	19	0	7	3	9	0	0	13	33	0	13	6	18	0	0	15	52
East Bay	0	3	3	11	0	0	2	19	1	5	5	12	0	0	29	51	1	8	8	23	0	0	30	70
North Bay	0	3	0	1	0	0	0	4	0	4	1	1	0	0	9	14	0	7	1	2	0	0	9	19
South Bay	0	11	5	17	0	0	3	36	2	13	8	21	0	0	68	113	2	24	14	38	0	0	71	148
Out of Region	0	5	2	6	0	0	1	14	0	5	2	6	0	0	4	17	0	10	4	12	0	0	5	30
Total	0	92	35	109	0	0	19	255	5	99	42	121	0	0	180	447	5	190	77	230	0	0	200	702

NO EVENT SUMMARY
SATURDAY: 7 PM TO 9 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM

SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees
	105 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips									Evening Peak Hour Trips							Percent of Daily during Late PM Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	71	4,640	1,565	4,745	0	0	660	11,681	53%	0	185	376	1,139	0	0	7	1,707	55%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	14.6%
Transit	162	1,095	697	1,857	0	0	1,507	5,318	24%	0	44	167	446	0	0	17	673	22%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	12.7%
Taxi/Coach (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	21	1,615	464	1,408	0	0	192	3,700	17%	0	65	111	338	0	0	2	516	16%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	13.9%
Other	9	145	234	713	0	0	83	1,184	5%	0	6	56	171	0	0	1	234	7%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	19.8%
Total	263	7,496	2,959	8,724	0	0	2,442	21,883	100%	0	300	710	2,093	0	0	27	3,130	100%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	14.3%
Vehicle Trips	55	2,477	714	2,122	0	0	509	5,876		0	99	171	509	0	0	6	785		0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	13.4%
Avg. veh. occupancy	1.30	1.87	2.19	2.24	0.00	0.00	1.30	1.99		0.00	1.87	2.19	2.24	0.00	0.00	1.30	2.17									

Saturday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips							Evening Peak Hour Vehicle-Trips							Avg. Veh. Occ.			
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX		Office	Total	
Superdistrict 1	2,141	0	18	88	266	0	0	2	374	0	6	20	55	0	0	1	82	0	4	15	46	0	0	0	66	8%	1.99
Superdistrict 2	2,547	0	27	96	288	0	0	3	414	0	5	18	48	0	0	2	72	0	11	32	98	0	0	0	141	18%	1.92
Superdistrict 3	9,963	0	176	295	894	0	0	6	1,372	0	18	69	200	0	0	3	290	0	52	53	160	0	0	1	266	34%	2.32
Superdistrict 4	1,405	0	15	50	147	0	0	2	214	0	2	11	28	0	0	1	43	0	7	13	39	0	0	0	59	8%	2.36
East Bay	2,292	0	13	79	211	0	0	7	311	0	5	34	79	0	0	6	124	0	4	18	51	0	0	1	74	9%	2.44
North Bay	390	0	6	9	24	0	0	1	40	0	1	1	2	0	0	0	5	0	4	2	4	0	0	0	10	1%	3.54
South Bay	2,366	0	29	72	201	0	0	5	306	0	4	9	18	0	0	3	34	0	13	30	84	0	0	2	129	16%	2.07
Out of Region	778	0	15	21	62	0	0	1	98	0	3	5	15	0	0	0	23	0	5	9	26	0	0	0	40	5%	1.68
Total	21,883	0	300	710	2,093	0	0	27	3,130	0	44	167	446	0	0	17	673	0	99	171	509	0	0	6	785	100%	2.17

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound								Outbound							Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	0	141	316	985	0	0	0	1,442	0	159	395	1,108	0	0	27	1,688	0	300	710	2,093	0	0	27	3,130
Transit Trips	0	16	59	185	0	0	0	261	0	27	108	261	0	0	17	413	0	44	167	446	0	0	17	673
Vehicle Trips	0	48	77	242	0	0	0	367	0	51	94	267	0	0	6	418	0	99	171	509	0	0	6	785

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound								Outbound							Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	4	15	46	0	0	0	65	0	4	16	47	0	0	67	0	8	30	93	0	0	0	0	132
Superdistrict 2	0	8	30	95	0	0	0	133	0	8	32	97	0	0	138	0	16	62	192	0	0	0	1	271
Superdistrict 3	0	52	61	189	0	0	0	302	0	53	64	195	0	0	313	0	105	125	384	0	0	0	1	615
Superdistrict 4	0	6	15	46	0	0	0	67	0	6	17	49	0	0	73	0	12	32	96	0	0	0	1	140
East Bay	0	3	19	61	0	0	0	83	0	4	24	67	0	0	97	0	7	43	128	0	0	0	1	180
North Bay	0	2	3	10	0	0	0	15	0	3	4	12	0	0	19	0	5	8	22	0	0	0	0	35
South Bay	0	11	27	84	0	0	0	122	0	13	34	96	0	0	145	0	24	61	179	0	0	0	3	267
Out of Region	0	4	7	22	0	0	0	33	0	4	7	22	0	0	34	0	8	14	44	0	0	0	0	67
Total	0	90	177	553	0	0	0	820	0	95	198	586	0	0	7	887	0	185	376	1,139	0	0	7	1,707

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM

SUMMARY OF TRIPS WITH NO EVENT

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	8	25	0	0	0	35	0	3	12	31	0	0	1	47	0	6	20	55	0	0	1	82
Superdistrict 2	0	2	6	20	0	0	0	28	0	3	11	28	0	0	2	44	0	5	18	48	0	0	2	72
Superdistrict 3	0	8	30	93	0	0	0	131	0	10	39	107	0	0	3	159	0	18	69	200	0	0	3	290
Superdistrict 4	0	1	4	11	0	0	0	16	0	2	7	17	0	0	1	27	0	2	11	28	0	0	1	43
East Bay	0	1	8	26	0	0	0	35	0	4	26	53	0	0	6	89	0	5	34	79	0	0	6	124
North Bay	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	5	0	1	1	2	0	0	0	5
South Bay	0	1	1	3	0	0	0	5	0	3	8	15	0	0	3	28	0	4	9	18	0	0	3	34
Out of Region	0	1	2	6	0	0	0	9	0	2	3	8	0	0	0	14	0	3	5	15	0	0	0	23
Total	0	16	59	185	0	0	0	261	0	27	108	261	0	0	17	413	0	44	167	446	0	0	17	673

Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	18	57	0	0	0	78	0	3	20	60	0	0	1	83	0	5	38	117	0	0	1	161
Superdistrict 2	0	3	7	23	0	0	0	34	0	3	9	25	0	0	0	37	0	6	16	48	0	0	0	71
Superdistrict 3	0	26	48	151	0	0	0	225	0	27	54	159	0	0	2	241	0	53	102	310	0	0	2	467
Superdistrict 4	0	0	4	11	0	0	0	15	0	0	4	12	0	0	0	16	0	1	7	23	0	0	0	31
East Bay	0	1	1	2	0	0	0	3	0	1	1	2	0	0	0	4	0	1	1	4	0	0	0	7
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	1	1	2	0	0	0	3	0	1	1	2	0	0	0	3	0	1	1	3	0	0	0	6
Out of Region	0	2	1	2	0	0	0	4	0	2	1	2	0	0	0	4	0	3	1	3	0	0	0	8
Total	0	34	79	248	0	0	0	361	0	36	88	261	0	0	3	389	0	70	168	509	0	0	3	750

Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	8	41	128	0	0	0	178	0	10	47	138	0	0	2	197	0	18	88	266	0	0	2	374
Superdistrict 2	0	13	44	138	0	0	0	195	0	14	52	150	0	0	3	219	0	27	96	288	0	0	3	414
Superdistrict 3	0	86	139	433	0	0	0	658	0	90	156	461	0	0	6	713	0	176	295	894	0	0	6	1,372
Superdistrict 4	0	7	22	69	0	0	0	98	0	8	28	78	0	0	2	116	0	15	50	147	0	0	2	214
East Bay	0	4	28	89	0	0	0	121	0	9	50	123	0	0	7	190	0	13	79	211	0	0	7	311
North Bay	0	3	3	10	0	0	0	16	0	3	6	14	0	0	1	25	0	6	9	24	0	0	1	40
South Bay	0	13	28	89	0	0	0	130	0	16	43	112	0	0	5	176	0	29	72	201	0	0	5	306
Out of Region	0	7	9	30	0	0	0	46	0	7	11	33	0	0	1	52	0	15	21	62	0	0	1	98
Total	0	141	316	985	0	0	0	1,442	0	159	395	1,108	0	0	27	1,688	0	300	710	2,093	0	0	27	3,130

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	7	23	0	0	0	32	0	2	8	24	0	0	0	34	0	4	15	46	0	0	0	66
Superdistrict 2	0	5	15	48	0	0	0	69	0	5	17	50	0	0	0	73	0	11	32	98	0	0	0	141
Superdistrict 3	0	25	25	78	0	0	0	128	0	26	28	82	0	0	1	137	0	52	53	160	0	0	1	266
Superdistrict 4	0	3	6	19	0	0	0	28	0	4	7	20	0	0	0	32	0	7	13	39	0	0	0	59
East Bay	0	2	8	23	0	0	0	33	0	2	10	28	0	0	1	41	0	4	18	51	0	0	1	74
North Bay	0	2	0	1	0	0	0	4	0	2	1	3	0	0	0	6	0	4	2	4	0	0	0	10
South Bay	0	6	12	37	0	0	0	54	0	7	18	47	0	0	2	75	0	13	30	84	0	0	2	129
Out of Region	0	2	4	13	0	0	0	20	0	3	4	13	0	0	0	20	0	5	9	26	0	0	0	40
Total	0	48	77	242	0	0	0	367	0	51	94	267	0	0	6	418	0	99	171	509	0	0	6	785

BASKETBALL GAME SUMMARY
WEEKDAY: 4 PM TO 6 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										PM Peak Hour Trips								Percent of Daily during PM Peak Hour							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Auto	20,398	2,024	1,256	1,961	0	0	4,997	30,636	52%	731	182	170	265	0	0	298	1,645	43%	3.6%	9.0%	13.5%	13.5%	0.0%	0.0%	6.0%	5.4%
Transit	13,865	582	559	873	0	0	3,748	19,627	34%	872	52	75	118	0	0	506	1,625	42%	6.3%	9.0%	13.5%	13.5%	0.0%	0.0%	13.5%	8.3%
Taxi/Coach (Event)	1,277							1,277	2%	33						33	1%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	
Bike (Event)	725							725	1%	19						19	0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	
Walk	1,613	701	373	581	0	0	1,477	4,745	8%	112	63	50	78	0	0	87	391	10%	7.0%	9.0%	13.5%	13.5%	0.0%	0.0%	5.9%	8.2%
Other	249	68	188	293	0	0	728	1,526	3%	35	6	25	40	0	0	40	146	4%	14.2%	9.0%	13.5%	13.5%	0.0%	0.0%	5.5%	9.6%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%	1,803	304	321	501	0	0	931	3,859	100%	4.7%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	6.6%
Vehicle Trips	8,589	1,092	573	895	0	0	2,542	13,691		390	98	77	121	0	0	200	886		4.5%	9.0%	13.5%	13.5%	0.0%	0.0%	7.9%	6.5%
<i>Avg. veh. occupancy</i>	<i>2.52</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.97</i>	<i>2.33</i>		<i>1.96</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.49</i>	<i>1.89</i>									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips										PM Peak Hour Transit-Trips								PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	7,006	203	19	40	62	0	0	80	404	106	6	9	14	0	0	42	177	27	4	7	11	0	0	9	58	7%	1.92	
Superdistrict 2	4,148	130	28	43	68	0	0	99	368	70	6	8	13	0	0	53	149	24	10	15	23	0	0	21	93	10%	1.73	
Superdistrict 3	10,602	251	172	133	208	0	0	242	1,006	111	19	31	48	0	0	101	311	42	50	24	37	0	0	40	193	22%	1.95	
Superdistrict 4	2,928	106	16	23	35	0	0	68	248	51	3	5	8	0	0	38	104	26	7	6	9	0	0	15	63	7%	1.98	
East Bay	14,730	531	17	36	55	0	0	228	867	316	8	15	24	0	0	171	535	90	5	8	12	0	0	30	146	16%	2.15	
North Bay	4,393	112	7	4	6	0	0	29	158	38	1	1	1	0	0	14	55	31	4	1	1	0	0	9	46	5%	2.19	
South Bay	12,587	411	31	32	51	0	0	161	686	147	5	4	7	0	0	73	236	142	13	14	21	0	0	71	261	30%	1.69	
Out of Region	2,143	59	14	9	15	0	0	24	121	33	3	2	4	0	0	15	57	7	5	4	6	0	0	5	27	3%	1.96	
Total	58,538	1,803	304	321	501	0	0	931	3,859	872	52	75	118	0	0	506	1,625	390	98	77	121	0	0	200	886	100%	1.89	

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound										Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Total Person Trips	1,758	135	143	222	0	0	79	2,337	45	169	178	278	0	0	852	1,522	1,803	304	321	501	0	0	931	3,859		
Transit Trips	845	16	27	42	0	0	15	944	28	37	49	76	0	0	492	681	872	52	75	118	0	0	506	1,625		
Vehicle Trips	370	46	35	55	0	0	19	524	20	53	42	66	0	0	180	362	390	98	77	121	0	0	200	886		
	95%	46%	45%	45%	0%	0%	10%	59%	5%	54%	55%	55%	0%	0%	90%	41%										

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound										Outbound								Total								Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	45	4	7	10	0	0	4	69	0	4	7	11	0	0	11	34	45	8	14	21	0	0	15	103	9		
Superdistrict 2	37	8	14	21	0	0	8	87	1	8	14	23	0	0	24	70	38	16	28	44	0	0	32	157	2		
Superdistrict 3	62	50	27	43	0	0	15	198	2	51	29	45	0	0	50	177	64	101	56	88	0	0	65	375	2		
Superdistrict 4	46	6	7	10	0	0	4	73	1	6	8	12	0	0	21	48	47	12	14	22	0	0	25	121	2		
East Bay	194	3	9	14	0	0	5	224	3	5	11	17	0	0	48	83	196	8	20	30	0	0	53	307	7		
North Bay	72	2	1	2	0	0	1	79	1	3	2	3	0	0	13	22	73	5	3	5	0	0	14	100	0		
South Bay	248	10	12	19	0	0	7	296	4	14	16	24	0	0	80	138	252	24	28	43	0	0	87	434	7		
Out of Region	15	4	3	5	0	0	2	29	0	4	3	5	0	0	6	19	15	8	6	10	0	0	8	48	5		
Total	719	87	80	125	0	0	44	1,054	12	96	90	140	0	0	253	590	731	182	170	265	0	0	298	1,645	33		

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	104	2	4	6	0	0	2	118	2	4	5	8	0	0	40	59	106	6	9	14	0	0	42	177
Superdistrict 2	67	2	3	5	0	0	2	78	3	4	5	8	0	0	51	71	70	6	8	13	0	0	53	149
Superdistrict 3	106	8	13	21	0	0	7	156	5	12	17	27	0	0	94	155	111	19	31	48	0	0	101	311
Superdistrict 4	49	1	2	3	0	0	1	54	2	2	3	5	0	0	37	50	51	3	5	8	0	0	38	104
East Bay	307	1	4	6	0	0	2	319	10	8	12	18	0	0	169	216	316	8	15	24	0	0	171	535
North Bay	38	0	0	0	0	0	0	38	1	1	1	1	0	0	14	17	38	1	1	1	0	0	14	55
South Bay	143	1	0	1	0	0	0	145	4	4	4	6	0	0	72	90	147	5	4	7	0	0	73	236
Out of Region	32	1	1	1	0	0	1	36	1	2	2	2	0	0	14	21	33	3	2	4	0	0	15	57
Total	845	16	27	42	0	0	15	944	28	37	49	76	0	0	492	681	872	52	75	118	0	0	506	1,625

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	5							5	0						0	0	5	0	0	0	0	0	0	5
Superdistrict 2	1							1	0						0	0	1	0	0	0	0	0	0	1
Superdistrict 3	1							1	0						0	0	1	0	0	0	0	0	0	1
Superdistrict 4	1							1	0						0	0	1	0	0	0	0	0	0	1
East Bay	6							6	0						0	0	6	0	0	0	0	0	0	6
North Bay	0							0	0						0	0	0	0	0	0	0	0	0	0
South Bay	4							4	0						0	0	4	0	0	0	0	0	0	4
Out of Region	0							0	0						0	0	0	0	0	0	0	0	0	0
Total	19	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	19

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	45	2	8	13	0	0	5	73	1	3	9	14	0	0	19	46	46	5	17	27	0	0	24	119
Superdistrict 2	21	3	3	5	0	0	2	34	1	3	4	6	0	0	12	26	21	6	7	11	0	0	14	60
Superdistrict 3	72	25	22	34	0	0	12	164	3	27	24	38	0	0	63	155	75	52	46	72	0	0	76	320
Superdistrict 4	7	0	2	3	0	0	1	12	0	1	2	3	0	0	4	9	7	1	3	5	0	0	5	21
East Bay	12	1	0	0	0	0	0	13	0	1	0	1	0	0	4	6	12	1	1	1	0	0	4	19
North Bay	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	3
South Bay	8	1	0	0	0	0	0	10	0	1	0	0	0	0	1	3	8	1	1	1	0	0	1	12
Out of Region	10	2	0	0	0	0	0	13	0	2	0	0	0	0	1	4	10	3	1	1	0	0	1	16
Total	176	33	36	56	0	0	20	320	5	37	40	62	0	0	107	251	181	69	76	118	0	0	127	571

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	200	8	19	29	0	0	10	265	3	11	21	33	0	0	70	139	203	19	40	62	0	0	80	404
Superdistrict 2	126	12	20	31	0	0	11	200	4	15	23	37	0	0	87	168	130	28	43	68	0	0	99	368
Superdistrict 3	241	82	63	98	0	0	35	518	10	90	71	110	0	0	207	488	251	172	133	208	0	0	242	1,006
Superdistrict 4	103	7	10	16	0	0	6	141	3	9	13	20	0	0	62	107	106	16	23	35	0	0	68	248
East Bay	518	4	13	20	0	0	7	562	12	13	23	35	0	0	221	305	531	17	36	55	0	0	228	867
North Bay	111	3	1	2	0	0	1	118	2	4	3	4	0	0	28	40	112	7	4	6	0	0	29	158
South Bay	403	12	13	20	0	0	7	455	9	19	20	31	0	0	154	231	411	31	32	51	0	0	161	686
Out of Region	58	7	4	7	0	0	2	78	1	8	5	8	0	0	22	44	59	14	9	15	0	0	24	121
Total	1,758	135	143	222	0	0	79	2,337	45	169	178	278	0	0	852	1,522	1,803	304	321	501	0	0	931	3,859

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	23	2	3	5	0	0	2	35	4	2	4	6	0	0	8	23	27	4	7	11	0	0	9	58
Superdistrict 2	22	5	7	11	0	0	4	49	2	6	8	12	0	0	17	44	24	10	15	23	0	0	21	93
Superdistrict 3	40	24	11	18	0	0	6	100	2	26	13	20	0	0	34	94	42	50	24	37	0	0	40	193
Superdistrict 4	24	3	3	4	0	0	1	36	2	4	3	5	0	0	13	27	26	7	6	9	0	0	15	63
East Bay	86	2	3	5	0	0	2	98	4	3	5	7	0	0	29	47	90	5	8	12	0	0	30	146
North Bay	31	2	0	0	0	0	0	33	0	2	1	1	0	0	9	13	31	4	1	1	0	0	9	46
South Bay	136	5	5	8	0	0	3	158	6	8	8	13	0	0	68	103	142	13	14	21	0	0	71	261
Out of Region	7	2	2	3	0	0	1	15	0	2	2	3	0	0	4	12	7	5	4	6	0	0	5	27
Total	370	46	35	55	0	0	19	524	20	53	42	66	0	0	180	362	390	98	77	121	0	0	200	886

BASKETBALL GAME SUMMARY
WEEKDAY: 6 PM TO 8 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND EVENING PEAK HOUR BETWEEN 6 AND 8 PM

SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										Evening Peak Hour Trips							Percent of Daily during Evening Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	20,398	2,024	1,256	1,961	0	0	4,997	30,636	52%		6,340	26	50	79	0	0	50	6,546	53%	31.1%	1.3%	4.0%	4.0%	0.0%	0.0%	1.0%	21.4%
Transit	13,865	582	559	873	0	0	3,748	19,627	34%		4,121	19	45	70	0	0	115	4,371	36%	29.7%	3.3%	8.1%	8.1%	0.0%	0.0%	3.1%	22.3%
Taxi/Coach (Event)	1,277							1,277	2%		434							434	4%	34.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	34.0%
Bike (Event)	725							725	1%		247							247	2%	34.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	34.0%
Walk	1,613	701	373	581	0	0	1,477	4,745	8%		540	9	15	23	0	0	15	602	5%	33.5%	1.3%	4.0%	4.0%	0.0%	0.0%	1.0%	12.7%
Other	249	68	188	293	0	0	728	1,526	3%		59	1	7	11	0	0	6	85	1%	23.6%	2.1%	3.9%	3.9%	0.0%	0.0%	0.9%	5.6%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%		11,742	56	118	184	0	0	186	12,285	100%	30.8%	1.7%	5.0%	5.0%	0.0%	0.0%	1.7%	21.0%
Vehicle Trips	8,589	1,092	573	895	0	0	2,542	13,691			2,628	16	27	42	0	0	39	2,752		30.6%	1.4%	4.7%	4.7%	0.0%	0.0%	1.5%	20.1%
<i>Avg. veh. occupancy</i>	<i>2.52</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.97</i>	<i>2.33</i>			<i>2.58</i>	<i>1.69</i>	<i>1.86</i>	<i>1.88</i>	<i>0.00</i>	<i>0.00</i>	<i>1.30</i>	<i>2.54</i>									

Weekday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips									Evening Peak Hour Transit-Trips							Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	7,006	1,733	4	12	19	0	0	14	1,783	812	2	4	7	0	0	9	834	259	1	2	3	0	0	1	266	10%	2.17
Superdistrict 2	4,148	538	5	14	22	0	0	18	598	158	2	5	7	0	0	12	184	113	2	4	6	0	0	3	128	5%	2.28
Superdistrict 3	10,602	649	24	40	63	0	0	42	818	132	5	12	19	0	0	21	188	131	6	7	11	0	0	7	162	6%	2.40
Superdistrict 4	2,928	517	3	8	13	0	0	14	556	106	1	3	5	0	0	9	125	152	1	2	3	0	0	3	161	6%	2.42
East Bay	14,730	3,655	8	21	32	0	0	52	3,767	1,583	6	13	21	0	0	40	1,663	771	1	3	5	0	0	6	787	29%	2.58
North Bay	4,393	1,049	1	3	4	0	0	7	1,064	289	1	1	2	0	0	3	295	282	1	1	1	0	0	2	286	10%	2.69
South Bay	12,587	3,131	8	16	25	0	0	35	3,214	822	3	5	8	0	0	17	855	870	3	7	11	0	0	16	907	33%	2.56
Out of Region	2,143	470	2	3	5	0	0	5	485	219	1	1	2	0	0	3	227	51	1	1	2	0	0	1	55	2%	3.69
Total	58,538	11,742	56	118	184	0	0	186	12,285	4,121	19	45	70	0	0	115	4,371	2,628	16	27	42	0	0	39	2,752	100%	2.53

Assumptions for Evening Peak Hour bet. 6 PM & 8 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	100%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	0%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 6 PM & 8 PM	Inbound									Outbound							Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office
Total Person Trips	11,742	15	32	50	0	0	0	11,839	0	41	86	133	0	0	186	446	11,742	56	118	184	0	0	186	12,285
Transit Trips	4,121	2	6	9	0	0	0	4,138	0	17	39	61	0	0	115	232	4,121	19	45	70	0	0	115	4,371
Vehicle Trips	2,756	5	8	12	0	0	0	2,781	134	10	19	30	0	0	39	232	2,890	16	27	42	0	0	39	3,013
	95%	33%	29%	29%	0%	0%	0%	92%	5%	67%	71%	71%	0%	0%	100%	8%								

Evening Peak Hour bet. 6 PM & 8 PM	Inbound									Outbound							Total								Taxi + Coach Arena	
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office		Total
Superdistrict 1	474	0	2	2	0	0	0	478	0	1	2	3	0	0	2	8	474	1	4	5	0	0	0	2	486	91
Superdistrict 2	240	1	3	5	0	0	0	249	0	1	4	7	0	0	4	16	240	2	7	11	0	0	0	4	265	26
Superdistrict 3	315	6	6	10	0	0	0	336	0	7	9	13	0	0	8	37	315	12	15	23	0	0	0	8	373	16
Superdistrict 4	349	1	2	2	0	0	0	353	0	1	3	4	0	0	4	12	349	2	4	7	0	0	0	4	366	25
East Bay	1,900	0	2	3	0	0	0	1,905	0	2	5	8	0	0	10	25	1,900	2	7	11	0	0	0	10	1,930	103
North Bay	760	0	0	1	0	0	0	762	0	1	1	2	0	0	3	7	760	1	1	2	0	0	0	3	768	0
South Bay	2,171	1	3	4	0	0	0	2,179	0	4	8	12	0	0	18	41	2,171	5	11	16	0	0	0	18	2,220	102
Out of Region	133	0	1	1	0	0	0	135	0	1	1	2	0	0	1	4	133	1	2	3	0	0	0	1	140	63
Total	6,340	10	18	28	0	0	0	6,396	0	17	32	51	0	0	50	150	6,340	26	50	79	0	0	0	50	6,546	426

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND EVENING PEAK HOUR BETWEEN 6 AND 8 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Evening Peak Hour bet. 6 PM & 8 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	812	0	1	1	0	0	0	815	0	1	3	5	0	0	9	19	812	2	4	7	0	0	9	834
Superdistrict 2	158	0	1	1	0	0	0	160	0	2	4	6	0	0	12	24	158	2	5	7	0	0	12	184
Superdistrict 3	132	1	3	5	0	0	0	140	0	4	9	14	0	0	21	48	132	5	12	19	0	0	21	188
Superdistrict 4	106	0	0	1	0	0	0	107	0	1	3	5	0	0	9	17	106	1	3	5	0	0	9	125
East Bay	1,583	0	1	1	0	0	0	1,586	0	6	12	19	0	0	40	78	1,583	6	13	21	0	0	40	1,663
North Bay	289	0	0	0	0	0	0	289	0	0	1	2	0	0	3	6	289	1	1	2	0	0	3	295
South Bay	822	0	0	0	0	0	0	822	0	2	5	8	0	0	17	33	822	3	5	8	0	0	17	855
Out of Region	219	0	0	0	0	0	0	220	0	1	1	2	0	0	3	7	219	1	1	2	0	0	3	227
Total	4,121	2	6	9	0	0	0	4,138	0	17	39	61	0	0	115	232	4,121	19	45	70	0	0	115	4,371

Evening Peak Hour bet. 6 PM & 8 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	68							68	0						0	0	68	0	0	0	0	0	0	68
Superdistrict 2	19							19	0						0	0	19	0	0	0	0	0	0	19
Superdistrict 3	12							12	0						0	0	12	0	0	0	0	0	0	12
Superdistrict 4	18							18	0						0	0	18	0	0	0	0	0	0	18
East Bay	81							81	0						0	0	81	0	0	0	0	0	0	81
North Bay	0							0	0						0	0	0	0	0	0	0	0	0	0
South Bay	48							48	0						0	0	48	0	0	0	0	0	0	48
Out of Region	0							0	0						0	0	0	0	0	0	0	0	0	0
Total	247	0	0	0	0	0	0	247	0	0	0	0	0	0	0	0	247	0	0	0	0	0	0	247

Evening Peak Hour bet. 6 PM & 8 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	379	0	2	3	0	0	0	384	0	1	3	5	0	0	4	12	379	1	5	7	0	0	4	396
Superdistrict 2	121	0	1	1	0	0	0	123	0	1	1	2	0	0	3	7	121	1	2	3	0	0	3	130
Superdistrict 3	191	3	5	8	0	0	0	207	0	4	8	13	0	0	12	39	191	7	13	21	0	0	12	245
Superdistrict 4	44	0	0	1	0	0	0	45	0	0	1	1	0	0	1	2	44	0	1	1	0	0	1	47
East Bay	90	0	0	0	0	0	0	91	0	0	0	1	0	0	1	2	90	0	0	1	0	0	1	93
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
South Bay	90	0	0	0	0	0	0	90	0	0	0	0	0	0	0	1	90	0	0	0	0	0	0	91
Out of Region	117	0	0	0	0	0	0	118	0	0	0	0	0	0	0	1	117	0	0	0	0	0	0	119
Total	1,033	4	8	13	0	0	0	1,058	0	7	14	22	0	0	21	64	1,033	10	22	35	0	0	21	1,121

Evening Peak Hour bet. 6 PM & 8 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	1,733	1	4	7	0	0	0	1,745	0	3	8	13	0	0	14	39	1,733	4	12	19	0	0	14	1,783
Superdistrict 2	538	1	4	7	0	0	0	550	0	4	10	15	0	0	18	47	538	5	14	22	0	0	18	598
Superdistrict 3	649	9	14	22	0	0	0	695	0	15	26	41	0	0	42	123	649	24	40	63	0	0	42	818
Superdistrict 4	517	1	2	4	0	0	0	524	0	3	6	10	0	0	14	32	517	3	8	13	0	0	14	556
East Bay	3,655	0	3	5	0	0	0	3,663	0	7	18	28	0	0	52	104	3,655	8	21	32	0	0	52	3,767
North Bay	1,049	0	0	1	0	0	0	1,051	0	1	2	3	0	0	7	13	1,049	1	3	4	0	0	7	1,064
South Bay	3,131	1	3	5	0	0	0	3,139	0	6	13	20	0	0	35	75	3,131	8	16	25	0	0	35	3,214
Out of Region	470	1	1	2	0	0	0	473	0	1	2	4	0	0	5	12	470	2	3	5	0	0	5	485
Total	11,742	15	32	50	0	0	0	11,839	0	41	86	133	0	0	186	446	11,742	56	118	184	0	0	186	12,285

Evening Peak Hour bet. 6 PM & 8 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	217	0	1	1	0	0	0	221	42	0	1	2	0	0	45	259	1	2	3	0	0	0	1	266
Superdistrict 2	101	1	2	2	0	0	0	108	12	1	2	4	0	0	19	113	2	4	6	0	0	0	3	128
Superdistrict 3	124	3	3	4	0	0	0	140	7	4	4	7	0	0	22	131	6	7	11	0	0	0	7	162
Superdistrict 4	141	0	1	1	0	0	0	145	11	1	1	2	0	0	16	152	1	2	3	0	0	0	3	161
East Bay	737	0	1	1	0	0	0	746	34	1	3	4	0	0	41	771	1	3	5	0	0	0	6	787
North Bay	282	0	0	0	0	0	0	284	0	0	1	1	0	0	2	282	1	1	1	0	0	0	2	286
South Bay	837	1	1	2	0	0	0	856	33	3	6	9	0	0	51	870	3	7	11	0	0	0	16	907
Out of Region	51	0	0	1	0	0	0	53	0	0	1	1	0	0	2	51	1	1	2	0	0	0	1	55
Total	2,489	5	8	12	0	0	0	2,553	139	10	19	30	0	0	198	2,628	16	27	42	0	0	0	39	2,752

BASKETBALL GAME SUMMARY
WEEKDAY: 9 PM TO 11 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND LATE PM PEAK HOUR BETWEEN 9 AND 11 PM

SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										Late PM Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	20,398	2,024	1,256	1,961	0	0	4,997	30,636	52%		7,126	12	50	79	0	0	13	7,280	55%	34.9%	0.6%	4.0%	4.0%	0.0%	0.0%	0.3%	23.8%
Transit	13,865	582	559	873	0	0	3,748	19,627	34%		4,527	9	45	70	0	0	29	4,680	35%	32.6%	1.5%	8.1%	8.1%	0.0%	0.0%	0.8%	23.8%
Taxi/Coach (Event)	1,277							1,277	2%		426							426	3%	33.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.4%
Bike (Event)	725							725	1%		242							242	2%	33.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.4%
Walk	1,613	701	373	581	0	0	1,477	4,745	8%		453	4	15	23	0	0	4	499	4%	28.1%	0.6%	4.0%	4.0%	0.0%	0.0%	0.2%	10.5%
Other	249	68	188	293	0	0	728	1,526	3%		70	1	7	11	0	0	2	91	1%	28.1%	1.0%	3.9%	3.9%	0.0%	0.0%	0.2%	6.0%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%		12,845	26	118	184	0	0	47	13,218	100%	33.7%	0.8%	5.0%	5.0%	0.0%	0.0%	0.4%	22.6%
	65%	6%	4%	6%	0%	0%	19%	100%			97%	0%	1%	1%	0%	0%	0%	100%									
Vehicle Trips	8,589	1,092	573	895	0	0	2,542	13,691			2,932	7	27	42	0	0	10	3,018		34.1%	0.7%	4.7%	4.7%	0.0%	0.0%	0.4%	22.0%
	63%	8%	4%	7%	0%	0%	19%	100%			97%	0%	1%	1%	0%	0%	0%	100%									
Avg. veh. occupancy	2.52	1.85	2.19	2.19	0.00	0.00	1.97	2.33			2.58	1.69	1.88	1.88	0.00	0.00	1.30	2.55									

Weekday Distribution	Total Daily Person-trips	Late PM Peak Hour Person-Trips								Late PM Peak Hour Transit-Trips								Late PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.		
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	7,006	1,418	2	12	19	0	0	4	1,455	667	1	4	7	0	0	2	681	211	0	2	3	0	0	0	0	217	7%	2.25
Superdistrict 2	4,148	455	2	14	22	0	0	5	498	141	1	5	7	0	0	3	157	95	1	4	6	0	0	0	1	106	4%	2.30
Superdistrict 3	10,602	570	11	40	63	0	0	10	695	129	2	12	19	0	0	5	167	113	3	7	11	0	0	2	136	4%	2.39	
Superdistrict 4	2,928	433	2	8	13	0	0	3	460	95	1	3	5	0	0	2	107	126	1	2	3	0	0	0	1	133	4%	2.45
East Bay	14,730	4,228	4	21	32	0	0	13	4,298	1,851	3	13	21	0	0	10	1,898	887	1	3	5	0	0	2	898	30%	2.57	
North Bay	4,393	1,651	1	3	4	0	0	2	1,660	456	0	1	2	0	0	1	460	443	0	1	1	0	0	0	1	446	15%	2.69
South Bay	12,587	3,578	4	16	25	0	0	9	3,632	948	1	5	8	0	0	4	967	1,001	2	7	11	0	0	4	1,024	34%	2.55	
Out of Region	2,143	511	1	3	5	0	0	1	521	240	0	1	2	0	0	1	244	56	0	1	2	0	0	0	59	2%	3.62	
Total	58,538	12,845	26	118	184	0	0	47	13,218	4,527	9	45	70	0	0	29	4,680	2,932	7	27	42	0	0	10	3,018	100%	2.55	

Assumptions for Late PM Peak Hour bet. 9 PM & 11 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	45%	0%	0%
Outbound	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	55%	100%	100%

Late PM Peak Hour bet. 9 PM & 11 PM	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	0	0	0	0	0	0	0	0	12,845	26	118	184	0	0	47	13,218	12,845	26	118	184	0	0	47	13,218
Transit Trips	0	0	0	0	0	0	0	0	4,527	9	45	70	0	0	29	4,680	4,527	9	45	70	0	0	29	4,680
Vehicle Trips	134	0	0	0	0	0	0	134	2,797	7	27	42	0	0	10	2,883	2,932	7	27	42	0	0	10	3,018
	5%	0%	0%	0%	0%	0%	0%	4%	95%	100%	100%	100%	0%	0%	100%	96%								

Late PM Peak Hour bet. 9 PM & 11 PM Auto Trips	Inbound								Outbound								Total								Taxi + Coach Arena	
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	0	0	0	0	0	0	0	0	385	0	4	5	0	0	0	395	385	0	4	5	0	0	0	0	395	91
Superdistrict 2	0	0	0	0	0	0	0	0	198	1	7	11	0	0	1	219	198	1	7	11	0	0	0	1	219	26
Superdistrict 3	0	0	0	0	0	0	0	0	263	6	15	23	0	0	2	309	263	6	15	23	0	0	2	309	16	
Superdistrict 4	0	0	0	0	0	0	0	0	287	1	4	7	0	0	1	299	287	1	4	7	0	0	0	1	299	25
East Bay	0	0	0	0	0	0	0	0	2,180	1	7	11	0	0	3	2,201	2,180	1	7	11	0	0	3	2,201	103	
North Bay	0	0	0	0	0	0	0	0	1,194	0	1	2	0	0	1	1,199	1,194	0	1	2	0	0	0	1	1,199	0
South Bay	0	0	0	0	0	0	0	0	2,474	2	11	16	0	0	4	2,507	2,474	2	11	16	0	0	4	2,507	102	
Out of Region	0	0	0	0	0	0	0	0	145	0	2	3	0	0	0	150	145	0	2	3	0	0	0	0	150	63
Total	0	0	0	0	0	0	0	0	7,126	12	50	79	0	0	13	7,280	7,126	12	50	79	0	0	13	7,280	426	

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND LATE PM PEAK HOUR BETWEEN 9 AND 11 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Late PM Peak Hour bet. 9 PM & 11 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	667	1	4	7	0	0	2	681	667	1	4	7	0	0	2	681
Superdistrict 2	0	0	0	0	0	0	0	0	141	1	5	7	0	0	3	157	141	1	5	7	0	0	3	157
Superdistrict 3	0	0	0	0	0	0	0	0	129	2	12	19	0	0	5	167	129	2	12	19	0	0	5	167
Superdistrict 4	0	0	0	0	0	0	0	0	95	1	3	5	0	0	2	107	95	1	3	5	0	0	2	107
East Bay	0	0	0	0	0	0	0	0	1,851	3	13	21	0	0	10	1,898	1,851	3	13	21	0	0	10	1,898
North Bay	0	0	0	0	0	0	0	0	456	0	1	2	0	0	1	460	456	0	1	2	0	0	1	460
South Bay	0	0	0	0	0	0	0	0	948	1	5	8	0	0	4	967	948	1	5	8	0	0	4	967
Out of Region	0	0	0	0	0	0	0	0	240	0	1	2	0	0	1	244	240	0	1	2	0	0	1	244
Total	0	0	0	0	0	0	0	0	4,527	9	45	70	0	0	29	4,680	4,527	9	45	70	0	0	29	4,680

Late PM Peak Hour bet. 9 PM & 11 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	55	55	0	0	0	0	0	0	55
Superdistrict 2	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	16	16	0	0	0	0	0	0	16
Superdistrict 3	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	9	9	0	0	0	0	0	0	9
Superdistrict 4	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	15	15	0	0	0	0	0	0	15
East Bay	0	0	0	0	0	0	0	0	93	0	0	0	0	0	0	93	93	0	0	0	0	0	0	93
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	55	55	0	0	0	0	0	0	55
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	242	0	0	0	0	0	0	242	242	0	0	0	0	0	0	242

Late PM Peak Hour bet. 9 PM & 11 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	311	0	5	7	0	0	1	324	311	0	5	7	0	0	1	324
Superdistrict 2	0	0	0	0	0	0	0	0	100	0	2	3	0	0	1	107	100	0	2	3	0	0	1	107
Superdistrict 3	0	0	0	0	0	0	0	0	168	3	13	21	0	0	3	209	168	3	13	21	0	0	3	209
Superdistrict 4	0	0	0	0	0	0	0	0	36	0	1	1	0	0	0	39	36	0	1	1	0	0	0	39
East Bay	0	0	0	0	0	0	0	0	104	0	0	1	0	0	0	106	104	0	0	1	0	0	0	106
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	102	102	0	0	0	0	0	0	102
Out of Region	0	0	0	0	0	0	0	0	127	0	0	0	0	0	0	127	127	0	0	0	0	0	0	127
Total	0	0	0	0	0	0	0	0	949	5	22	35	0	0	5	1,016	949	5	22	35	0	0	5	1,016

Late PM Peak Hour bet. 9 PM & 11 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	1,418	2	12	19	0	0	4	1,455	1,418	2	12	19	0	0	4	1,455
Superdistrict 2	0	0	0	0	0	0	0	0	455	2	14	22	0	0	5	498	455	2	14	22	0	0	5	498
Superdistrict 3	0	0	0	0	0	0	0	0	570	11	40	63	0	0	10	695	570	11	40	63	0	0	10	695
Superdistrict 4	0	0	0	0	0	0	0	0	433	2	8	13	0	0	3	460	433	2	8	13	0	0	3	460
East Bay	0	0	0	0	0	0	0	0	4,228	4	21	32	0	0	13	4,298	4,228	4	21	32	0	0	13	4,298
North Bay	0	0	0	0	0	0	0	0	1,651	1	3	4	0	0	2	1,660	1,651	1	3	4	0	0	2	1,660
South Bay	0	0	0	0	0	0	0	0	3,578	4	16	25	0	0	9	3,632	3,578	4	16	25	0	0	9	3,632
Out of Region	0	0	0	0	0	0	0	0	511	1	3	5	0	0	1	521	511	1	3	5	0	0	1	521
Total	0	0	0	0	0	0	0	0	12,845	26	118	184	0	0	47	13,218	12,845	26	118	184	0	0	47	13,218

Late PM Peak Hour bet. 9 PM & 11 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	34	0	0	0	0	0	0	34	177	0	2	3	0	0	0	183	211	0	2	3	0	0	0	217
Superdistrict 2	10	0	0	0	0	0	0	10	85	1	4	6	0	0	1	97	95	1	4	6	0	0	1	106
Superdistrict 3	6	0	0	0	0	0	0	6	107	3	7	11	0	0	2	130	113	3	7	11	0	0	2	136
Superdistrict 4	9	0	0	0	0	0	0	9	117	1	2	3	0	0	1	123	126	1	2	3	0	0	1	133
East Bay	38	0	0	0	0	0	0	38	848	1	3	5	0	0	2	859	887	1	3	5	0	0	2	898
North Bay	0	0	0	0	0	0	0	0	443	0	1	1	0	0	1	446	443	0	1	1	0	0	1	446
South Bay	38	0	0	0	0	0	0	38	964	2	7	11	0	0	4	987	1,001	2	7	11	0	0	4	1,024
Out of Region	0	0	0	0	0	0	0	0	56	0	1	2	0	0	0	59	56	0	1	2	0	0	0	59
Total	134	0	0	0	0	0	0	134	2,797	7	27	42	0	0	10	2,883	2,932	7	27	42	0	0	10	3,018

BASKETBALL GAME SUMMARY
SATURDAY: 7 PM TO 9 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips									Evening Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	22,217	2,368	1,565	2,442	0	0	660	29,252	56%	7,045	18	74	116	0	0	7	7,261	59%	31.7%	0.8%	4.8%	4.8%	0.0%	0.0%	1.1%	24.8%
Transit	13,879	681	697	1,087	0	0	1,507	17,851	34%	4,110	13	66	104	0	0	17	4,310	35%	29.6%	2.0%	9.5%	9.5%	0.0%	0.0%	1.1%	24.1%
Taxi/Coach (Event)	434							434	1%	141							141	1%	32.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.5%
Bike (Event)	542							542	1%	176							176	1%	32.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.5%
Walk	880	821	464	724	0	0	192	3,081	6%	235	6	22	34	0	0	2	299	2%	26.7%	0.7%	4.7%	4.7%	0.0%	0.0%	1.1%	9.7%
Other	177	80	234	365	0	0	83	939	2%	35	1	11	17	0	0	1	65	1%	19.9%	1.2%	4.6%	4.6%	0.0%	0.0%	1.1%	6.9%
Total	38,128	3,950	2,959	4,618	0	0	2,442	52,098	100%	11,742	39	174	271	0	0	27	12,252	100%	30.8%	1.0%	5.9%	5.9%	0.0%	0.0%	1.1%	23.5%
Vehicle Trips	8,715	1,278	714	1,114	0	0	509	12,331		2,697	11	40	62	0	0	6	2,815		30.9%	0.8%	5.6%	5.6%	0.0%	0.0%	1.1%	22.8%
<i>Avg. veh. occupancy</i>	<i>2.60</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.30</i>	<i>2.41</i>		<i>2.66</i>	<i>1.69</i>	<i>1.88</i>	<i>1.88</i>	<i>0.00</i>	<i>0.00</i>	<i>1.30</i>	<i>2.63</i>									

Saturday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips								Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.		
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	5,537	1,302	3	18	29	0	0	2	1,354	679	1	6	10	0	0	1	698	184	0	3	4	0	0	0	0	191	7%	2.50
Superdistrict 2	3,068	404	4	21	33	0	0	3	464	130	1	7	11	0	0	2	151	86	1	6	9	0	0	0	0	103	4%	2.46
Superdistrict 3	7,883	488	17	59	92	0	0	6	662	111	3	18	28	0	0	3	163	111	4	10	16	0	0	1	143	5%	2.52	
Superdistrict 4	2,265	389	2	12	19	0	0	2	425	80	1	5	7	0	0	1	94	111	1	3	5	0	0	0	120	4%	2.58	
East Bay	14,220	3,875	5	30	47	0	0	7	3,966	1,638	4	20	31	0	0	6	1,698	816	1	5	8	0	0	0	1	831	30%	2.65
North Bay	5,036	1,526	1	4	6	0	0	1	1,538	395	0	1	2	0	0	0	399	419	0	1	2	0	0	0	422	15%	2.69	
South Bay	12,123	3,288	5	23	37	0	0	5	3,358	830	2	8	12	0	0	3	854	908	2	10	16	0	0	2	938	33%	2.63	
Out of Region	1,966	470	1	5	8	0	0	1	484	247	0	2	3	0	0	0	253	61	0	2	2	0	0	0	66	2%	2.96	
Total	52,098	11,742	39	174	271	0	0	27	12,252	4,110	13	66	104	0	0	17	4,310	2,697	11	40	62	0	0	6	2,815	100%	2.63	

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound									Outbound									Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Total Person Trips	11,742	11	47	74	0	0	0	11,873		0	28	126	197	0	0	27	378	11,742	39	174	271	0	0	27	12,252		
Transit Trips	4,110	1	9	14	0	0	0	4,134		0	12	58	90	0	0	17	176	4,110	13	66	104	0	0	17	4,310		
Vehicle Trips	2,653	4	12	18	0	0	0	2,687		43	7	28	44	0	0	6	128	2,697	11	40	62	0	0	6	2,815		
	98%	33%	29%	29%	0%	0%	0%	95%		2%	67%	71%	71%	0%	0%	100%	5%										

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound									Outbound									Total									Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	432	0	2	3	0	0	0	438		0	0	3	5	0	0	0	8	432	1	5	8	0	0	0	0	446	32	
Superdistrict 2	215	1	5	7	0	0	0	227		0	1	6	10	0	0	1	18	215	2	11	17	0	0	0	1	245	9	
Superdistrict 3	288	4	9	14	0	0	0	316		0	5	13	20	0	0	1	38	288	9	22	34	0	0	1	354	6		
Superdistrict 4	285	0	2	3	0	0	0	291		0	1	4	6	0	0	1	12	285	1	6	10	0	0	0	1	303	8	
East Bay	2,141	0	3	5	0	0	0	2,148		0	1	7	11	0	0	1	21	2,141	1	10	16	0	0	0	1	2,170	32	
North Bay	1,132	0	0	1	0	0	0	1,133		0	0	2	3	0	0	0	5	1,132	1	2	3	0	0	0	0	1,138	0	
South Bay	2,389	1	4	6	0	0	0	2,400		0	2	12	18	0	0	3	34	2,389	3	16	24	0	0	3	2,434	31		
Out of Region	164	0	1	2	0	0	0	167		0	0	1	2	0	0	0	4	164	1	3	4	0	0	0	0	171	23	
Total	7,045	7	27	41	0	0	0	7,120		0	11	48	75	0	0	7	141	7,045	18	74	116	0	0	7	7,261	141		

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	679	0	1	2	0	0	0	682	0	1	5	8	0	0	1	15	679	1	6	10	0	0	1	698
Superdistrict 2	130	0	1	1	0	0	0	133	0	1	6	9	0	0	2	18	130	1	7	11	0	0	2	151
Superdistrict 3	111	1	4	7	0	0	0	123	0	3	13	21	0	0	3	40	111	3	18	28	0	0	3	163
Superdistrict 4	80	0	1	1	0	0	0	81	0	1	4	7	0	0	1	13	80	1	5	7	0	0	1	94
East Bay	1,638	0	1	2	0	0	0	1,641	0	4	18	29	0	0	6	57	1,638	4	20	31	0	0	6	1,698
North Bay	395	0	0	0	0	0	0	395	0	0	1	2	0	0	4	395	0	1	2	0	0	0	399	
South Bay	830	0	0	0	0	0	0	831	0	2	8	12	0	0	3	23	830	2	8	12	0	0	3	854
Out of Region	247	0	0	0	0	0	0	248	0	0	2	3	0	0	5	247	0	2	3	0	0	0	0	253
Total	4,110	1	9	14	0	0	0	4,134	0	12	58	90	0	0	17	176	4,110	13	66	104	0	0	17	4,310

Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	43							43	0						0	43	0	0	0	0	0	0	0	43
Superdistrict 2	12							12	0						0	12	0	0	0	0	0	0	0	12
Superdistrict 3	8							8	0						0	8	0	0	0	0	0	0	0	8
Superdistrict 4	11							11	0						0	11	0	0	0	0	0	0	0	11
East Bay	65							65	0						0	65	0	0	0	0	0	0	0	65
North Bay	0							0	0						0	0	0	0	0	0	0	0	0	0
South Bay	38							38	0						0	38	0	0	0	0	0	0	0	38
Out of Region	0							0	0						0	0	0	0	0	0	0	0	0	0
Total	176	0	0	0	0	0	0	176	0	0	0	0	0	0	0	176	0	0	0	0	0	0	0	176

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	148	0	3	4	0	0	0	156	0	0	4	7	0	0	1	12	148	1	7	11	0	0	1	167
Superdistrict 2	47	0	1	2	0	0	0	50	0	0	2	3	0	0	0	6	47	1	3	5	0	0	0	56
Superdistrict 3	81	2	7	11	0	0	0	102	0	3	12	19	0	0	2	37	81	5	20	31	0	0	2	138
Superdistrict 4	13	0	1	1	0	0	0	15	0	0	1	1	0	0	0	2	13	0	1	2	0	0	0	17
East Bay	32	0	0	0	0	0	0	32	0	0	1	1	0	0	2	32	0	1	1	0	0	0	34	
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	31	0	0	0	0	0	0	31	0	0	0	0	0	0	1	31	0	0	0	0	0	0	0	32
Out of Region	59	0	0	0	0	0	0	59	0	0	0	0	0	0	1	59	0	0	0	0	0	0	0	60
Total	411	3	12	19	0	0	0	444	0	5	21	32	0	0	3	61	411	7	33	51	0	0	3	505

Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	1,302	1	6	10	0	0	0	1,319	0	2	12	19	0	0	2	35	1,302	3	18	29	0	0	2	1,354
Superdistrict 2	404	1	7	10	0	0	0	422	0	3	14	23	0	0	3	42	404	4	21	33	0	0	3	464
Superdistrict 3	488	6	21	33	0	0	0	548	0	10	38	60	0	0	6	115	488	17	59	92	0	0	6	662
Superdistrict 4	389	1	3	5	0	0	0	398	0	2	9	14	0	0	2	27	389	2	12	19	0	0	2	425
East Bay	3,875	0	4	7	0	0	0	3,886	0	5	26	41	0	0	7	80	3,875	5	30	47	0	0	7	3,966
North Bay	1,526	0	0	1	0	0	0	1,528	0	1	3	5	0	0	1	10	1,526	1	4	6	0	0	1	1,538
South Bay	3,288	1	4	7	0	0	0	3,300	0	4	19	30	0	0	5	59	3,288	5	23	37	0	0	5	3,358
Out of Region	470	1	1	2	0	0	0	474	0	1	3	5	0	0	1	10	470	1	5	8	0	0	1	484
Total	11,742	11	47	74	0	0	0	11,873	0	28	126	197	0	0	27	378	11,742	39	174	271	0	0	27	12,252

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	172	0	1	2	0	0	0	175	12	0	2	3	0	0	17	184	0	3	4	0	0	0	0	191
Superdistrict 2	83	0	2	4	0	0	0	89	3	1	4	6	0	0	14	86	1	6	9	0	0	0	0	103
Superdistrict 3	109	2	4	6	0	0	0	120	2	3	7	10	0	0	1	22	111	4	10	16	0	0	1	143
Superdistrict 4	109	0	1	1	0	0	0	111	3	1	2	3	0	0	9	111	1	3	5	0	0	0	0	120
East Bay	805	0	1	2	0	0	0	808	12	1	4	6	0	0	1	23	816	1	5	8	0	0	1	831
North Bay	419	0	0	0	0	0	0	419	0	0	1	1	0	0	3	419	0	1	2	0	0	0	0	422
South Bay	896	0	2	3	0	0	0	901	11	2	8	13	0	0	2	37	908	2	10	16	0	0	2	938
Out of Region	61	0	1	1	0	0	0	63	0	0	1	1	0	0	3	61	0	2	2	0	0	0	0	66
Total	2,653	4	12	18	0	0	0	2,687	43	7	28	44	0	0	6	128	2,697	11	40	62	0	0	6	2,815

CONVENTION EVENT SUMMARY
WEEKDAY: 4 PM TO 6 PM PERIOD PEAK HOUR

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH CONVENTION EVENT

Land Use	Intensity
Arena	9,000 attendees 675 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips									PM Peak Hour Trips						Percent of Daily during PM Peak Hour										
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	5,862	2,024	1,256	1,961	0	0	4,997	16,100	33%	633	182	170	265	0	0	298	1,547	30%	10.8%	9.0%	13.5%	13.5%	0.0%	0.0%	6.0%	9.6%
Transit	7,252	582	559	873	0	0	3,748	13,014	27%	772	52	75	118	0	0	506	1,524	29%	10.6%	9.0%	13.5%	13.5%	0.0%	0.0%	13.5%	11.7%
Taxi/Shuttle (Event)	13,491							13,491	27%	1,484							1,484	29%	11.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.0%
Walk	672	701	373	581	0	0	1,477	3,805	8%	71	63	50	78	0	0	87	350	7%	10.5%	9.0%	13.5%	13.5%	0.0%	0.0%	5.9%	9.2%
Other	1,411	68	188	293	0	0	728	2,688	5%	154	6	25	40	0	0	40	265	5%	10.9%	9.0%	13.5%	13.5%	0.0%	0.0%	5.5%	9.8%
Total	28,688	3,375	2,376	3,708	0	0	10,951	49,097	100%	3,113	304	321	501	0	0	931	5,169	100%	10.9%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	10.5%
Avg. veh. occupancy	4.94	1.85	2.19	2.19	0.00	0.00	1.97	3.26		5.01	1.85	2.19	2.19	0.00	0.00	1.49	3.30									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips									PM Peak Hour Transit-Trips						PM Peak Hour Vehicle-Trips						Avg. Veh. Occ.					
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX		XX	Office	Total		
Superdistrict 1	17,161	1,645	19	40	62	0	0	80	1,846	396	6	9	14	0	0	42	467	130	4	7	11	0	0	0	9	161	18%	8.10
Superdistrict 2	4,019	163	28	43	68	0	0	99	400	20	6	8	13	0	0	53	99	18	10	15	23	0	0	0	21	87	9%	3.00
Superdistrict 3	10,133	180	172	133	208	0	0	242	936	28	19	31	48	0	0	101	228	13	50	24	37	0	0	0	40	165	18%	2.40
Superdistrict 4	2,862	159	16	23	35	0	0	68	301	27	3	5	8	0	0	38	81	17	7	6	9	0	0	0	15	54	6%	3.77
East Bay	5,084	263	17	36	55	0	0	228	599	168	8	15	24	0	0	171	387	38	5	8	12	0	0	0	30	93	10%	2.18
North Bay	1,095	79	7	4	6	0	0	29	125	3	1	1	1	0	0	14	19	37	4	1	1	0	0	0	9	51	6%	2.04
South Bay	5,354	324	31	32	51	0	0	161	599	50	5	4	7	0	0	73	139	126	13	14	21	0	0	0	71	245	27%	1.86
Out of Region	3,390	301	14	9	15	0	0	24	363	80	3	2	4	0	0	15	104	43	5	4	6	0	0	0	5	62	7%	1.67
Total	49,097	3,113	304	321	501	0	0	931	5,169	772	52	75	118	0	0	506	1,524	423	98	77	121	0	0	200	919	100%	3.30	

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	50%	10%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	50%	90%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound									Outbound						Total									
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	369	135	143	222	0	0	79	948		2,745	169	178	278	0	0	852	4,221	3,113	304	321	501	0	0	931	5,169
Transit Trips	113	16	27	42	0	0	15	212		659	37	49	76	0	0	492	1,312	772	52	75	118	0	0	506	1,524
Vehicle Trips	102	46	35	55	0	0	19	256		321	53	42	66	0	0	180	663	423	98	77	121	0	0	200	919
	24%	46%	45%	45%	0%	0%	10%	28%		76%	54%	55%	55%	0%	0%	90%	72%								

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound									Outbound						Total						Taxi + Shuttle Arena				
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.		XX	XX	Office	Total
Superdistrict 1	8	4	7	10	0	0	4	32		64	4	7	11	0	0	11	97	72	8	14	21	0	0	15	129	1,174
Superdistrict 2	3	8	14	21	0	0	8	53		12	8	14	23	0	0	24	81	15	16	28	44	0	0	32	134	126
Superdistrict 3	4	50	27	43	0	0	15	139		9	51	29	45	0	0	50	184	13	101	56	88	0	0	65	323	71
Superdistrict 4	3	6	7	10	0	0	4	30		16	6	8	12	0	0	21	63	19	12	14	22	0	0	25	93	112
East Bay	13	3	9	14	0	0	5	43		81	5	11	17	0	0	48	161	93	8	20	30	0	0	53	204	0
North Bay	9	2	1	2	0	0	1	15		68	3	2	3	0	0	13	89	76	5	3	5	0	0	14	104	0
South Bay	33	10	12	19	0	0	7	81		241	14	16	24	0	0	80	374	274	24	28	43	0	0	87	455	0
Out of Region	7	4	3	5	0	0	2	21		64	4	3	5	0	0	6	83	72	8	6	10	0	0	8	104	0
Total	79	87	80	125	0	0	44	415		555	96	90	140	0	0	253	1,133	633	182	170	265	0	0	298	1,547	1,484

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH CONVENTION EVENT

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	42	2	4	6	0	0	2	56	354	4	5	8	0	0	40	411	396	6	9	14	0	0	42	467
Superdistrict 2	6	2	3	5	0	0	2	17	14	4	5	8	0	0	51	82	20	6	8	13	0	0	53	99
Superdistrict 3	9	8	13	21	0	0	7	59	19	12	17	27	0	0	94	169	28	19	31	48	0	0	101	228
Superdistrict 4	5	1	2	3	0	0	1	11	22	2	3	5	0	0	37	70	27	3	5	8	0	0	38	81
East Bay	29	1	4	6	0	0	2	42	139	8	12	18	0	0	169	346	168	8	15	24	0	0	171	387
North Bay	1	0	0	0	0	0	0	2	1	1	1	1	0	0	14	18	3	1	1	1	0	0	14	19
South Bay	10	1	0	1	0	0	0	13	40	4	4	6	0	0	72	126	50	5	4	7	0	0	73	139
Out of Region	9	1	1	1	0	0	1	13	71	2	2	2	0	0	14	91	80	3	2	4	0	0	15	104
Total	113	16	27	42	0	0	15	212	659	37	49	76	0	0	492	1,312	772	52	75	118	0	0	506	1,524

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	119	2	8	13	0	0	5	147	1,058	3	9	14	0	0	19	1,103	1,177	5	17	27	0	0	24	1,250
Superdistrict 2	14	3	3	5	0	0	2	27	115	3	4	6	0	0	12	140	128	6	7	11	0	0	14	167
Superdistrict 3	18	25	22	34	0	0	12	111	122	27	24	38	0	0	63	275	140	52	46	72	0	0	76	385
Superdistrict 4	12	0	2	3	0	0	1	17	101	1	2	3	0	0	4	110	113	1	3	5	0	0	5	127
East Bay	0	1	0	0	0	0	0	2	0	1	0	1	0	0	4	7	1	1	1	1	0	0	4	8
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	2
South Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	3	0	1	1	1	0	0	1	4
Out of Region	15	2	0	0	0	0	0	17	134	2	0	0	0	0	1	138	149	3	1	1	0	0	1	155
Total	177	33	36	56	0	0	20	322	1,531	37	40	62	0	0	107	1,777	1,708	69	76	118	0	0	127	2,098

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	169	8	19	29	0	0	10	235	1,476	11	21	33	0	0	70	1,611	1,645	19	40	62	0	0	80	1,846
Superdistrict 2	22	12	20	31	0	0	11	96	141	15	23	37	0	0	87	304	163	28	43	68	0	0	99	400
Superdistrict 3	31	82	63	98	0	0	35	309	150	90	71	110	0	0	207	628	180	172	133	208	0	0	242	936
Superdistrict 4	20	7	10	16	0	0	6	58	139	9	13	20	0	0	62	243	159	16	23	35	0	0	68	301
East Bay	42	4	13	20	0	0	7	86	220	13	23	35	0	0	221	513	263	17	36	55	0	0	228	599
North Bay	10	3	1	2	0	0	1	17	69	4	3	4	0	0	28	108	79	7	4	6	0	0	29	125
South Bay	43	12	13	20	0	0	7	95	281	19	20	31	0	0	154	503	324	31	32	51	0	0	161	599
Out of Region	31	7	4	7	0	0	2	52	269	8	5	8	0	0	22	312	301	14	9	15	0	0	24	363
Total	369	135	143	222	0	0	79	948	2,745	169	178	278	0	0	852	4,221	3,113	304	321	501	0	0	931	5,169

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	51	2	3	5	0	0	2	63	79	2	4	6	0	0	8	98	130	4	7	11	0	0	9	161
Superdistrict 2	7	5	7	11	0	0	4	33	12	6	8	12	0	0	17	53	18	10	15	23	0	0	21	87
Superdistrict 3	6	24	11	18	0	0	6	65	8	26	13	20	0	0	34	99	13	50	24	37	0	0	40	165
Superdistrict 4	6	3	3	4	0	0	1	18	11	4	3	5	0	0	13	37	17	7	6	9	0	0	15	54
East Bay	6	2	3	5	0	0	2	18	32	3	5	7	0	0	29	75	38	5	8	12	0	0	30	93
North Bay	4	2	0	0	0	0	0	7	32	2	1	1	0	0	9	44	37	4	1	1	0	0	9	51
South Bay	17	5	5	8	0	0	3	39	109	8	8	13	0	0	68	206	126	13	14	21	0	0	71	245
Out of Region	4	2	2	3	0	0	1	13	38	2	2	3	0	0	4	50	43	5	4	6	0	0	5	62
Total	102	46	35	55	0	0	19	256	321	53	42	66	0	0	180	663	423	98	77	121	0	0	200	919

INDIVIDUAL LAND USE TRAVEL DEMAND CALCULATIONS

A-50

A-51

TR-67

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: ARENA - NO EVENT (WORK TRIPS)

Proposed Size: 105 employees					WEEKDAY/SATURDAY		WEEKDAY		WEEKDAY		SATURDAY			
Origins	Distribution [f]	Mode	Percent [f]	Avg. Vehicle Occupancy [e]	All Day		4-6 PM Peak Hour		7-9 PM Peak Hour		9-11 PM Peak Hour		7-9 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	7.7%	Auto	12.4%	1.30	3	2	0	0	0	0	0	0	0	0
		Transit	63.0%		13	0	1	0	0	0	0	0	0	0
		Walk	21.4%		4	0	0	0	0	0	0	0	0	0
		Other	3.1%		1	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		20	2	2	0	0	0	0	0	0	0
Superdistrict 2	9.9%	Auto	21.8%	1.26	6	4	0	0	0	0	0	0	0	0
		Transit	64.6%		17	0	1	0	0	0	0	0	0	0
		Walk	10.0%		3	0	0	0	0	0	0	0	0	0
		Other	3.1%		1	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		26	4	2	0	1	0	0	0	0	0
Superdistrict 3	22.3%	Auto	20.0%	1.25	12	9	1	1	0	0	0	0	0	0
		Transit	50.2%		29	0	2	1	0	0	0	0	0	0
		Walk	23.1%		14	0	1	0	0	0	0	0	0	0
		Other	6.7%		4	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		59	9	5	1	1	0	0	0	0	0
Superdistrict 4	7.4%	Auto	31.0%	1.48	6	4	1	0	0	0	0	0	0	0
		Transit	64.0%		12	0	1	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0
		Other	5.0%		1	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		19	4	2	0	0	0	0	0	0	0
East Bay	27.7%	Auto	20.1%	1.61	15	9	1	1	0	0	0	0	0	0
		Transit	78.0%		57	5	5	1	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0
		Other	2.0%		1	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		73	9	6	1	1	0	0	0	0	0
North Bay	3.5%	Auto	44.4%	1.44	4	3	0	0	0	0	0	0	0	0
		Transit	51.1%		5	0	0	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0
		Other	4.4%		0	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		9	3	1	0	0	0	0	0	0	0
South Bay	19.0%	Auto	50.0%	1.13	25	22	2	2	0	0	0	0	0	0
		Transit	49.2%		24	0	2	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0
		Other	0.8%		0	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		50	22	4	2	1	0	0	0	0	0
Out of Region	2.5%	Auto	21.9%	1.56	1	1	0	0	0	0	0	0	0	0
		Transit	71.9%		5	0	0	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0
		Other	6.3%		0	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		7	1	1	0	0	0	0	0	0	0
TOTAL	100.0%	Auto	27.0%	1.30	71	55	6	5	1	1	0	0	0	0
		Transit	61.7%		162	14	3	0	0	0	0	0	0	0
		Walk	7.9%		21	2	0	0	0	0	0	0	0	
		Other	3.4%		9	1	0	1	0	0	0	0	0	
		TOTAL	100.0%		263	55	22	5	5	1	0	0	0	0

[a] No linked-trip factor assumed for arena
 [b] Assumes that 25% of the employees will make four trips to/from the project site (e.g., for lunch, errands, etc.).
 [c] SF Guidelines, Appendix C - Table C-1 (General Office)
 [d] Based on Pushkarev and Zupan, Urban Space for Pedestrians (1978) for general office
 [e] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: ARENA - CONVENTION EVENT (WORK TRIPS)

Proposed Size:		9,000 attendees		plus 675 employees				
DAILY:						Weekday		
Linked Trip Factor [a]:		0%				Peak Hour of		
Overall Person-trip Generation Rate [b]:		3.19		trips/attendee		4-6 PM Period		
Total Person-trips (w/out linked trip factor):		28,688		person-trips				
Percent of Work Trips [c]:		5.9%						
Work Person-trip Generation Rate [d]:		2.50		trips/employee				
Work Trips (w/ linked trip factor):		1,688		person-trips				
PEAK HOUR PERIOD:								
Overall peak hour trips as a % of daily trips:						10.9% [c]		
Overall peak hour person-trip rate (trips/attendee):						0.35		
Total peak hour person-trips (w/ linked trip factor):						3,113		
% Work trips arrive/depart during peak hour:						8.5% [e]		
Peak hour Work Trips (w/ linked trip factor):						143		
WEEKDAY								
Origins	Distribution [g]	Mode	Percent [g]	Avg. Vehicle Occupancy [f]	All Day		4-6 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	7.7%	Auto	12.4%	1.30	16	13	1	1
		Transit	63.0%		82		7	
		Walk	21.4%		28		2	
		Other	3.1%		4		0	
		TOTAL	100.0%		131	13	11	1
Superdistrict 2	9.9%	Auto	21.8%	1.26	36	29	3	2
		Transit	64.6%		108		9	
		Walk	10.6%		18		2	
		Other	3.1%		5		0	
		TOTAL	100.0%		167	29	14	2
Superdistrict 3	22.3%	Auto	20.0%	1.25	75	60	6	5
		Transit	50.2%		189		16	
		Walk	23.1%		87		7	
		Other	6.7%		25		2	
		TOTAL	100.0%		376	60	32	5
Superdistrict 4	7.4%	Auto	31.0%	1.48	39	26	3	2
		Transit	64.0%		80		7	
		Walk	0.0%		0		0	
		Other	5.0%		6		1	
		TOTAL	100.0%		124	26	11	2
East Bay	27.7%	Auto	20.1%	1.61	94	58	8	5
		Transit	78.0%		365		31	
		Walk	0.0%		0		0	
		Other	2.0%		9		1	
		TOTAL	100.0%		468	58	40	5
North Bay	3.5%	Auto	44.4%	1.44	26	18	2	2
		Transit	51.1%		30		3	
		Walk	0.0%		0		0	
		Other	4.4%		3		0	
		TOTAL	100.0%		59	18	5	2
South Bay	19.0%	Auto	50.0%	1.13	160	142	14	12
		Transit	49.2%		157		13	
		Walk	0.0%		0		0	
		Other	0.8%		3		0	
		TOTAL	100.0%		320	142	27	12
Out of Region	2.5%	Auto	21.9%	1.56	9	6	1	1
		Transit	71.9%		30		3	
		Walk	0.0%		0		0	
		Other	6.3%		3		0	
		TOTAL	100.0%		42	6	4	1
TOTAL	100.0%	Auto	27.0%	1.30	456	352	39	30
		Transit	61.7%		1,041		89	
		Walk	7.9%		133		11	
		Other	3.4%		58		5	
		TOTAL	100.0%		1,688	352	143	30

[a] No linked-trip factor assumed for arena
 [b] Calculated by the model by dividing the total number of person-trips by the expected event attendance.
 [c] Calculated by the model
 [d] Assumes that 25% of the employees will make four trips to/from the project site (e.g., for lunch, errands, etc.).
 [e] SF Guidelines, Appendix C - Table C-1 (General Office)
 [f] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

PROJECT TRIP GENERATION
LAND USE: ARENA - CONVENTION EVENT (NON-WORK TRIPS)

Proposed Size:		9,000 attendees		plus 675 employees				
DAILY:						Weekday		
Linked Trip Factor [a]:		0%				Peak Hour of		
Overall Person-trip Generation Rate [b]:		3.19		trips/attendee		4-6 PM Period		
Total Person-trips (w/out linked trip factor):		28,688		person-trips				
Percent of Non-Work Trips [c]:		94.1%						
Non-Work Person-trip Generation Rate [d]:		3.00		trips/attendee				
Non-Work Trips (w/ linked trip factor):		27,000		person-trips				
PEAK HOUR PERIOD:								
Overall peak hour trips as a % of daily trips:						10.9% [c]		
Overall peak hour person-trip rate (trips/attendee):						0.35		
Total peak hour person-trips (w/ linked trip factor):						3,113		
% Non-Work trips arrive/depart during peak hour:						11% [e]		
Peak hour Non-Work Trips (w/ linked trip factor):						2,970		
WEEKDAY								
Origins	Distribution [f]	Mode	Percent [f]	Avg. Vehicle Occupancy [g]	All Day		4-6 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	55.0%	Auto	4.3%	2.03	640	315	70	35
		Transit	23.8%		3,536		389	
		Taxi/Shuttle	71.9%	25.00	10,674	427	1,174	47
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		14,850	742	1,634	82
Superdistrict 2	5.0%	Auto	7.7%	1.97	104	53	11	6
		Transit	7.2%		97			
		Taxi/Shuttle	85.1%	25.00	1,149	46	126	5
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		1,350	99	149	11
Superdistrict 3	5.0%	Auto	4.3%	2.43	58	24	6	3
		Transit	7.9%		107		12	
		Taxi/Shuttle	47.8%	25.00	646	26	71	3
		Walk	40.0%		539		59	
		Other	0.0%		0		0	
		TOTAL	100.0%		1,350	50	149	5
Superdistrict 4	5.0%	Auto	10.5%	2.51	142	57	16	6
		Transit	13.8%		186		20	
		Taxi/Shuttle	75.7%	25.00	1,022	41	112	4
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		1,350	97	149	11
East Bay	7.5%	Auto	38.3%	2.69	777	300	85	33
		Transit	61.7%		1,248		137	
		Taxi/Shuttle	0.0%	25.00	0	0	0	0
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		2,025	300	223	33
North Bay	2.5%	Auto	100.0%	2.11	675	320	74	35
		Transit	0.0%		0		0	
		Taxi/Shuttle	0.0%	25.00	0	0	0	0
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		675	320	74	35
South Bay	10.0%	Auto	87.6%	2.28	2,365	1,037	260	114
		Transit	12.4%		335		37	
		Taxi/Shuttle	0.0%	25.00	0	0	0	0
		Walk	0.0%		0		0	
		Other	0.0%		0		0	
		TOTAL	100.0%		2,700	1,037	297	114
Out of Region	10.0%	Auto	23.9%	1.68	646	384	71	42
		Transit	26.0%		701		77	
		Taxi/Shuttle	0.0%	25.00	0	0	0	0
		Walk	0.0%		0		0	
		Other	50.1%		1,353		149	
		TOTAL	100.0%		2,700	384	297	42
TOTAL	100.0%	Auto	20.0%	2.17	5,406	2,490	585	274
		Transit	23.0%		6,210		683	
		Taxi/Shuttle	50.0%	25.00	13,491	540	1,484	59
		Walk	2.0%		539		59	
		Other	5.0%		1,353		149	
		TOTAL	100.0%		27,000	3,030	2,970	333

[a] No linked-trip factor assumed for arena
 [b] Calculated by the model by dividing the total number of person-trips by the expected event attendance
 [c] Calculated by the model
 [d] Assumes that half of the convention attendees will leave the project site for lunch, shopping, other meetings, etc
 [e] Based on Moscone Center survey data
 [f] Based on Moscone Center data, adjusted for SD3; all walk trips excepts those from SD3 proportionally added to auto and transi
 [g] SF Guidelines, Appendix E - Table E-15 Visitor Trips to SD3 (All Other) for auto trips, shuttle buses/taxis assumed to carry 25 people per vehicle on average

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: OFFICE (WORK TRIPS)
 Proposed Size: 605,000 gsf

DAILY:				PEAK HOUR PERIOD:																
Linked Trip Factor [a]: 0%				Weekday Peak Hour of 4-6 PM [a]: 0%				Weekday Peak Hour of 6-8 PM [a]: 0%				Weekday Peak Hour of 9-11 PM [a]: 0%				Saturday Peak Hour of 7-9 PM [a]: 0%				
Weekday person-trip Generation Rate [b]: 18.1 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 0%				Peak hour trips as a % of daily trips: 8.5% [b]				Peak hour trips as a % of daily trips: 1.7% [d]				Peak hour trips as a % of daily trips: 0.1% [e]				
Total Weekday Person-trips (w/out linked trip factor): 10,951				Total peak hour person-trips rate (trips/1,000 gsf): 1.5				Total peak hour person-trips rate (trips/1,000 gsf): 0.3				Total peak hour person-trips rate (trips/1,000 gsf): 0.1				Total peak hour person-trips rate (trips/1,000 gsf): 0.0				
Weekday Work Trips (w/linked trip factor) [g]: 36%				Saturday person-trip Generation Rate [c]: 4.0 trips/1000 gsf				Percent of Work Trips during peak hour: 83% [g]				Percent of Work Trips during peak hour: 100% [f]				Percent of Work Trips during peak hour: 100% [f]				
Saturday person-trip Generation Rate [c]: 4.0 trips/1000 gsf				Total Saturday Person-trips (w/out linked trip factor): 2,442				Peak hour Work Trips (w/linked trip factor): 773				Peak hour Work Trips (w/linked trip factor): 186				Peak hour Work Trips (w/linked trip factor): 47				
Total Saturday Person-trips (w/out linked trip factor): 2,442				Sat. Non-Work Trips (w/linked trip factor) [h]: 100%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				
Origins	Distribution [j]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY												SATURDAY			
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour					
					Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips				
Superdistrict 1	7.7%	Auto	12.4%	1.30	38	29	7	6	2	1	0	0	24	18	0	0	119	18	0	0
		Transit	63.0%		192	38	38	9	2	0	0	0	41	0	0	0	41	0	0	0
		Walk	21.4%		65	13	3	3	1	0	0	0	6	0	0	0	6	0	0	0
		Other	3.1%		9	2	0	0	0	0	0	0	6	0	0	0	6	0	0	0
		TOTAL	100.0%		305	29	60	6	14	1	4	0	189	18	2	0	189	18	2	0
Superdistrict 2	9.9%	Auto	21.8%	1.26	85	67	17	13	4	3	1	1	53	42	1	0	156	42	2	0
		Transit	64.6%		252	49	49	12	3	0	0	0	26	0	0	0	26	0	0	0
		Walk	10.6%		41	8	2	2	0	0	0	0	7	0	0	0	7	0	0	0
		Other	3.1%		12	2	1	1	0	0	0	0	7	0	0	0	7	0	0	0
		TOTAL	100.0%		390	67	76	13	18	3	5	1	242	42	3	0	242	42	3	0
Superdistrict 3	22.3%	Auto	20.0%	1.25	176	141	34	28	8	7	2	2	109	87	1	1	273	87	3	3
		Transit	50.2%		441	86	86	21	5	0	0	0	126	1	0	0	126	1	0	0
		Walk	23.1%		203	40	10	2	1	0	0	0	36	0	0	0	36	0	0	0
		Other	6.7%		59	11	3	1	0	0	0	0	9	0	0	0	9	0	0	0
		TOTAL	100.0%		879	141	172	28	42	7	10	2	545	87	6	1	545	87	6	1
Superdistrict 4	7.4%	Auto	31.0%	1.48	90	61	18	12	4	3	1	1	56	38	1	0	115	38	1	0
		Transit	64.0%		186	36	9	9	2	0	0	0	0	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	5.0%		14	3	1	0	0	0	0	0	9	0	0	0	9	0	0	0
		TOTAL	100.0%		291	61	57	12	14	3	3	1	180	38	2	0	180	38	2	0
East Bay	27.7%	Auto	20.1%	1.61	219	136	43	27	10	6	3	2	136	84	1	1	328	84	6	6
		Transit	78.0%		852	167	167	40	10	0	0	0	528	6	0	0	528	6	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	2.0%		22	4	1	0	0	0	0	0	13	0	0	0	13	0	0	0
		TOTAL	100.0%		1093	136	214	27	52	6	13	2	677	84	7	1	677	84	7	1
North Bay	3.5%	Auto	44.4%	1.44	62	43	12	8	3	2	1	1	38	27	0	0	44	27	0	0
		Transit	51.1%		71	14	3	3	1	0	0	0	0	0	0	0	0	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	4.4%		6	1	0	0	0	0	0	0	4	0	0	0	4	0	0	0
		TOTAL	100.0%		139	43	27	8	7	2	2	1	86	27	1	0	86	27	1	0
South Bay	19.0%	Auto	50.0%	1.13	374	331	73	65	18	16	4	4	231	205	3	2	463	205	3	2
		Transit	49.2%		367	72	72	17	4	0	0	0	228	3	0	0	228	3	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0.8%		6	1	0	0	0	0	0	0	4	0	0	0	4	0	0	0
		TOTAL	100.0%		747	331	146	65	35	16	9	4	463	205	5	2	463	205	5	2
Out of Region	2.5%	Auto	21.9%	1.56	22	14	4	3	1	1	0	0	13	9	0	0	14	9	0	0
		Transit	71.9%		71	14	3	3	1	0	0	0	44	0	0	0	44	0	0	0
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	6.3%		6	1	0	0	0	0	0	0	4	0	0	0	4	0	0	0
		TOTAL	100.0%		99	14	19	3	5	1	1	0	61	9	1	0	61	9	1	0
TOTAL	100.0%	Auto	27.0%	1.30	1,065	822	209	161	50	39	13	10	660	509	7	6	1,507	509	7	6
		Transit	61.7%		2,433	477	477	115	29	0	0	0	1,507	17	0	0	1,507	17	0	0
		Walk	7.9%		310	61	15	4	4	0	0	0	192	2	0	0	192	2	0	0
		Other	3.4%		134	26	6	2	2	0	0	0	83	1	0	0	83	1	0	0
		TOTAL	100.0%		3,942	822	773	161	186	39	47	10	2,442	509	27	6	2,442	509	27	6

[a] No linked-trip factor assumed for work trips
 [b] SF Guidelines, Appendix C - Table C-1 (General Office Rate)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for General Office Building [LU 710] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m. peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] All weekday and Saturday late p.m. peak hour trips are assumed to be for work purposes
 [g] SF Guidelines, Appendix C - Table C-2 (General Office)
 [h] All Saturday daily and p.m. peak hour trips are assumed to be for work purposes
 [i] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

PROJECT TRIP GENERATION
LAND USE: OFFICE (NON-WORK TRIPS)
 Proposed Size: 605,000 gsf

DAILY:				PEAK HOUR PERIOD:																
Linked Trip Factor [a]: 0%				Weekday Peak Hour of 4-6 PM [a]: 0%				Weekday Peak Hour of 6-8 PM [a]: 0%				Weekday Peak Hour of 9-11 PM [a]: 0%				Saturday Peak Hour of 7-9 PM [a]: 0%				
Weekday person-trip Generation Rate [b]: 18.1 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 0%				Peak hour trips as a % of daily trips: 8.5% [b]				Peak hour trips as a % of daily trips: 1.7% [d]				Peak hour trips as a % of daily trips: 0.1% [e]				
Total Weekday Person-trips (w/out linked trip factor): 10,951				Total peak hour person-trips rate (trips/1,000 gsf): 1.5				Total peak hour person-trips rate (trips/1,000 gsf): 0.3				Total peak hour person-trips rate (trips/1,000 gsf): 0.1				Total peak hour person-trips rate (trips/1,000 gsf): 0.0				
Weekday Work Trips (w/linked trip factor) [g]: 64%				Saturday person-trip Generation Rate [c]: 4.0 trips/1000 gsf				Percent of Non-Work Trips during peak hour: 17% [g]				Percent of Non-Work Trips during peak hour: 0% [f]				Percent of Non-Work Trips during peak hour: 0% [f]				
Saturday person-trip Generation Rate [c]: 4.0 trips/1000 gsf				Total Saturday Person-trips (w/out linked trip factor): 2,442				Peak hour Work Trips (w/linked trip factor): 773				Peak hour Work Trips (w/linked trip factor): 186				Peak hour Work Trips (w/linked trip factor): 47				
Total Saturday Person-trips (w/out linked trip factor): 2,442				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				Sat. Non-Work Trips (w/linked trip factor) [h]: 0%				
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY												SATURDAY			
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour					
					Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips				
Superdistrict 1	13.0%	Auto	36.0%	2.03	328	162	7	4	0	0	0	0	0	0	0	0	0	0	0	0
		Transit	19.2%		175	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Walk	33.3%		303	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	11.5%		105	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		911	162	21	4	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	14.0%	Auto	68.6%	1.97	673	342	15	8	0	0	0	0	0	0	0	0	0	0	0	0
		Transit	14.5%		142	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Walk	2.4%		24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	14.5%		142	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TOTAL	100.0%		981	342	22	8	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	44.0%	Auto	43.7%	2.43	1,348	555	30	13	0	0	0	0	0	0	0	0	0	0	0	0
		Transit	21.5%		663	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Walk	25.4%		783	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	9.4%		290	7	0	0												

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: RETAIL (WORK TRIPS)
 Proposed Size: 62,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday				
Linked Trip Factor [a]:				Linked Trip Factor before 6 PM [a]:				Peak Hour of 4-6 PM Period		Peak Hour of 6-8 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period				
Weekday person-trip Generation Rate [b]:				Linked Trip Factor after 6 PM [a]:				Peak Hour of 9-0 PM [b]		Peak Hour of 6-8 PM [d]		Peak Hour of 3-2 PM [d]		Peak Hour of 4-0 PM [e]				
Total Weekday Person-trips (w/out linked trip factor):				Peak hour trips as a % of daily trips:				13.5 [b]		10.1 [d]		4.7 [d]		7.0 [e]				
Weekday Work Trips (w/linked trip factor) [g]:				Total peak hour person-trips (w/linked trip factor):				304		56		26		39				
Saturday person-trip Generation Rate [c]:				Percent of Work Trips during peak hour:				4% [g]		4% [f]		4% [f]		4% [f]				
Total Saturday Person-trips (w/out linked trip factor):				Peak hour Work Trips (w/linked trip factor):				34		25		12		18				
Saturday Work Trips (w/linked trip factor) [h]:																		
Origins	Distribution [j]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY													
					All Day				4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		SATURDAY			
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips		
Superdistrict 1	7.7%	Auto	12.4%	1.30	4	3	0	0	0	0	0	0	4	3	0	0		
		Transit	63.0%		18	2	1	1	0	0	21	7	0	0				
		Walk	21.4%		6	1	0	0	0	0	7	0	0	0				
		Other	3.1%		1	0	0	0	0	0	1	0	0	0				
		TOTAL	100.0%		29	3	3	0	2	0	1	0	34	3	1	0		
Superdistrict 2	9.9%	Auto	21.8%	1.26	8	6	1	1	1	0	0	0	9	7	0	0		
		Transit	64.6%		24	2	2	2	1	28	1	0	0	0				
		Walk	10.6%		4	0	0	0	0	5	0	0	0	0				
		Other	3.1%		1	0	0	0	0	1	0	0	0	0				
		TOTAL	100.0%		37	6	3	1	3	0	1	0	43	7	2	0		
Superdistrict 3	22.3%	Auto	20.0%	1.25	17	13	2	1	1	1	0	20	16	1	1			
		Transit	50.2%		42	4	3	3	1	49	2	2	0	0				
		Walk	23.1%		19	2	1	1	1	23	1	0	0	0				
		Other	6.7%		6	1	0	0	0	7	0	0	0	0				
		TOTAL	100.0%		84	13	8	1	6	1	3	0	98	16	4	1		
Superdistrict 4	7.4%	Auto	31.0%	1.48	9	6	1	1	1	0	0	10	7	0	0			
		Transit	64.0%		18	2	1	1	1	21	1	0	0	0				
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0				
		Other	5.0%		1	0	0	0	0	2	0	0	0	0				
		TOTAL	100.0%		28	6	2	1	2	0	1	0	32	7	1	0		
East Bay	27.7%	Auto	20.1%	1.61	21	13	2	1	1	1	0	24	15	1	1			
		Transit	78.0%		81	7	5	3	95	4	0	0	0	0				
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0				
		Other	2.0%		2	0	0	0	0	2	0	0	0	0				
		TOTAL	100.0%		104	13	9	1	7	1	3	0	122	15	5	1		
North Bay	3.5%	Auto	44.4%	1.44	6	4	1	0	0	0	0	7	5	0	0			
		Transit	51.1%		7	1	0	0	0	8	0	0	0	0				
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0				
		Other	4.4%		1	0	0	0	0	1	0	0	0	0				
		TOTAL	100.0%		13	4	1	0	1	0	0	0	15	5	1	0		
South Bay	19.0%	Auto	50.0%	1.13	36	31	3	3	2	2	1	42	37	2	1			
		Transit	49.2%		35	3	2	1	41	2	2	0	0	0				
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0				
		Other	0.8%		1	0	0	0	1	0	0	0	0	0				
		TOTAL	100.0%		71	31	6	3	5	2	2	1	83	37	3	1		
Out of Region	2.5%	Auto	21.9%	1.56	2	1	0	0	0	0	0	2	2	0	0			
		Transit	71.9%		7	1	0	0	8	0	0	0	0	0				
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0				
		Other	6.3%		1	0	0	0	1	0	0	0	0	0				
		TOTAL	100.0%		9	1	1	0	1	0	0	0	11	2	0	0		
TOTAL	100.0%	Auto	27.0%	1.30	101	78	9	7	7	5	3	119	91	5	4			
		Transit	61.7%		231	21	16	7	271	11	0	0	0	0				
		Walk	7.9%		29	3	2	1	35	1	0	0	0	0				
		Other	3.4%		13	1	1	0	15	1	0	0	0	0				
		TOTAL	100.0%		375	78	34	7	25	5	12	2	439	91	18	4		

[a] No linked-trip factor assumed for work trips
 [b] SF Guidelines, Appendix C - Table C-1 (General Retail)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Shopping Center [LU 820] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m., peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Retail)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [j] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

PROJECT TRIP GENERATION
LAND USE: RETAIL (NON-WORK TRIPS WITH EVENT)
 Proposed Size: 62,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday				
Linked Trip Factor [a]:				Linked Trip Factor before 6 PM [a]:				Peak Hour of 4-6 PM Period		Peak Hour of 6-8 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period				
Weekday person-trip Generation Rate [b]:				Linked Trip Factor after 6 PM [a]:				Peak Hour of 9-0 PM [b]		Peak Hour of 6-8 PM [d]		Peak Hour of 3-2 PM [d]		Peak Hour of 4-0 PM [e]				
Total Weekday Person-trips (w/out linked trip factor):				Peak hour trips as a % of daily trips:				13.5 [b]		10.1 [d]		4.7 [d]		7.0 [e]				
Weekday Work Trips (w/linked trip factor) [g]:				Total peak hour person-trips (w/linked trip factor):				304		56		26		39				
Saturday person-trip Generation Rate [c]:				Percent of Non-Work Trips during peak hour:				96% [g]		96% [f]		96% [f]		96% [f]				
Total Saturday Person-trips (w/out linked trip factor):				Peak hour Non-Work Trips (w/linked trip factor):				34		25		12		18				
Saturday Work Trips (w/linked trip factor) [h]:																		
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY													
					All Day				4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		SATURDAY			
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips		
Superdistrict 1	6.0%	Auto	45.0%	1.76	81	46	7	4	1	0	0	0	0	0	0			
		Transit	29.0%		52	5	1	0	0	0	0	0	0	0				
		Walk	22.0%		40	4	0	0	0	46	0	0	0	0				
		Other	4.0%		7	1	0	0	0	8	0	0	0	0				
		TOTAL	100.0%		180	46	16	4	2	0	1	0	211	54	1	0		
Superdistrict 2	9.0%	Auto	61.8%	1.52	167	110	15	10	2	1	1	195	128	1	1			
		Transit	15.3%		41	4	0	0	0	48	0	0	0	0				
		Walk	19.8%		53	5	1	0	0	63	0	0	0	0				
		Other	3.1%		8	1	0	0	0	10	0	0	0	0				
		TOTAL	100.0%		270	110	24	10	3	1	1	1	316	128	2	1		
Superdistrict 3	61.0%	Auto	60.4%	2.04	1,105	542	99	49	11	5	3	1,294	634	8	4			
		Transit	9.5%		174	16	2	1	203	1	0	0	0					
		Walk	28.7%		525	47	5	2	615	4	0	0	0					
		Other	1.4%		26	2	0	0	30	0	0	0	0					
		TOTAL	100.0%		1,830	542	165	49	19	5	9	3	2,142	634	13	4		
Superdistrict 4	5.0%	Auto	84.7%	1.78	127	71	11	6	1	1	1	149	84	1	1			
		Transit	9.7%		15	1	0	0	0	17	0	0	0					
		Walk	2.8%		4	0	0	0	5	0	0	0	0					
		Other	2.8%		4	0	0	0	5	0	0	0	0					
		TOTAL	100.0%		150	71	14	6	2	1	1	0	176	84	1	1		
East Bay	3.0%	Auto	75.0%	1.77	68	38	6	3	1	0	0	79	45	0	0			
		Transit	12.5%		11	1	0	0	0	13	0	0	0					
		Walk	12.5%		11	1	0	0	0	13	0	0	0					
		Other	0.0%		0	0	0	0	0	0	0	0	0					
		TOTAL	100.0%		90	38	8	3	1	0	0	0	105	45	1	0		
North Bay	2.0%	Auto	87.5%	1.44	53	36	5	3	1	0	0	61	43	0	0			
		Transit	12.5%		8	1	0	0	0	9	0	0	0					
		Walk	0.0%		0	0	0	0	0	0	0	0	0					
		Other	0.0%		0	0	0	0	0	0	0	0	0					
		TOTAL	100.0%		60	36	5	3	1	0	0	0	70	43	0	0		
South Bay	9.0%	Auto	86.4%	1.98	233	118	21	11	2	1	1	273	138	2	1			
		Transit	9.1%		25	2	0	0	0	29	0	0	0					
		Walk	3.2%		9	1	0	0	10	0	0	0						
		Other	1.3%		4	0	0	0	4	0	0	0						
		TOTAL	100.0%		270	118	24	11	3	1	1	1	316	138	2	1		
Out of Region	5.0%	Auto	59.2%	1.69	89	53	8	5	1	1	0	104	61	1	0			
		Transit	16.9%		25	2	0	0	0	30	0	0	0					
		Walk	19.7%		30	3	0	0	35	0	0	0						
		Other	4.2%		6	1	0	0	7	0	0	0						
		TOTAL	100.0%		150	53	14	5	2	1	1	0	176	61	1	0		
TOTAL	100.0%	Auto	64.1%	1.90	1,922	1,014	173	91	19	10	9	2,250	1,187	13	7			
		Transit	11.7%		351	32	4	2	410	2	0	0	0					
		Walk	22.4%		672	60	7	3	786	5	0	0	0					
		Other	1.8%		55	5	1	0	65	0	0	0						
		TOTAL	100.0%		3,000	1,014	270	91	30	10	14	5						

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PROJECT TRIP GENERATION
LAND USE: RETAIL (NON-WORK TRIPS WITHOUT EVENT)
 Proposed Size: 62,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday		
Linked Trip Factor [a]: 33%				Linked Trip Factor before 6 PM [a]: 33%				Peak Hour of 4-6 PM Period		Peak Hour of 6-9 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period		
Weekday person-trip Generation Rate [b]: 150.0 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 33%				9.0% [b]		6.8% [d]		3.2% [d]		4.0% [e]		
Total Weekday Person-trips (w/out linked trip factor): 9,375				Peak hour trips as a % of daily trips:				13.5		10.1		4.7		7.0		
Wday Non-Work Trips (w/ linked trip factor) [g]: 96%				Total peak hour person-trips rate (trips/1,000 gsf):				576		432		202		300		
Saturday person-trip Generation Rate [c]: 175.5 trips/1000 gsf				Percent of Non-Work Trips during peak hour:				96% [g]		96% [f]		96% [f]		96% [f]		
Total Saturday Person-trips (w/out linked trip factor): 10,971				Peak hour Non-Work Trips (w/ linked trip factor):				543		407		190		282		
Sat. Non-Work Trips (w/ linked trip factor) [h]: 96%																
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY								SATURDAY			
					All Day		4-6 PM Peak Hour		6-9 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour	
					Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips
Superdistrict 1	6.0%	Auto	45.0%	1.76	163	93	15	8	11	6	5	3	191	108	8	4
		Transit	29.0%		105	9	7	3	123	5						
		Walk	22.0%		80	7	5	3	93	4						
		Other	4.0%		14	1	1	0	17	1						
		TOTAL	100.0%		362	93	33	8	24	6	11	3	423	108	17	4
Superdistrict 2	9.0%	Auto	61.8%	1.52	335	221	30	20	23	15	11	7	392	258	16	10
		Transit	15.3%		83	7	6	3	97	4						
		Walk	19.8%		107	10	7	3	126	5						
		Other	3.1%		17	2	1	1	20	1						
		TOTAL	100.0%		543	221	49	20	37	15	17	7	635	258	25	10
Superdistrict 3	61.0%	Auto	60.4%	2.04	2,222	1,089	200	98	150	74	70	34	2,600	1,274	104	51
		Transit	9.5%		349	31	24	11	409	16						
		Walk	28.7%		1,056	95	71	33	1,235	49						
		Other	1.4%		51	5	3	2	60	2						
		TOTAL	100.0%		3,678	1,089	331	98	248	74	116	34	4,305	1,274	172	51
Superdistrict 4	5.0%	Auto	84.7%	1.78	255	143	23	13	17	10	8	5	299	168	12	7
		Transit	9.7%		29	3	2	1	34	1						
		Walk	2.8%		8	1	1	0	10	0						
		Other	2.8%		8	1	1	0	10	0						
		TOTAL	100.0%		302	143	27	13	20	10	9	5	353	168	14	7
East Bay	3.0%	Auto	75.0%	1.77	136	77	12	7	9	5	4	2	159	90	6	4
		Transit	12.5%		23	2	2	1	26	1						
		Walk	12.5%		23	2	2	1	26	1						
		Other	0.0%		0	0	0	0	0	0						
		TOTAL	100.0%		181	77	16	7	12	5	6	2	212	90	8	4
North Bay	2.0%	Auto	87.5%	1.44	106	73	9	7	7	5	3	2	123	86	5	3
		Transit	12.5%		15	1	1	0	18	1						
		Walk	0.0%		0	0	0	0	0	0						
		Other	0.0%		0	0	0	0	0	0						
		TOTAL	100.0%		121	73	11	7	8	5	4	2	141	86	6	3
South Bay	9.0%	Auto	86.4%	1.98	469	237	42	21	32	16	15	7	549	277	22	11
		Transit	9.1%		49	4	3	2	58	2						
		Walk	3.2%		17	2	1	1	20	1						
		Other	1.3%		7	1	0	0	8	0						
		TOTAL	100.0%		543	237	49	21	37	16	17	7	635	277	25	11
Out of Region	5.0%	Auto	59.2%	1.69	178	106	16	10	12	7	6	3	209	124	8	5
		Transit	16.9%		51	5	3	2	60	2						
		Walk	19.7%		59	5	4	2	70	3						
		Other	4.2%		13	1	1	0	15	1						
		TOTAL	100.0%		302	106	27	10	20	7	9	3	353	124	14	5
TOTAL	100.0%	Auto	64.1%	1.90	3,864	2,038	348	183	261	138	122	64	4,522	2,385	181	95
		Transit	11.7%		705	63	48	22	825	33						
		Walk	22.4%		1,351	122	91	43	1,580	63						
		Other	1.8%		111	10	7	3	130	5						
		TOTAL	100.0%		6,030	2,038	543	183	407	138	190	64	7,057	2,385	282	95

[a] Assumes that one third of the retail customers are already in the area when there is no event, based on 1998 Mission Bay SEIR
 [b] SF Guidelines, Appendix C - Table C-1 (General Retail)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Shopping Center [LU 820] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m., peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Retail)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [i] SF Guidelines, Appendix E - Table E-14 Visitor Trips to SD3 (Retail)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: SIT-DOWN RESTAURANT (WORK TRIPS)
 Proposed Size: 51,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday						
Linked Trip Factor [a]:				Linked Trip Factor before 6 PM [a]:				Peak Hour of 4-6 PM Period		Peak Hour of 6-8 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period						
Weekday person-trip Generation Rate [b]:				Linked Trip Factor after 6 PM [a]:				13.5% [b]		20.3% [c]		20.3% [d]		24.0% [e]						
Total Weekday Person-trips (w/out linked trip factor):				Peak hour trips as a % of daily trips:				27.0		40.5		40.5		59.6						
Weekday Work Trips (w/linked trip factor) [g]:				Total peak hour person-trips (w/linked trip factor):				501		184		184		271						
Saturday person-trip Generation Rate [c]:				Percent of Work Trips during peak hour:				4% [g]		4% [f]		4% [f]		4% [f]						
Total Saturday Person-trips (w/out linked trip factor):				Peak hour Work Trips (w/linked trip factor):				56		83		83		123						
Saturday Work Trips (w/linked trip factor) [h]:																				
Origins	Distribution [j]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY								SATURDAY							
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour		All Day		7-9 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	7.7%	Auto	12.4%	1.30	4	3	1	0	1	1	1	1	1	1	5	4	1	1		
		Transit	63.0%		20	3	3	4	4	4	4	4	4	25	4	6	6	6		
		Walk	21.4%		7	1	1	1	1	1	1	1	1	9	2	2	2	2		
		Other	3.1%		1	0	0	0	0	0	0	0	0	1	0	0	0	0		
		TOTAL	100.0%		32	3	4	0	6	1	6	1	6	40	4	10	1	1		
Superdistrict 2	9.9%	Auto	21.8%	1.26	9	7	1	1	2	1	2	1	11	9	3	2	2	2		
		Transit	64.6%		26	4	4	5	5	5	5	3	33	8	8	8	8	8		
		Walk	10.6%		4	1	1	1	1	1	1	1	5	1	1	1	1	1		
		Other	3.1%		1	0	0	0	0	0	0	0	2	0	0	0	0	0		
		TOTAL	100.0%		41	7	6	1	8	1	8	1	51	9	12	2	2	2		
Superdistrict 3	22.3%	Auto	20.0%	1.25	18	15	2	2	4	3	4	3	23	18	5	4	4	4		
		Transit	50.2%		46	6	6	9	9	9	9	5	57	14	14	14	14	14		
		Walk	23.1%		21	3	4	4	4	4	4	2	26	6	6	6	6	6		
		Other	6.7%		6	1	1	1	1	1	1	1	8	2	2	2	2	2		
		TOTAL	100.0%		92	15	12	2	19	3	19	3	114	18	27	4	4	4		
Superdistrict 4	7.4%	Auto	31.0%	1.48	9	6	1	1	2	1	2	1	12	8	3	2	2	2		
		Transit	64.0%		19	3	4	4	4	4	4	2	24	6	6	6	6	6		
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other	5.0%		2	0	0	0	0	0	0	0	2	0	0	0	0	0		
		TOTAL	100.0%		30	6	4	1	6	1	6	1	38	8	9	2	2	2		
East Bay	27.7%	Auto	20.1%	1.61	23	14	3	2	5	3	5	3	29	18	7	4	4	4		
		Transit	78.0%		89	12	18	18	18	18	18	11	111	27	27	27	27	27		
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other	2.0%		2	0	0	0	0	0	0	0	3	1	1	1	1	1		
		TOTAL	100.0%		114	14	15	2	23	3	23	3	142	18	34	4	4	4		
North Bay	3.5%	Auto	44.4%	1.44	6	4	1	1	1	1	1	1	8	6	2	1	1	1		
		Transit	51.1%		7	1	2	2	2	2	2	9	9	2	2	2	2	2		
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other	4.4%		1	0	0	0	0	0	0	1	1	0	0	0	0	0		
		TOTAL	100.0%		15	4	2	1	3	1	3	1	18	6	4	1	1	1		
South Bay	19.0%	Auto	50.0%	1.13	39	35	5	5	8	7	8	7	49	43	12	10	10	10		
		Transit	49.2%		38	5	8	8	8	8	8	48	48	11	11	11	11	11		
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other	0.8%		1	0	0	0	0	0	0	1	1	0	0	0	0	0		
		TOTAL	100.0%		78	35	11	5	16	7	16	7	97	43	23	10	10	10		
Out of Region	2.5%	Auto	21.9%	1.56	2	1	0	0	0	0	0	0	3	2	1	0	0	0		
		Transit	71.9%		7	1	2	2	2	2	2	9	9	2	2	2	2	2		
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		Other	6.3%		1	0	0	0	0	0	0	1	1	0	0	0	0	0		
		TOTAL	100.0%		10	1	1	0	2	0	2	0	13	2	3	0	0	0		
TOTAL	100.0%	Auto	27.0%	1.30	111	86	15	12	23	17	23	17	139	107	33	26	26	26		
		Transit	61.7%		254	34	51	51	51	51	51	317	317	76	76	76	76	76		
		Walk	7.9%		32	4	7	7	7	7	7	40	10	10	10	10	10	10		
		Other	3.4%		14	2	3	3	3	3	3	18	4	4	4	4	4	4		
		TOTAL	100.0%		412	86	56	12	83	17	83	17	513	107	123	26	26	26		

[a] No linked-trip factor assumed for work trips
 [b] SF Guidelines, Appendix C - Table C-1 (Quality Sit-Down Restaurant Rate)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Restaurant High Turn-Over [LU 932] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m., peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Eating establishments)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [i] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

PROJECT TRIP GENERATION
LAND USE: SIT-DOWN RESTAURANT (NON-WORK TRIPS WITH EVENT)
 Proposed Size: 51,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday						
Linked Trip Factor [a]:				Linked Trip Factor before 6 PM [a]:				Peak Hour of 4-6 PM Period		Peak Hour of 6-8 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period						
Weekday person-trip Generation Rate [b]:				Linked Trip Factor after 6 PM [a]:				13.5% [b]		20.3% [c]		20.3% [d]		24.0% [e]						
Total Weekday Person-trips (w/out linked trip factor):				Peak hour trips as a % of daily trips:				27.0		40.5		40.5		59.6						
Weekday Work Trips (w/linked trip factor) [g]:				Total peak hour person-trips (w/linked trip factor):				501		184		184		271						
Saturday person-trip Generation Rate [c]:				Percent of Non-Work Trips during peak hour:				4% [g]		4% [f]		4% [f]		4% [f]						
Total Saturday Person-trips (w/out linked trip factor):				Peak hour Non-Work Trips (w/linked trip factor):				56		83		83		123						
Saturday Work Trips (w/linked trip factor) [h]:																				
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY								SATURDAY							
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour		All Day		7-9 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	13.0%	Auto	36.0%	2.03	154	76	21	10	5	2	5	2	192	95	7	3	3			
		Transit	19.2%		82	11	2	2	2	2	2	2	102	4	4	4	4			
		Walk	33.3%		143	19	4	4	4	4	4	4	178	6	6	6	6			
		Other	11.5%		49	7	1	1	1	1	1	1	61	2	2	2	2			
		TOTAL	100.0%		428	76	58	10	13	2	13	2	534	95	19	3	3			
Superdistrict 2	14.0%	Auto	68.6%	1.97	317	161	43	22	10	5	10	5	394	200	14	7	7			
		Transit	14.5%		67	9	2	2	2	2	2	2	83	3	3	3	3			
		Walk	2.4%		11	1	0	0	0	0	0	0	14	0	0	0	0			
		Other	14.5%		67	9	2	2	2	2	2	2	83	3	3	3	3			
		TOTAL	100.0%		461	161	62	22	14	5	14	5	575	200	21	7	7			
Superdistrict 3	44.0%	Auto	43.7%	2.43	634	261	86	35	19	8	19	8	789	325	28	12	12			
		Transit	21.5%		312	42	9	9	9	9	9	9	388	14	14	14	14			
		Walk	25.4%		368	50	11	11	11	11	11	11	459	17	17	17	17			
		Other	9.4%		136	18	4	4	4	4	4	4	170	6	6	6	6			
		TOTAL	100.0%		1,450	261	196	35	44	8	44	8	1,806	325	65	12	12			
Superdistrict 4	7.0%	Auto	67.4%	2.51	156	62	21	8	5	2	5	2	194	77	7	3	3			
		Transit	16.3%		38	5	1	1	1	1	1	1	47	2	2	2	2			
		Walk	7.0%		16	2	0	0	0	0	0	0	20	1	1	1	1			
		Other	9.3%		21	3	1	1	1	1	1	1	27	1	1	1	1			
		TOTAL	100.0%		231	62	31	8	7	2	7	2	287	77	10	3	3			
East Bay	9.0%	Auto	68.4%	2.59	203	78	27	11	6	2	6	2	253	98	9	4	4			
		Transit</																		

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: SIT-DOWN RESTAURANT (NON-WORK TRIPS WITHOUT EVENT)
 Proposed Size: 51,500 gsf

DAILY:				PEAK HOUR PERIOD:				Weekday		Weekday		Weekday		Saturday		
Linked Trip Factor [a]: 33%				Linked Trip Factor before 6 PM [a]: 33%				Peak Hour of 4-6 PM Period		Peak Hour of 6-9 PM Period		Peak Hour of 9-11 PM Period		Peak Hour of 7-9 PM Period		
Weekday person-trip Generation Rate [b]: 200.0 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 33%				13.5% [b]		20.3% [c]		20.3% [d]		24.0% [e]		
Total Weekday Person-trips (w/out linked trip factor): 10,300				Peak hour trips as a % of daily trips:				27.0		40.5		40.5		59.6		
Wday Non-Work Trips (w/ linked trip factor) [g]: 96%				Total peak hour person-trips rate (trips/1,000 gsf):				946		1,418		1,418		2,093		
Saturday person-trip Generation Rate [c]: 249.1 trips/1000 gsf				Percent of Non-Work Trips during peak hour:				96% [g]		96% [f]		96% [f]		96% [f]		
Total Saturday Person-trips (w/out linked trip factor): 12,829				Peak hour Non-Work Trips (w/ linked trip factor):				890		1,335		1,335		1,970		
Sat. Non-Work Trips (w/ linked trip factor) [h]: 96%																
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY								SATURDAY			
					All Day		4-6 PM Peak Hour		6-9 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour	
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips
Superdistrict 1	13.0%	Auto	36.0%	2.03	309	152	42	21	62	31	62	31	384	189	92	45
		Transit	19.2%		165	22	33	33	33	205	49					
		Walk	33.3%		285	39	58	58	355	85						
		Other	11.5%		99	13	20	20	123	29						
		TOTAL	100.0%		857	152	116	21	174	31	174	31	1,067	189	256	45
Superdistrict 2	14.0%	Auto	68.6%	1.97	833	321	85	43	128	65	128	65	789	400	189	96
		Transit	14.5%		134	18	27	27	167	40						
		Walk	2.4%		22	3	4	4	28	7						
		Other	14.5%		134	18	27	27	167	40						
		TOTAL	100.0%		923	321	125	43	187	65	187	65	1,149	400	276	96
Superdistrict 3	44.0%	Auto	43.7%	2.43	1,268	522	171	70	257	106	257	106	1,579	650	379	156
		Transit	21.5%		624	84	126	126	777	186						
		Walk	25.4%		737	99	149	149	918	220						
		Other	9.4%		273	37	55	55	340	81						
		TOTAL	100.0%		2,900	522	392	70	587	106	587	106	3,613	650	867	156
Superdistrict 4	7.0%	Auto	67.4%	2.51	311	124	42	17	63	25	63	25	387	154	93	37
		Transit	16.3%		75	10	15	15	94	22						
		Walk	7.0%		32	4	7	7	40	10						
		Other	9.3%		43	6	9	9	53	13						
		TOTAL	100.0%		461	124	62	17	93	25	93	25	575	154	138	37
East Bay	9.0%	Auto	68.4%	2.59	406	157	55	21	82	32	82	32	505	195	121	47
		Transit	29.8%		177	24	36	36	220	53						
		Walk	1.8%		11	1	2	2	13	3						
		Other	0.0%		0	0	0	0	0	0						
		TOTAL	100.0%		593	157	80	21	120	32	120	32	739	195	177	47
North Bay	1.0%	Auto	100.0%	7.00	66	9	9	1	13	2	13	2	82	12	20	3
		Transit	0.0%		0	0	0	0	0	0						
		Walk	0.0%		0	0	0	0	0	0						
		Other	0.0%		0	0	0	0	0	0						
		TOTAL	100.0%		66	9	9	1	13	2	13	2	82	12	20	3
South Bay	9.0%	Auto	94.6%	2.28	561	246	76	33	114	50	114	50	699	307	168	74
		Transit	3.6%		21	3	4	4	27	6						
		Walk	1.8%		11	1	2	2	13	3						
		Other	0.0%		0	0	0	0	0	0						
		TOTAL	100.0%		593	246	80	33	120	50	120	50	739	307	177	74
Out of Region	3.0%	Auto	73.6%	1.68	146	87	20	12	29	18	29	18	181	108	44	26
		Transit	21.1%		42	6	8	8	52	12						
		Walk	0.0%		0	0	0	0	0	0						
		Other	5.3%		10	1	2	2	13	3						
		TOTAL	100.0%		198	87	27	12	40	18	40	18	246	108	59	26
TOTAL	100.0%	Auto	56.1%	2.29	3,699	1,618	499	218	749	328	749	328	4,607	2,015	1,106	484
		Transit	18.8%		1,237	167	251	251	1,541	370						
		Walk	16.7%		1,098	148	222	222	1,367	328						
		Other	8.5%		558	75	113	113	696	167						
		TOTAL	100.0%		6,592	1,618	890	218	1,335	328	1,335	328	8,211	2,015	1,970	484

[a] Assumes that one third of the sit-down restaurant customers are already in the Mission Bay area when there is no event
 [b] SF Guidelines, Appendix C - Table C-1 (Quality Sit-Down Restaurant Rate)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Restaurant High Turn-Over [LU 932] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m. peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Eating establishments)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [i] SF Guidelines, Appendix E - Table E-15 Visitor Trips to SD3 (All Other)

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: QUICK SERVICE RESTAURANT (WORK TRIPS)
 Proposed Size: 11,000 gsf

DAILY:				PEAK HOUR PERIOD:																
Linked Trip Factor [a]: 0%				Weekday Peak Hour of 4-6 PM Period [b]: 0%			Weekday Peak Hour of 6-8 PM Period [c]: 13.5% [b]			Weekday Peak Hour of 9-11 PM Period [d]: 20.3% [c]			Saturday Peak Hour of 7-9 PM Period [e]: 24.0% [e]							
Weekday person-trip Generation Rate [b]: 600.0 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 0%			Peak hour trips as a % of daily trips: 81.0 [b]			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321							
Total Weekday Person-trips (w/out linked trip factor): 6,600				Peak hour trips as a % of daily trips: 81.0 [b]			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321							
Weekday Work Trips (w/linked trip factor) [g]: 4%				Total peak hour person-trips (w/linked trip factor): 321			Percent of Work Trips during peak hour: 4% [g]			Percent of Work Trips during peak hour: 4% [f]			Percent of Work Trips during peak hour: 4% [f]							
Saturday person-trip Generation Rate [c]: 747.3 trips/1000 gsf				Total peak hour person-trips (w/linked trip factor): 321			Percent of Non-Work Trips during peak hour: 96% [g]			Percent of Non-Work Trips during peak hour: 96% [f]			Percent of Non-Work Trips during peak hour: 96% [f]							
Total Saturday Person-trips (w/out linked trip factor): 8,221				Peak hour Work Trips (w/linked trip factor) [h]: 4%			Peak hour Work Trips (w/linked trip factor): 36			Peak hour Work Trips (w/linked trip factor): 53			Peak hour Work Trips (w/linked trip factor): 79							
Saturday Work Trips (w/linked trip factor) [h]: 4%																				
Origins	Distribution [j]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY												SATURDAY			
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour					
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips				
Superdistrict 1	7.7%	Auto	12.4%	1.30	3	2	0	0	1	1	0	0	0	3	2	1	1			
		Transit	63.0%		13	2	0	0	3	3	0	0	0	16	4	4	4			
		Walk	21.4%		4	1	1	1	1	1	1	1	1	5	1	1	1			
		Other	3.1%		1	0	0	0	0	0	0	0	0	1	0	0	0			
		TOTAL	100.0%		20	2	3	0	4	0	4	0	0	25	2	6	1			
Superdistrict 2	9.9%	Auto	21.8%	1.26	6	5	1	1	1	1	1	1	7	6	2	1	1			
		Transit	64.6%		17	2	2	3	3	3	3	3	21	5	5	5	5			
		Walk	10.6%		3	0	1	1	1	1	1	1	3	1	1	1	1			
		Other	3.1%		1	0	0	0	0	0	0	0	1	0	0	0	0			
		TOTAL	100.0%		26	5	4	1	5	1	5	1	33	6	8	1	1			
Superdistrict 3	22.3%	Auto	20.0%	1.25	12	9	2	1	2	2	2	2	15	12	4	3	3			
		Transit	50.2%		30	4	4	6	6	6	6	6	37	9	9	9	9			
		Walk	23.1%		14	2	3	3	3	3	3	3	17	4	4	4	4			
		Other	6.7%		4	1	1	1	1	1	1	1	5	1	1	1	1			
		TOTAL	100.0%		59	9	8	1	12	2	12	2	73	12	18	3	3			
Superdistrict 4	7.4%	Auto	31.0%	1.48	6	4	1	1	1	1	1	1	8	5	2	1	1			
		Transit	64.0%		12	2	2	3	3	3	3	3	16	4	4	4	4			
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0			
		Other	5.0%		1	0	0	0	0	0	0	0	1	0	0	0	0			
		TOTAL	100.0%		19	4	3	1	4	1	4	1	24	5	6	1	1			
East Bay	27.7%	Auto	20.1%	1.61	15	9	2	1	3	2	3	2	18	11	4	3	3			
		Transit	78.0%		57	8	8	12	12	12	12	12	71	17	17	17	17			
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0			
		Other	2.0%		1	0	0	0	0	0	0	0	2	0	0	0	0			
		TOTAL	100.0%		73	9	10	1	15	2	15	2	91	11	22	3	3			
North Bay	3.5%	Auto	44.4%	1.44	4	3	1	0	1	1	1	1	5	4	1	1	1			
		Transit	51.1%		5	1	1	1	1	1	1	1	6	1	1	1	1			
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0			
		Other	4.4%		0	0	0	0	0	0	0	0	1	0	0	0	0			
		TOTAL	100.0%		9	3	1	0	2	1	2	1	12	4	3	1	1			
South Bay	19.0%	Auto	50.0%	1.13	25	22	3	3	5	4	5	4	31	28	7	7	7			
		Transit	49.2%		25	3	3	5	5	5	5	5	31	7	7	7	7			
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0			
		Other	0.8%		0	0	0	0	0	0	0	0	1	0	0	0	0			
		TOTAL	100.0%		50	22	7	3	10	4	10	4	62	28	15	7	7			
Out of Region	2.5%	Auto	21.9%	1.56	1	1	0	0	0	0	0	0	2	1	0	0	0			
		Transit	71.9%		5	1	1	1	1	1	1	1	6	1	1	1	1			
		Walk	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0			
		Other	6.3%		0	0	0	0	0	0	0	0	1	0	0	0	0			
		TOTAL	100.0%		7	1	1	0	1	0	1	0	8	1	2	0	0			
TOTAL	100.0%	Auto	27.0%	1.30	71	55	10	7	14	11	14	11	89	69	21	16	16			
		Transit	61.7%		163	22	33	33	33	33	33	33	203	49	49	49	49			
		Walk	7.9%		21	3	4	4	4	4	4	4	26	6	6	6	6			
		Other	3.4%		9	1	2	2	2	2	2	2	11	3	3	3	3			
		TOTAL	100.0%		264	55	36	7	53	11	53	11	329	69	79	16	16			

[a] No linked-trip factor assumed for work trips
 [b] SF Guidelines, Appendix C - Table C-1 (Composite Restaurant Rate)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Restaurant High Turn-Over [LU 932] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m., peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Eating establishments)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [i] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All)

PROJECT TRIP GENERATION
LAND USE: QUICK SERVICE RESTAURANT (NON-WORK TRIPS WITH EVENT)
 Proposed Size: 11,000 gsf

DAILY:				PEAK HOUR PERIOD:																
Linked Trip Factor [a]: 67%				Weekday Peak Hour of 4-6 PM Period [b]: 67%			Weekday Peak Hour of 6-8 PM Period [c]: 13.5% [b]			Weekday Peak Hour of 9-11 PM Period [d]: 20.3% [c]			Saturday Peak Hour of 7-9 PM Period [e]: 24.0% [e]							
Weekday person-trip Generation Rate [b]: 600.0 trips/1000 gsf				Linked Trip Factor after 6 PM [a]: 95%			Peak hour trips as a % of daily trips: 81.0 [b]			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321							
Total Weekday Person-trips (w/out linked trip factor): 6,600				Peak hour trips as a % of daily trips: 81.0 [b]			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321			Total peak hour person-trips (w/linked trip factor): 321							
Weekday Work Trips (w/linked trip factor) [g]: 4%				Total peak hour person-trips (w/linked trip factor): 321			Percent of Work Trips during peak hour: 4% [g]			Percent of Work Trips during peak hour: 4% [f]			Percent of Work Trips during peak hour: 4% [f]							
Saturday person-trip Generation Rate [c]: 747.3 trips/1000 gsf				Total peak hour person-trips (w/linked trip factor): 321			Percent of Non-Work Trips during peak hour: 96% [g]			Percent of Non-Work Trips during peak hour: 96% [f]			Percent of Non-Work Trips during peak hour: 96% [f]							
Total Saturday Person-trips (w/out linked trip factor): 8,221				Peak hour Work Trips (w/linked trip factor) [h]: 4%			Peak hour Work Trips (w/linked trip factor): 36			Peak hour Work Trips (w/linked trip factor): 53			Peak hour Work Trips (w/linked trip factor): 79							
Saturday Work Trips (w/linked trip factor) [h]: 4%																				
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [j]	WEEKDAY												SATURDAY			
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour					
					Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips	Person Trips	Vehicle-Trips				
Superdistrict 1	13.0%	Auto	36.0%	2.03	99	49	13	7	3	3	1	3	1	123	61	4	2			
		Transit	19.2%		53	7	7	2	2	2	2	2	2	66	4	4	4			
		Walk	33.3%		91	12	3	3	3	3	3	3	3	114	4	4	4			
		Other	11.5%		32	4	1	1	1	1	1	1	1	39	1	1	1			
		TOTAL	100.0%		275	49	37	7	8	1	8	1	8	1	342	61	12	2		
Superdistrict 2	14.0%	Auto	68.6%	1.97	203	103	27	14	6	3	6	3	253	128	9	5	5			
		Transit	14.5%		43	6	1	1	1	1	1	1	53	2	2	2	2			
		Walk	2.4%		7	1	0	0	0	0	0	0	9	0	0	0	0			
		Other	14.5%		43	6	1	1	1	1	1	1	53	2	2	2	2			
		TOTAL	100.0%		296	103	40	14	9	3	9	3	368	128	13	5	5			
Superdistrict 3	44.0%	Auto	43.7%	2.43	406	167	55	23	12	5	12	5	506	208	18	7	7			
		Transit	21.5%		200	27	6	6	6	6	6	6	249	9	9	9	9			
		Walk	25.4%		236	32	7	7	7	7	7	7	294	11	11	11	11			
		Other	9.4%		87	12	3	3	3	3	3	3	109	4	4	4	4			
		TOTAL	100.0%		929	167	125	23	28	5	28	5	1,157	208	42	7	7			
Superdistrict 4	7.0%	Auto	67.4%	2.51	100	40	13	5	3	1	3	1	124	49	4	2	2			
		Transit	16.3%		24	3	1	1	1	1	1	1	30	1	1	1	1			
		Walk	7.0%		10	1	0	0	0	0	0	0	13	0	0	0	0			
		Other	9.3%		14	2	0	0	0	0	0	0	17	1	1	1	1			
		TOTAL	100.0%		148	40	20	5	4	1	4	1	184	49	7	2	2			
East Bay	9.0%	Auto	68.4%	2.59	130	50	18	7	4	2	4	2	162	63	6	2	2			
		Transit	29.8%		57	8	2	2	2	2	2	2	71	3	3	3	3			
		Walk	1.8%		3	0	0	0	0	0	0	0	4	0	0	0	0			

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT TRIP GENERATION
LAND USE: QUICK SERVICE RESTAURANT (NON-WORK TRIPS WITHOUT EVENT)
 Proposed Size: 11,000 gsf

DAILY:				PEAK HOUR PERIOD:												
Linked Trip Factor [a]:				Weekday			Weekday			Weekday			Saturday			
Weekday person-trip Generation Rate [b]:				Peak Hour of			Peak Hour of			Peak Hour of			Peak Hour of			
Total Weekday Person-trips (w/out linked trip factor):				4-6 PM Period			6-8 PM Period			9-11 PM Period			7-9 PM Period			
Wday Non-Work Trips (w/ linked trip factor) [g]:				13.5% [b]			20.3% [d]			20.3% [d]			24.0% [e]			
Saturday person-trip Generation Rate [c]:				Total peak hour person-trips rate (trips/1,000 gsf):												
Total Saturday Person-trips (w/out linked trip factor):				81.0			121.5			121.5			179.3			
Sat. Non-Work Trips (w/ linked trip factor) [h]:				321			481			481			710			
Average Vehicle Occup. [i]:				96% [g]			96% [f]			96% [f]			96% [f]			
Person Trips				285			428			428			631			
Origins	Distribution [i]	Mode	Percent [i]	Average Vehicle Occup. [i]	WEEKDAY								SATURDAY			
					All Day		4-6 PM Peak Hour		6-8 PM Peak Hour		9-11 PM Peak Hour		All Day		7-9 PM Peak Hour	
Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips			
Superdistrict 1	13.0%	Auto 36.0% Transit 19.2% Walk 33.3% Other 11.5%	36.0% 19.2% 33.3% 11.5%	2.03	99	49	13	7	20	10	20	10	123	61	30	15
Superdistrict 2	14.0%	Auto 68.6% Transit 14.5% Walk 2.4% Other 14.5%	68.6% 14.5% 2.4% 14.5%	1.97	203	103	27	14	41	21	41	21	253	128	61	31
Superdistrict 3	44.0%	Auto 43.7% Transit 21.5% Walk 25.4% Other 9.4%	43.7% 21.5% 25.4% 9.4%	2.43	406	167	55	23	82	34	82	34	506	208	121	50
Superdistrict 4	7.0%	Auto 67.4% Transit 16.3% Walk 7.0% Other 9.3%	67.4% 16.3% 7.0% 9.3%	2.51	100	40	13	5	20	8	20	8	124	49	30	12
East Bay	9.0%	Auto 68.4% Transit 29.8% Walk 1.8% Other 0.0%	68.4% 29.8% 1.8% 0.0%	2.59	130	50	18	7	26	10	26	10	162	63	39	15
North Bay	1.0%	Auto 100.0% Transit 0.0% Walk 0.0% Other 0.0%	100.0% 0.0% 0.0% 0.0%	7.00	21	3	3	0	4	1	4	1	26	4	6	1
South Bay	9.0%	Auto 94.6% Transit 3.6% Walk 1.8% Other 0.0%	94.6% 3.6% 1.8% 0.0%	2.28	180	79	24	11	36	16	36	16	224	98	54	24
Out of Region	3.0%	Auto 73.6% Transit 21.1% Walk 0.0% Other 5.3%	73.6% 21.1% 0.0% 5.3%	1.68	47	28	6	4	9	6	9	6	58	35	14	8
TOTAL	100.0%	Auto 56.1% Transit 18.8% Walk 16.7% Other 8.5%	56.1% 18.8% 16.7% 8.5%	2.29	1,185	518	160	70	240	105	240	105	1,476	646	354	155
					2,112	518	285	70	428	105	428	105	2,631	646	631	155

[a] Assumes that two thirds of the quick-service restaurant customers are already in the Mission Bay area when there is no event
 [b] SF Guidelines, Appendix C - Table C-1 (Composite Restaurant Rate)
 [c] The Saturday daily and p.m. peak hour trip generation rates are based on the weekday to Saturday ratio for Restaurant High Turn-Over [LU 932] from ITE Trip Generation, 9th Edition (2012)
 [d] The weekday late p.m. percentage is based on Pushkarev and Zupan, Urban Space for Pedestrians (1978)
 [e] The weekday late p.m. percentage is based on a combination of the weekday p.m. peak hour-to-late p.m. and weekday-to-Saturday ratios
 [f] The weekday and Saturday late p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [g] SF Guidelines, Appendix C - Table C-2 (Eating establishments)
 [h] The Saturday daily and p.m. peak hour percentages of work/non-work trips are assumed to be the same as the weekday p.m. peak hour percentages shown in Table C-2 of the SF Guidelines
 [i] SF Guidelines, Appendix E - Table E-15 Visitor Trips to SD3 (All Other)

APPENDIX C
PROPOSED PROJECT PARKING DEMAND

A-62

A-63

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PARKING DEMAND CALCULATIONS

PROPOSED PROJECT

Office:	605,000 gsf
Retail:	62,500 gsf
Quick Service Restaurant:	11,000 gsf
Sit-down Restaurant:	51,500 gsf

No Event:	----	attendees and	105 employees
Basketball:	18,064	attendees and	1,000 employees
Convention:	9,000	attendees and	675 employees

	WEEKDAY DEMAND		SATURDAY DEMAND	
	Midday (1 PM to 3 PM)	Evening (7 PM to 9 PM)	Midday (1 PM to 3 PM)	Evening (7 PM to 9 PM)
OFFICE (w/ and w/out arena event)				
Short-Term	1,720 daily visitor vehicle-trips 5.5 turn-over rate 100% of the peak demand ^[a] 156 short-term spaces	1,720 daily visitor vehicle-trips 5.5 turn-over rate 5% of the peak demand ^[a] 8 short-term spaces	0 daily visitor vehicle-trips 5.5 turn-over rate 80% of the peak demand ^[b] 0 short-term spaces	0 daily visitor vehicle-trips 5.5 turn-over rate 0% of the peak demand ^[b] 0 short-term spaces
Long-Term	276 gsf per employee 2,192 daily employees 27% employees who drive 1.30 vehicle occupancy 100% of the peak demand ^[a] 457 long-term spaces	276 gsf per employee 2,192 daily employees 27% employees who drive 1.30 vehicle occupancy 10% of the peak demand ^[a] 46 long-term spaces	276 gsf per employee 489 daily employees ^[h] 27% employees who drive 1.30 vehicle occupancy 80% of the peak demand ^[b] 82 long-term spaces	276 gsf per employee 489 daily employees ^[h] 27% employees who drive 1.30 vehicle occupancy 0% of the peak demand ^[b] 0 long-term spaces
Subtotal	613 spaces	54 spaces	82 spaces	0 spaces
RETAIL (w/ arena event)				
Short-Term	1,014 daily visitor vehicle-trips 4.0 turn-over rate 100% of the peak demand ^[a] 127 short-term spaces	1,014 daily visitor vehicle-trips 4.0 turn-over rate 95% of the peak demand ^[a] 120 short-term spaces	1,187 daily visitor vehicle-trips 4.0 turn-over rate 100% of the peak demand ^[b] 148 short-term spaces	1,187 daily visitor vehicle-trips 4.0 turn-over rate 75% of the peak demand ^[b] 111 short-term spaces
Long-Term	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 100% of the peak demand ^[a] 37 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 95% of the peak demand ^[a] 35 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 100% of the peak demand ^[b] 37 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 80% of the peak demand ^[b] 30 long-term spaces
Subtotal	164 spaces	155 spaces	185 spaces	141 spaces
RETAIL (w/out arena event)				
Short-Term	2,038 daily visitor vehicle-trips 5.5 turn-over rate 100% of the peak demand ^[a] 185 short-term spaces	2,038 daily visitor vehicle-trips 5.5 turn-over rate 95% of the peak demand ^[a] 176 short-term spaces	2,385 daily visitor vehicle-trips 5.5 turn-over rate 100% of the peak demand ^[b] 217 short-term spaces	2,385 daily visitor vehicle-trips 5.5 turn-over rate 75% of the peak demand ^[b] 163 short-term spaces
Long-Term	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 100% of the peak demand ^[a] 37 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 95% of the peak demand ^[a] 35 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 100% of the peak demand ^[b] 37 long-term spaces	350 gsf per employee 179 daily employees 27% employees who drive 1.30 vehicle occupancy 80% of the peak demand ^[b] 30 long-term spaces
Subtotal	222 spaces	211 spaces	254 spaces	193 spaces

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PARKING DEMAND CALCULATIONS

QUICK SERVICE RESTAURANT (w/ arena event)

Short-Term	518 daily visitor vehicle-trips	518 daily visitor vehicle-trips	646 daily visitor vehicle-trips	646 daily visitor vehicle-trips
	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate
	100% of the peak demand ^[a]	80% of the peak demand ^[a]	100% of the peak demand ^[b]	80% of the peak demand ^[b]
	47 short-term spaces	38 short-term spaces	59 short-term spaces	47 short-term spaces
Long-Term	350 gsf per employee	350 gsf per employee	350 gsf per employee	350 gsf per employee
	31 daily employees	31 daily employees	31 daily employees	31 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	100% of the peak demand ^[a]	90% of the peak demand ^[a]	100% of the peak demand ^[b]	90% of the peak demand ^[b]
	7 long-term spaces	6 long-term spaces	7 long-term spaces	6 long-term spaces
Subtotal	54 spaces	44 spaces	66 spaces	53 spaces

QUICK SERVICE RESTAURANT (w/out arena event)

Short-Term	518 daily visitor vehicle-trips	518 daily visitor vehicle-trips	646 daily visitor vehicle-trips	646 daily visitor vehicle-trips
	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate
	100% of the peak demand ^[a]	80% of the peak demand ^[b]	100% of the peak demand ^[b]	80% of the peak demand ^[b]
	47 short-term spaces	38 short-term spaces	59 short-term spaces	47 short-term spaces
Long-Term	350 gsf per employee	350 gsf per employee	350 gsf per employee	350 gsf per employee
	31 daily employees	31 daily employees	31 daily employees	31 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	100% of the peak demand ^[a]	90% of the peak demand ^[b]	100% of the peak demand ^[b]	90% of the peak demand ^[b]
	7 long-term spaces	6 long-term spaces	7 long-term spaces	6 long-term spaces
Subtotal	54 spaces	44 spaces	66 spaces	53 spaces

SIT-DOWN RESTAURANT (w/ arena event)

Short-Term	809 daily visitor vehicle-trips	809 daily visitor vehicle-trips	1,007 daily visitor vehicle-trips	1,007 daily visitor vehicle-trips
	4.0 turn-over rate	4.0 turn-over rate	4.0 turn-over rate	4.0 turn-over rate
	75% of the peak demand ^[a]	100% of the peak demand ^[a]	75% of the peak demand ^[c]	100% of the peak demand ^[c]
	76 short-term spaces	101 short-term spaces	94 short-term spaces	126 short-term spaces
Long-Term	350 gsf per employee	350 gsf per employee	350 gsf per employee	350 gsf per employee
	147 daily employees	147 daily employees	147 daily employees	147 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	90% of the peak demand ^[a]	100% of the peak demand ^[a]	90% of the peak demand ^[c]	100% of the peak demand ^[c]
	28 long-term spaces	31 long-term spaces	28 long-term spaces	31 long-term spaces
Subtotal	104 spaces	132 spaces	122 spaces	157 spaces

SIT-DOWN RESTAURANT (w/out arena event)

Short-Term	1,618 daily visitor vehicle-trips	1,618 daily visitor vehicle-trips	2,015 daily visitor vehicle-trips	2,015 daily visitor vehicle-trips
	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate	5.5 turn-over rate
	75% of the peak demand ^[a]	100% of the peak demand ^[a]	75% of the peak demand ^[c]	100% of the peak demand ^[c]
	110 short-term spaces	147 short-term spaces	137 short-term spaces	183 short-term spaces
Long-Term	350 gsf per employee	350 gsf per employee	350 gsf per employee	350 gsf per employee
	147 daily employees	147 daily employees	147 daily employees	147 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	90% of the peak demand ^[a]	100% of the peak demand ^[a]	90% of the peak demand ^[c]	100% of the peak demand ^[c]
	28 long-term spaces	31 long-term spaces	28 long-term spaces	31 long-term spaces
Subtotal	138 spaces	178 spaces	165 spaces	214 spaces

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PARKING DEMAND CALCULATIONS

ARENA (No Event)

Short-Term	0 short-term spaces	0 short-term spaces	0 short-term spaces	0 short-term spaces
Long-Term	105 daily employees	105 daily employees	105 daily employees	105 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	100% of the peak demand ^[e]	10% of the peak demand ^[e]	100% of the peak demand ^[e]	10% of the peak demand ^[e]
	22 long-term spaces	2 long-term spaces	22 long-term spaces	2 long-term spaces
Subtotal	22 spaces	2 spaces	22 spaces	2 spaces

ARENA (Basketball Game)

Short-Term	7,355 daily visitor vehicle-trips	7,355 daily visitor vehicle-trips	8,028 daily visitor vehicle-trips	8,028 daily visitor vehicle-trips
	1 turn-over rate	1 turn-over rate	1 turn-over rate	1 turn-over rate
	2% of the peak demand ^[f]	100% of the peak demand ^[a]	2% of the peak demand ^[f]	100% of the peak demand ^[a]
	74 short-term spaces	3,677 short-term spaces	80 short-term spaces	4,014 short-term spaces
Long-Term	1000 daily employees	1000 daily employees	1000 daily employees	1000 daily employees
	27% employees who drive	27% employees who drive	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy	1.30 vehicle occupancy
	30% of the peak demand ^[a]	100% of the peak demand ^[a]	30% of the peak demand ^[a]	100% of the peak demand ^[a]
	63 long-term spaces	208 long-term spaces	63 long-term spaces	208 long-term spaces
Subtotal	137 spaces	3,885 spaces	143 spaces	4,222 spaces

ARENA (Convention Event)

Short-Term	2,490 daily visitor vehicle-trips	2,490 daily visitor vehicle-trips
	1.5 turn-over rate	1.5 turn-over rate
	100% of the peak demand ^[a]	30% of the peak demand ^[a]
	830 short-term spaces	249 short-term spaces
Long-Term	675 daily employees	675 daily employees
	27% employees who drive	27% employees who drive
	1.30 vehicle occupancy	1.30 vehicle occupancy
	100% of the peak demand ^[a]	25% of the peak demand ^[a]
	141 long-term spaces	35 long-term spaces
Subtotal	971 spaces	284 spaces

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
PARKING DEMAND CALCULATIONS

TOTAL PARKING DEMAND SUMMARY

	WEEKDAY DEMAND		SATURDAY DEMAND	
	Midday (1 PM to 3 PM)	Evening (7 PM to 9 PM)	Midday (1 PM to 3 PM)	Evening (7 PM to 9 PM)
No Arena Event				
Short-Term	498 spaces	369 spaces	413 spaces	393 spaces
Long-Term	551 spaces	120 spaces	176 spaces	69 spaces
TOTAL	1,049 spaces	489 spaces	589 spaces	462 spaces
Basketball Game				
Short-Term	480 spaces	3,944 spaces	381 spaces	4,298 spaces
Long-Term	592 spaces	326 spaces	217 spaces	275 spaces
TOTAL	1,072 spaces	4,270 spaces	598 spaces	4,573 spaces
Convention Event				
Short-Term	1,236 spaces	516 spaces		
Long-Term	670 spaces	153 spaces		
TOTAL	1,906 spaces	669 spaces		

Notes

- [a] Table 2-5 Recommended Time-of-Day Factors for Weekdays (pp. 16 and 17), Shared Parking, Second Edition, Urban Land Institute, 2005.
- [b] Table 2-6 Recommended Time-of-Day Factors for Weekends (pp. 18 and 19), Shared Parking, Second Edition, Urban Land Institute, 2005.
- [c] Based on more conservatively weekday time-of-day factors; Table 2-6 from ULI indicates 55% of the short-term peak parking demand and 75% of the long-term peak parking demand.
- [d] Parking Generation, 4th Edition (p. 109), ITE, 2010.
- [e] Based on weekday time-of-day factors for office land uses.
- [f] Derived from more conservative assumptions; Table 2-6 from ULI indicates 1 percent of the peak demand for short-term parking.
- [g] Weekday time-of-day factors from ULI Shared Parking Table 2-5 have been used since ULI weekend data presented in Table 2-6 includes a matinee event.
- [h] A Saturday-to-Weekday ratio based on ITE office trip generation rates has been applied to derive the number of office employees on a Saturday.
- [i] Appendix G; Transportation Impact Analysis Guidelines for Environmental Review, SF Planning Department, 2002.
- [j] Assumed open late on no-event days; same demand percentages as on an event day.

Sources: SF Guidelines, ULI Shared Parking, ITE Parking Generation, Golden State Warriors

APPENDIX D
LOADING DEMAND CALCULATIONS

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
Truck and Service Vehicle Loading Demand

Land Use	Gross Square Feet	Truck Trip Generation Ratio (R)	Daily Trucks/Service Vehicles	Loading Space Demand	
				Average Hour	Peak Hour
Event Center	750,000 gsf	NA	30	7	7
Office	605,000 gsf	0.21	127	6	7
Retail	62,500 gsf	0.22	14	1	1
Restaurant	62,500 gsf	3.60	225	10	13
Total			396	24	28

General Loading Demand Equations (SF Guidelines)

for Office, Retail, Restaurant, and Cinema Uses

Daily Trips = (GSF / 1,000) * R
 Average Hour = (GSF / 1,000) * R / 9 / 2.4
 Peak Hour = (GSF / 1,000) * (R * 1.25) / 9 / 2.4

R = Daily truck trip generation per 1,000 gsf of use from Table H-1 in SF Guidelines

Arena Service Vehicles/Truck Deliveries

GSW Game vendor/service truck deliveries is 6 trucks per game scheduled to avoid peak commute hours.
 Non-GSW Event vendor/service truck deliveries are 20 trucks between 4 and 8 AM, and 6 food service trucks between 7 AM and 12 PM.
 TV crew trucks include 2 trucks/mobile units arrive at 10 AM and leave at 11:30 PM.
 ESPN/TNT games would have an additional 1 or 2 trucks that arrive day before the game.
 Source: Golden State Warriors

Event Center Loading Space Demand:

Based on SF Guidelines methodology, modified to reduce number of hours loading would occur, and activities that would occupy the loading dock for one to two days.
 Maximum number of deliveries would occur during non-GSW event = 20 vendor/service + 6 food service + up to 4 TV trucks = 30
 Peak loading period for 26 trucks would be between 4 and 8 AM = 4 hours. Up to 4 TV trucks occupy space for duration of event.

APPENDIX **E**
OTHER SUPPORTING TECHNICAL DATA

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CITY PLACE CROSS SHOPPING SURVEY RESULTS

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TR-86

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Ms. Pat Siefers
 October 18, 2007
 CityPlace Cross Shopping Survey Results
 Page 2

Memorandum

Date: October 18, 2007
 To: Pat Siefers, Department of Major Environmental Assessment
 From: Tim Erney
 Geoffrey Rubendall
 Subject: CityPlace Cross Shopping Survey Results

Introduction

DMJM Harris is pleased to submit this memorandum summarizing the results from the cross-shopping survey conducted as part of the transportation study for the project proposed for 935 Market Street (referred to as "CityPlace"). As specified in the approved scope of work dated September 6, 2007, DMJM Harris was commissioned to conduct surveys at two existing retail stores in the Union Square area to identify the level of cross-shopping (visitors visiting multiple stores in one shopping trip) in the project area. This survey was conducted to verify the results of another study commissioned by the project sponsor that found that visitors to large value-oriented shopping centers (like those proposed as part of this project) typically visit 1.8 stores per trip.

Survey Methodology

Approach:

During each survey, DMJM Harris staff were stationed at the doorway of each store and asked shoppers how many stores they planned to visit during their shopping trip. The responses from all shoppers were documented and tabulated.

Stores:

DMJM Harris conducted surveys at two stores in the Union Square area that are similar to those likely to be included in the proposed project. Through discussions with the project sponsor, the two stores chosen for the survey were the Ross store located at 799 Market Street and the H&M store located at 149 Powell Street.

Time Periods:

The surveys were conducted over a two-hour period at each store during the following three time periods:

- Weekend Midday Peak Period: 11am to 1pm – Saturday, September 22, 2007
- Weekday Midday Peak Period: 11am to 1pm – Wednesday, September 26, 2007
- Weekday PM Peak Period: 4pm to 6pm – Wednesday, September 26, 2007

Survey Results

The results of the surveys are presented in Table 1. As shown, the average shopper to these two stores planned to visit an average of about 2 ½ to 3 stores regardless of the time period of the shopping trip. The detailed results of the surveys are graphically illustrated in Figure 1. It should be noted that at both stores, weekend visitors typically visited more stores during their trips than weekday visitors.

Table 1: Survey Results

Store	Weekend Midday Peak Saturday, 9/22/07 11am to 1pm		Weekday Midday Peak Wednesday, 9/26/07 11am to 1pm		Weekday PM Peak Wednesday, 9/26/07 4pm to 6pm	
	# of Responses	Avg # Stores Visited	# of Responses	Avg # Stores Visited	# of Responses	Avg # Stores Visited
H&M	107	3.4	119	3.1	117	2.9
Ross	250	3.1	267	2.4	248	2.5
Total	357	3.2	386	2.6	365	2.6
			Overall		1,108	2.8

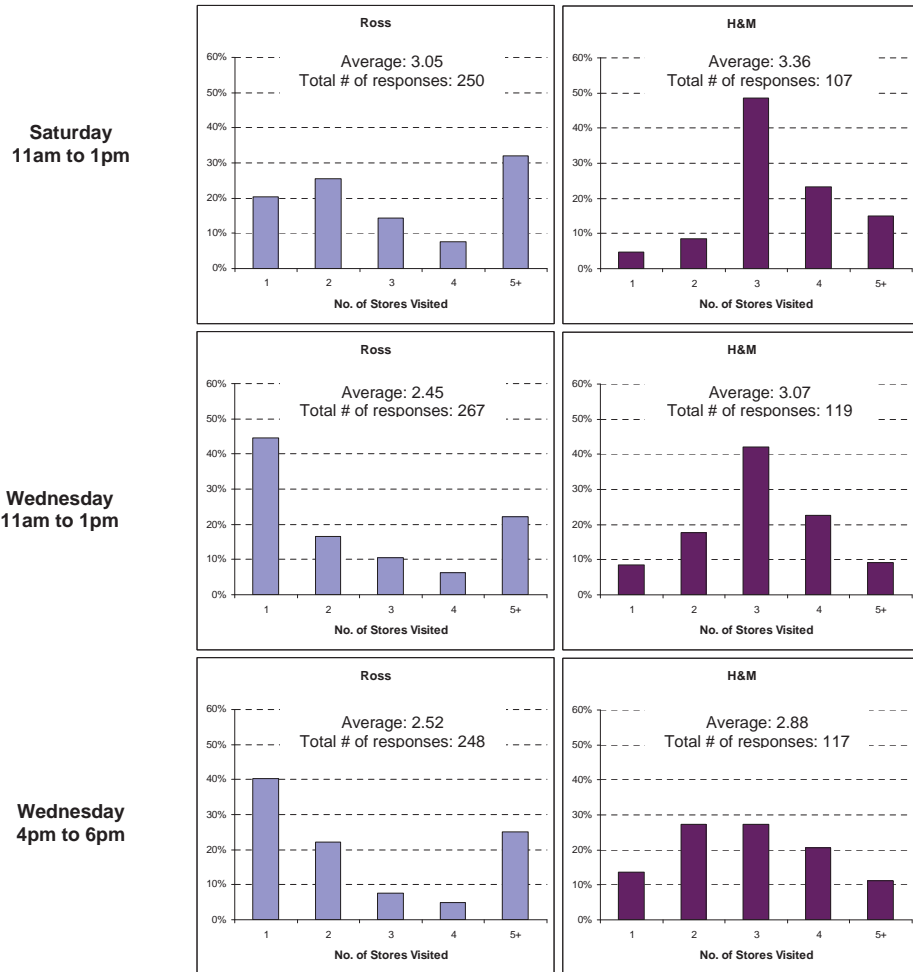
Source: DMJM Harris – October 2007

It should be noted that responses that were greater than five stores were put into a "5+" category. The above averages were calculated using the "5+" as five. Therefore, the averages presented in the above table are slightly underestimated.

Conclusions and Recommendations

As shown in the previous table and following charts, it was found that the stores surveyed exceeded the 1.8 stores per visit figure that was found in the previous survey commissioned by the project sponsor. Therefore, it is DMJM Harris' recommendation that the 1.8 cross-shopping factor is appropriate for the analysis to account for linked trips to other retail stores in the Union Square area. The 1.8 factor is a more conservative value than the factors calculated in this doorway survey, and was determined by a more detailed survey and supplemental research.

Figure 1: Survey Results



TRANSPORTATION PLANNING ASSUMPTIONS FOR THE
ATLANTIC YARDS ARENA AND REDEVELOPMENT



Philip Habib & Associates

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TECHNICAL MEMORANDUM

TO: Files

FROM: Stuart Gewirtzman

DATE: May 4, 2006

PROJECT: Atlantic Yards Arena and Redevelopment (PHA No. 0343E)

RE: Transportation Planning Assumptions

This memorandum summarizes the transportation planning assumptions to be used for the analysis of traffic, parking, transit and pedestrian conditions for the proposed Atlantic Yards Arena and Redevelopment project. Estimates of the proposed project's peak hour travel demand and trip assignment patterns are provided, along with discussions of the traffic, parking, transit and pedestrian study areas for the impact analyses.

PROJECT PROGRAM

The proposed Atlantic Yards Arena and Redevelopment project would be located on an approximately 22-acre site in the Atlantic Terminal area of Brooklyn, roughly bounded by Flatbush and Fourth Avenues on the west, Vanderbilt Avenue on the east, Atlantic Avenue on the north, and Dean Street on the south (see Figure 1). In addition to an approximately 850,000 gross-square-foot (gsf) arena for use by the Nets professional basketball team and other sporting and cultural events, it is anticipated that the proposed project would include residential, office, hotel, and local retail uses, approximately seven acres of publicly accessible open space, approximately 3,800 parking spaces, and an improved Long Island Rail Road (LIRR) yard. In addition to the arena, a total of 16 buildings would be constructed on the eight blocks comprising the project site. These buildings are referred to as Site 5 and Buildings 1 through 15.

The proposed development considers two program variations: residential mixed-use and commercial mixed-use (shown in Figures 2a and 2b, respectively). The variations reflect the fact that the programs for three of the project's 17 buildings are not fixed and could be

May 4, 2006



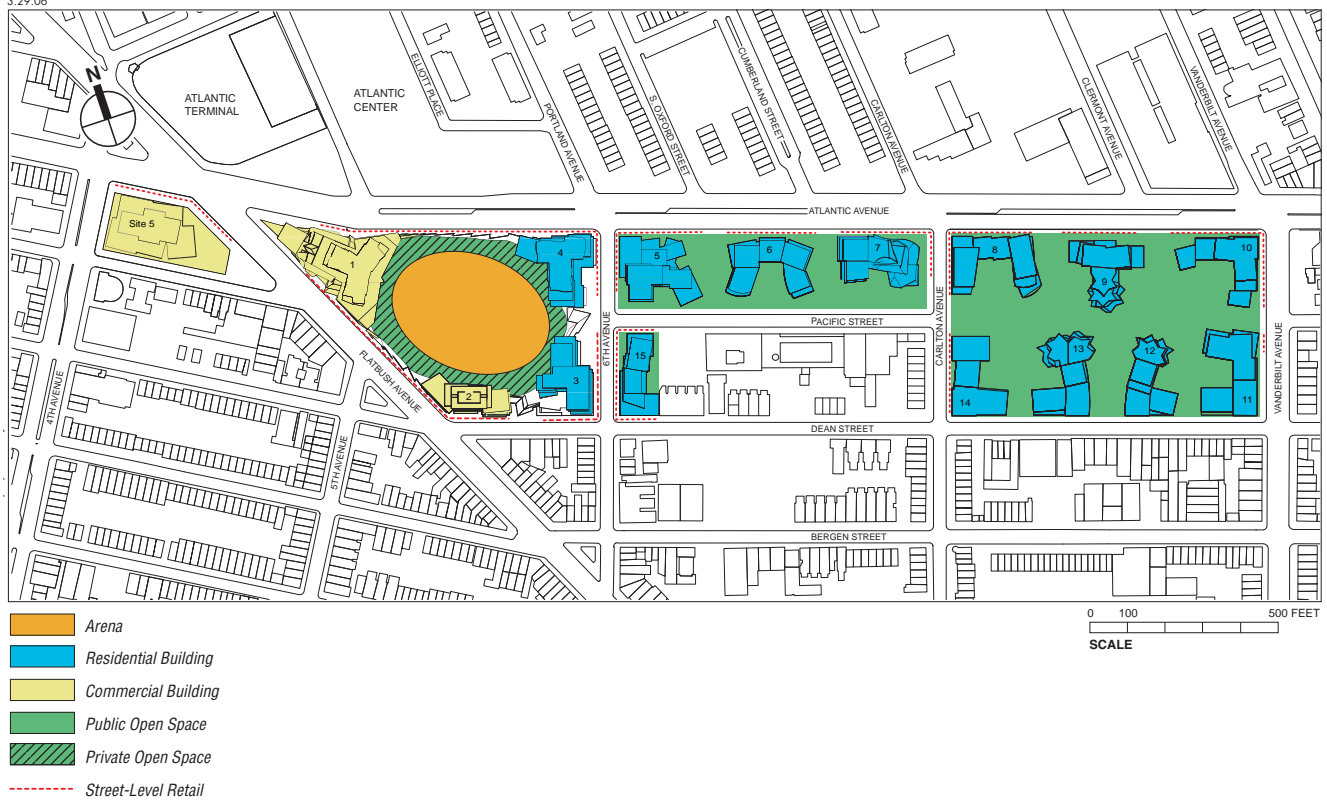
Atlantic Yards Arena and Redevelopment Project

Project Site
Figure 1



Atlantic Yards Arena and Redevelopment Project

Residential Mixed-Use Variation Site Plan
Figure 2a



Atlantic Yards Arena and Redevelopment Project

Commercial Mixed-Use Variation Site Plan
Figure 2b

used for a mixture of residential and commercial uses. Under the commercial mixed-use variation additional commercial space would substitute for the hotel use and a majority of the residential space in Buildings 1 and 2 on the arena site (blocks 1118, 1119, and 1127) and on Site 5 (Block 927). The other buildings and uses on the project site (the arena and Buildings 3 through 15) would remain the same under both the residential mixed-use and commercial mixed-use variations. Table 1 compares the development programs for the proposed project's two variations. As shown in Table 1, along with the 18,000-seat arena (for basketball), the residential mixed-use variation would consist of a total of approximately 6,860 dwelling units, 606,000 gsf of commercial office space, a 180-room hotel, and 247,000 gsf of ground floor local retail space that would be distributed among Site 5 and Buildings 1 through 15. A total of approximately 3,800 parking spaces would also be provided in on-site parking garages. By contrast, the commercial mixed-use variation would include approximately 5,790 dwelling units, 1,829,000 gsf of commercial office space, and no hotel use, as well as a total of approximately 3,800 parking spaces. The arena and local retail uses would remain the same under both scenarios.

**Table 1
Project Development Program**

Component	Residential Mixed-Use Variation	Commercial Mixed-Use Variation
Arena	850,000 gsf (18,000 seats)	850,000 sf (18,000 seats)
Residential	6,860 D.U.	5,790 D.U.
Office	606,000 gsf	1,829,000 gsf
Local Retail	247,000 gsf	247,000 gsf
Hotel	165,000 gsf (180 rooms)	0 gsf
Parking	3,800 spaces	3,800 spaces

Both the residential mixed-use and the commercial mixed-use variations are expected to include community facility uses, including a health care center and an intergenerational community center offering child care and youth and senior activities. Community facilities built as part of the proposed project would occupy some portion of the 247,000 gsf of space included as local retail in Table 1. For the purposes of the travel demand forecast, all of this space is assumed to be local retail (i.e., retail establishments serving the needs of workers and residents in the neighborhood).

It is anticipated that the proposed project would be developed in two phases. Phase I, to be completed in 2010, would include the arena, Site 5, Buildings 1 through 4, and a new on-site entrance to the Atlantic Avenue/Pacific Street subway station complex on Block 1118

at the intersection of Flatbush and Atlantic Avenues. Two parking garages located on Site 5 and the Arena Block would be constructed, along with interim parking elsewhere on the project site. Also included in this phase would be the closure of the existing LIRR yard at the west end of the site and the development of an improved LIRR yard at the east end of the site along with a new portal for direct train access between the new yard and the LIRR's Atlantic Terminal. The remainder of the project, which includes construction of Buildings 5 through 15 and additional permanent parking, would be completed by 2016.

In addition to the development program outlined above, the proposed project would entail a number of permanent roadway closures and changes in street direction, including:

- the closure of Pacific Street between Flatbush Avenue and Sixth Avenue, and between Carlton and Vanderbilt Avenues;
- the closure of Fifth Avenue between Flatbush and Atlantic Avenues;
- the conversion of Sixth Avenue between Atlantic and Flatbush Avenues from one-way southbound to two-way operation (partly in response to the closure of Fifth Avenue); and
- the conversion of Carlton Avenue from one-way northbound to two-way operation between Atlantic Avenue and Pacific Street.

SELECTION OF PEAK HOURS FOR ANALYSIS

On weekdays, the proposed project's residential, office and local retail components are expected to generate their highest demand during the traditional 8-9 AM and 5-6 PM commuter periods as well as the 12-1 PM midday (lunch time) period. By contrast, a Nets basketball game at the arena would generate much of its travel demand during the weekday evening and nighttime periods and on weekends. On weekdays, for example, it is anticipated that a Nets basketball game or other event at the arena would typically start at 7:30 PM or 8 PM. A 7-8 PM peak hour was therefore selected for the analysis of weekday pre-game conditions as it is during this period that residual commuter demand and peak demand en route to a basketball game or other event at the arena would most likely overlap. The 10-11 PM peak hour was selected for the weekday nighttime period to coincide with the peak demand generated at the end of a basketball game or other event at the arena. For the weekend period, the 1-2 PM and 4-5 PM peak hours on a Saturday were selected for analysis to coincide with the start and end times of a weekend afternoon basketball game, respectively, as well as peak retail-based travel demand from on-site and other nearby retail uses in Downtown Brooklyn (Atlantic Center, for example).

The EIS traffic analyses will examine conditions in all seven peak hours identified above. Transit (subway and bus) analyses generally examine conditions during the weekday AM and PM peak commuter periods as it is during these times that overall transit demand (and the potential for significant adverse impacts) is typically greatest. As there would be some overlap between trips en route to the arena and commuter demand during the 7-8 PM pre-

game period, this peak hour will also be analyzed to identify potential impacts at subway station processors (e.g., entrance stairways, fare arrays, etc.). In addition to the weekday AM and PM peak commuter hours, the pedestrian analysis will also focus on the 7-8 PM pre-game and Saturday 1-2 PM midday peak hours as it is during these periods that trips en route to the arena would coincide with elevated demand on study area pedestrian facilities (from commuters and shoppers, respectively).

TRANSPORTATION PLANNING ASSUMPTIONS

The transportation planning assumptions used to forecast travel demand from the project's residential, office, hotel, local retail and arena components are summarized in Table 2 and discussed below. The trip generation rates, temporal distributions and mode choice assumptions shown in Table 2 were based on accepted CEQR criteria, standard professional references, and studies that have been done for similar uses in Downtown Brooklyn and Manhattan. These sources were supplemented by data from the 2000 Census, and Employee Commute Options survey data from firms and governmental/educational institutions in Downtown Brooklyn.

Residential

The forecasts of travel demand from the project's residential components were based on trip rates from *Urban Space for Pedestrians* (Pushkarev & Zupan, 1975) and *Trip Generation, 7th Edition* (ITE), and vehicle occupancy and temporal and directional distribution data from the *Downtown Brooklyn Development FEIS* (April 2004). The weekday modal split assumed for the residential components reflects journey-to-work data from the 2000 Census. Although residential-based trips in the midday would likely be more local in nature than in the peak commuter hours (and therefore have a higher walk share, for example), the modal split based on census journey-to-work data is conservatively assumed for all analyzed weekday peak periods. The modal split for the Saturday peak periods was adjusted to reflect anticipated higher walk and auto shares compared to the weekday periods.

Office

The travel demand forecasts for the project's office components were based on trip rates and temporal distributions from *Urban Space for Pedestrians* and the *Coliseum Redevelopment FSEIS* (July 1997). The estimated modal split and vehicle occupancies were derived from NYCDOT Employee Commute Options survey data from office firms and governmental/educational institutions in Downtown Brooklyn, as well as data from the *Downtown Brooklyn Development FEIS*.

Hotel

The travel demand forecast for the hotel that would be developed under the residential mixed-use variation (but not the commercial mixed-use variation) was based on data from the *Renaissance Plaza Expansion EAS* (March 2003) and from the *Marriott Hotel Transportation*

**Table 2
Transportation Planning Assumptions for Project Components**

Land Use:		Arena	Residential	Office	Hotel	Local Retail				
Trip Generation:	Weekday	(1)	(3,6)	(6,11)	(4)	(6,7)				
	Saturday	2.00	8.075	18.00	5.82	2.05				
(Person-trips)			7.679	0.50	8.61	2.05				
		(trips/seat)	(trips/dwelling unit)	(trips/1,000 gsf)	(trips/room)	(trips/1,000 gsf)				
Temporal Distribution:	AM (8-9)	(8,9)	(2,23)	(2)	(4,5)	(2,10)				
	MD (12-1)	1.0%	9.1%	11.8%	6.6%	3.1%				
	PM (5-6)	1.0%	4.7%	14.5%	8.3%	19.0%				
	Pre-game (7-8 PM)	5.0%	10.7%	13.7%	7.7%	9.6%				
	Post-game (10-11 PM)	37.5%	8.3%	4.0%	6.6%	3.0%				
	Saturday (1-2 PM)	42.5%	3.3%	0.5%	2.0%	1.0%				
	Saturday (4-5 PM)	37.5%	7.0%	15.0%	7.5%	9.5%				
		42.5%	7.2%	15.0%	7.5%	9.5%				
		(12)	(22)	(14,15)	(4)	(13)				
Modal Split:		Weekday	Sat							
		In	Out	All Periods	Weekday	Sat	AM/PM/EVE	MD/Sat MD	All Periods	All Periods
	Auto	34.8%	35.9%	40.0%	14.0%	20.0%	12.0%	2.0%	30.1%	2.0%
	Taxi	3.0%	3.0%	3.0%	1.0%	1.0%	1.0%	1.0%	12.3%	3.0%
	Subway	49.7%	46.7%	44.0%	72.0%	45.0%	65.0%	7.0%	18.8%	20.0%
	LIRR	7.7%	9.6%	8.0%	1.0%	1.0%	12.0%	0.0%	0.0%	0.0%
	Bus	2.1%	2.1%	2.0%	3.0%	3.0%	6.0%	7.0%	5.5%	5.0%
	Walk	2.7%	2.7%	3.0%	9.0%	30.0%	4.0%	83.0%	33.3%	70.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
			(16)	(16)	(13,22)	(14)	(4)	(13)		
Vehicle Occupancy:	Auto	2.35	2.75	1.18	1.42	1.60	2.00			
	Taxi	2.35	2.75	1.40	1.42	1.40	2.00			
		(13,17)		(5,13)	(2,5,13)	(4,18)	(10)			
Directional Distribution:		In	Out	In	Out	In	Out	In	Out	
	AM (8-9)	96%	4%	20%	80%	96%	4%	41%	59%	
	MD (12-1)	39%	61%	51%	49%	39%	61%	68%	32%	
	PM (5-6)	85%	15%	65%	35%	5%	95%	59%	41%	
	Pre-game (7-8 PM)	99%	1%	70%	30%	20%	80%	60%	40%	
	Post-game (10-11 PM)	1%	99%	95%	5%	20%	80%	95%	5%	
	Saturday (1-2 PM)	99%	1%	50%	50%	60%	40%	56%	44%	
Saturday (4-5 PM)	1%	99%	50%	50%	15%	85%	56%	44%		
		(21)	(5,13)	(5,20)	(5,19)	(5,19)	(5,19)			
Daily Truck Trip Generation:	Weekday	0.07	0.07	0.16	0.06	0.35				
	Saturday	0.02	0.01	0.01	0.01	0.02				
		(trips/1,000 gsf)	(trips/dwelling unit)	(trips/1,000 gsf)	(trips/1,000 gsf)	(trips/1,000 gsf)				
		(21)	(19)	(5,20)	(5,19)	(5,19)				
Truck Trip Temporal Distribution:	AM (8-9)	12%	12%	7%	12%	8%				
	MD (12-1)	14%	9%	7%	9%	11%				
	PM (5-6)	3%	2%	3%	0%	2%				
	Pre-game (7-8 PM)	0%	0%	2%	0%	0%				
	Post-game (10-11 PM)	0%	0%	2%	0%	0%				
	Saturday (1-2 PM)	20%	9%	11%	9%	11%				
	Saturday (4-5 PM)	0%	0%	3%	0%	2%				

Notes:

- (1) Although a sell-out basketball game typically has 90% attendance, a trip rate of 2 trips/seat for all 18,000 seats is assumed in order to account for trips by spectators as well as employees, players, coaches, team staff and other visitors.
- (2) Source: Pushkarev & Zupan, *Urban Space for Pedestrians*.
- (3) Saturday residential trip rate based on ratio of weekday/Saturday trip rates from *ITE Trip Generation, 7th Edition*, Land Use: 220 (Apartment).
- (4) Source: *Renaissance Plaza Expansion EAS*, March 2003 and data from *Marriott Hotel Transportation Survey*, AKRF, August 1999.
- (5) Based on Saturday data from *Coliseum Redevelopment FSEIS*, July 1997.
- (6) Source: *City Environmental Quality Review (CEQR) Technical Manual*, Appendix 3, 2001.
- (7) Weekday trip generation rate assumed for Saturday as per *Coliseum Redevelopment FSEIS*, July 1997.
- (8) Based on data from *Madison Square Garden Modal Split Analysis*, August 26, 2003.
- (9) Post-game arena temporal distribution based on MTA data on subway ridership patterns at stations serving Madison Square Garden.
- (10) Source: *Coliseum Redevelopment FSEIS*, July 1997.
- (11) Saturday trip generation assumed to be 5% of weekday generation, consistent with assumptions in the *Coliseum Redevelopment FSEIS*, July 1997.
- (12) Reflects the anticipated origin/destination distribution of arena spectators and the accessibility by transit of the proposed arena site in Downtown Brooklyn.
- (13) Source: *Downtown Brooklyn Development FEIS*, April 2004.
- (14) Source: NYCDOT ECO Survey data for Downtown Brooklyn.
- (15) Source for midday modal split data: *Downtown Brooklyn Development FEIS*, April 2004. Weekday midday modal split assumed for Saturday midday.
- (16) Based on data from *Madison Square Garden Modal Split Analysis* and data from a PHA parking survey prior to a Knicks game at MSG on March 9, 2003.
- (17) PM and pre-game directional distribution for arena trips assumed to be predominantly inbound; post-game predominantly outbound.
- (18) Weekday 10-11 PM directional distribution assumed based on pattern for residential uses.
- (19) Source: *Curbside Pickup & Delivery Operations & Arterial Traffic Impacts*, FHWA, February 1981.
- (20) Weekday office truck trip rate and temporal distribution based on PHA June 10, 2004 survey at existing office buildings in Midtown and Lower Manhattan.
- (21) Based on FCRRC projections for Arena loading dock usage.
- (22) Based on 2000 Census journey-to-work data. Saturday modal split adjusted to reflect anticipated higher walk and auto shares compared to a weekday.
- (23) Saturday 4-5 PM based on Sunday 4-5 PM data from the No. 7 Subway Extension - Hudson Yards Rezoning and Development Program FGEIS, Nov. 2004.

Survey (AKRF, August 1999). Saturday temporal distribution and truck trip generation assumptions were based on data from the *Coliseum Redevelopment FSEIS*.

Local Retail

The retail uses developed under both the residential mixed-use variation and the commercial mixed-use variation would be local (or "neighborhood") retail, attracting trips primarily from the residential and worker populations on-site and in surrounding neighborhoods. It is therefore anticipated that the majority of these trips would be via the walk mode, and that many would be "linked" trips (e.g., a trip with multiple purposes, such as stopping at a retail store while commuting to or from work) and would therefore not represent the addition of new discrete trips to the study area transportation systems. For the purposes of the travel demand forecast, it is conservatively assumed that 40 percent of retail trips would be such "linked" trips, consistent with the rates assumed for other retail developments in New York City. The travel demand forecasts for local retail uses were based on data from a variety of sources, including the *City Environmental Quality Review (CEQR) Technical Manual* (2001), *Coliseum Redevelopment FSEIS*, and *Downtown Brooklyn Development FEIS*.

Arena

The proposed 850,000 gsf Atlantic Yards Arena would accommodate 18,000 to 20,500 seats, depending on the event. The capacity for a basketball game, for example, would be 18,000 seats, whereas for a concert, ethnic event or religious/motivational show, additional space for seating could be available on the arena floor. As a reasonable worst case for the EIS transportation analyses, the weekday and Saturday travel demand forecasts examine the demand that would be generated by a Nets basketball game at the arena. A Nets basketball game was selected as a reasonable worst case scenario based on both the frequency of home games and the relatively high level of travel demand that such games are expected to generate compared to most other uses. Using the 2005-2006 season as a guide, approximately 41 games would occur at the arena during a typical basketball season from early November to late April (not including playoff games which could continue through June). Approximately 26 of these games would occur on a weekday, four on a weekend afternoon (Saturday or Sunday) and 11 on a weekend evening. Non-basketball events, such as concerts, ethnic shows, general fixed fee rentals (graduations, receptions, job fairs, etc.), religious/motivational shows, other sporting events, family shows and community events, are each expected to occur with less frequency, would often attract fewer spectators, and would typically generate a lower level of travel demand than a Nets basketball game.

The travel demand forecast for the arena assumes a sold-out game with 100 percent attendance for all 18,000 seats, and a daily trip generation rate of two trips per seat. It should be noted, however, that the actual number of spectators at a game is typically fewer than the number of tickets distributed, and that even a sold-out game typically has about 90 percent attendance. The daily trip generation rate of two trips per seat for all 18,000 seats therefore also accounts for trips by employees, players, coaches, team staff and other such non-spectator demand.

Data on the arrival patterns for spectators at a Knicks basketball game at Madison Square Garden reported in the August 26, 2003 *Madison Square Garden Modal Split Analysis* study was utilized to estimate the temporal distribution for trips to the Atlantic Yards Arena. Based on these data, it is estimated that approximately 75 percent of spectators en route to a basketball game would arrive in the peak one-hour period. The temporal distribution of post-game peak hour trips was estimated based on MTA subway ridership data for stations serving Madison Square Garden. Using a comparison of the subway ridership on both game days and non-game days, and the hourly variation in the demand attributable to Madison Square Garden, it is estimated that approximately 85 percent of spectators would typically depart the Atlantic Yards Arena in the peak one hour at the end of a basketball game.

In addition to trips by spectators before and after a Nets basketball game, it is anticipated that arena employees, players, coaches, team staff and other non-spectator visitors to the arena would generate trips outside of the immediate pre-game and post-game periods. As shown in the temporal distribution in Table 2, it is assumed that one percent of daily trips generated by the arena would occur in each of the weekday AM and midday peak hours, and five percent during the weekday 5-6 PM peak hour.

Trip origin and modal split assumptions for the Atlantic Yards Arena reflect the anticipated origin/destination distribution of arena spectators and the accessibility by transit of the proposed arena site in Downtown Brooklyn. The assumptions were developed from trip origin and modal split data reported in the *Madison Square Garden Modal Split Analysis* study, along with data specific to Downtown Brooklyn developed for other studies such as the *Downtown Brooklyn Development FEIS*. The derivations of the trip origin/destination and modal split assumptions for both a weekday and weekend sporting event at the proposed arena are presented in Appendix A. For example, it is anticipated that there would be a higher percentage of trips en route to the Atlantic Yards Arena from Brooklyn than for Madison Square Garden (30 percent versus 7 percent, respectively), and a lower percentage of trips with Manhattan origins (25 percent versus 36 percent, respectively). With its proximity to Penn Station, the Port Authority Bus Terminal, the PATH terminal at West 33rd Street and the Lincoln Tunnel, a sporting event at Madison Square Garden likely attracts a higher percentage of spectators from New Jersey than would be the case for an arena located in Downtown Brooklyn. The analysis therefore assumes that 13 percent of trips would be en route from New Jersey compared to 21 percent for Madison Square Garden.

As with trip origins, modal splits were correspondingly adjusted to reflect both the anticipated trip origins and the differences in transit access. For example, the combined weekday auto share from all origins was increased to 34.8 percent from the 29.7 percent experienced at Madison Square Garden, while the taxi share (which includes livery or "black" cars) was reduced (from 7.5 percent to 3.0 percent) in part to reflect the generally higher availability and usage of taxis in Manhattan. Trips from the northern and western suburbs served by PATH, NJ Transit and Metro-North were assumed to complete their journeys via the subway mode, accounting in part for a higher subway mode share than for Madison Square Garden (49.7 percent versus 23.6 percent on weekdays). A smaller percentage of trips were assumed to travel to the Atlantic Yards Arena via Long Island Rail Road compared to Madison Square Garden as there is no direct access to the LIRR's Brooklyn terminus from the Port Washington Branch. Walk-only trips were also assumed to be lower compared to Madison Square Garden

given the higher concentration of office space and overall employment in the Garden's midtown Manhattan location compared to Downtown Brooklyn.

Table 3
Travel Demand Forecast for the Residential Mixed-Use Variation - 2016
(Person Trips)

Based on discussions with MTA New York City Transit concerning the anticipated travel characteristics of arena patrons, separate trip origin/destination and modal split assumptions have been assumed for persons arriving and departing the arena. On weekdays it is likely that some spectators would travel to the arena from workplaces in one borough or county, and then depart en route to residences in a different borough or county at the conclusion of a game, sometimes by a different mode of travel. For example, it is likely that some spectators would travel to the arena from Manhattan by subway, and then to homes on Long Island via the Long Island Rail Road's Atlantic Terminal. Others may walk from workplaces in Downtown Brooklyn and then drive home to New Jersey. These work-based trips en route to the arena are more likely to be made by transit (primarily subway) than would be the case for post-game trips en route home which are more likely to have higher auto and commuter rail shares. The trip destination and modal split assumptions shown in Appendix A for persons departing the arena on a weekday therefore reflect a lower Manhattan share than for trips en route to the arena (20 percent versus 25 percent), and a lower subway share (46.7 percent versus 49.7 percent). The auto mode share is slightly higher for trips departing the arena (35.9 percent versus 34.8 percent) as is the LIRR share (9.8 percent versus 7.8 percent), reflecting the expected higher percentage of trips with end points outside of Manhattan in the post-game period. As work-based trips would be minimal on weekends, the travel demand forecast assumes a general balance of trip origins and destinations for the Saturday peak hours.

Truck Trips

Truck trip generation rates and temporal distributions for the project's residential, hotel and local retail components were based on data from the *Coliseum Redevelopment FSEIS* and from *Curbside Pick-Up & Delivery Operations and Arterial Traffic Impacts* (FHWA, February 1981). Truck travel demand for the project's office component was based on data from surveys at existing office buildings in Midtown and Lower Manhattan. The truck trip generation forecast for the arena was derived from projections for arena loading dock usage provided by the project sponsors. These truck trips include deliveries of food and supplies, general deliveries (e.g., UPS, Fed Ex, etc.), and trucks associated with television broadcasts.

TRIP GENERATION

Tables 3 and 4 show the trip generation in peak hour person trips that would result in 2016 from the full build-out of the residential mixed-use and commercial mixed-use variations, respectively. A comparison of the total peak hour person trips generated by each scenario is presented in Table 5 along with the total numbers of peak hour vehicle trips (auto, taxi and truck) and person trips by transit (subway, bus and LIRR).

It should be noted that the residential mixed-use variation and the commercial mixed-use variation would both displace existing land uses on the project site, such as the 46,913 square feet of retail (a Modell's Sporting Goods store and a P.C. Richards consumer electronics

Person Trips by Mode:		Site 5			Arena Block						Residential Blocks ⁽¹⁾			Total Trips		
		Residential/ Office/Local Retail			Arena			Residential/ Office/Hotel/Local Retail			Residential/Local Retail					
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM (8-9)	Auto	74	29	103	120	5	125	135	186	321	99	378	477	428	598	1,026
	Taxi	9	5	14	10	0	10	16	20	36	16	35	51	51	60	111
	Subway	407	156	563	172	7	179	684	913	1,597	537	1,969	2,506	1,800	3,045	4,845
	LIRR	66	5	71	27	1	28	85	15	100	7	26	33	185	47	232
	Bus	38	10	48	7	0	7	56	44	100	35	95	130	136	149	285
Walk	89	79	168	9	0	9	122	183	305	269	448	717	489	710	1,199	
Total	683	284	967	345	13	358	1,098	1,361	2,459	963	2,951	3,914	3,089	4,609	7,698	
MD (12-1)	Auto	24	28	52	49	79	128	91	82	173	160	153	313	324	342	666
	Taxi	20	21	41	4	7	11	29	27	56	64	64	128	117	119	236
	Subway	170	179	349	70	103	173	424	420	844	994	969	1,963	1,658	1,671	3,329
	LIRR	1	1	2	11	21	32	4	4	8	9	9	18	25	35	60
	Bus	48	59	107	3	5	8	65	76	141	118	118	236	234	258	492
Walk	617	746	1,363	4	6	10	701	848	1,549	1,354	1,352	2,706	2,676	2,952	5,628	
Total	880	1,034	1,914	141	221	362	1,314	1,457	2,771	2,699	2,665	5,364	5,034	5,377	10,411	
PM (5-6)	Auto	33	94	127	532	97	629	185	196	381	374	210	584	1,124	597	1,721
	Taxi	10	15	25	46	8	54	26	26	52	54	41	95	136	90	226
	Subway	195	529	724	760	126	886	919	1,016	1,935	2,010	1,168	3,178	3,884	2,839	6,723
	LIRR	6	77	83	118	26	144	17	100	117	26	13	39	167	216	383
	Bus	21	55	76	32	6	38	53	81	134	122	88	210	228	230	458
Walk	210	227	437	41	7	48	304	280	584	873	768	1,641	1,428	1,282	2,710	
Total	475	997	1,472	1,529	270	1,799	1,504	1,699	3,203	3,459	2,288	5,747	6,967	5,254	12,221	
Pre-game (7-8 PM)	Auto	26	29	55	4,651	48	4,699	155	91	246	301	132	433	5,133	300	5,433
	Taxi	4	6	10	401	4	405	17	11	28	30	18	48	452	39	491
	Subway	140	160	300	6,642	63	6,705	749	444	1,193	1,583	712	2,295	9,114	1,379	10,493
	LIRR	6	20	26	1,029	13	1,042	16	27	43	21	9	30	1,072	69	1,141
	Bus	10	15	25	281	3	284	38	30	68	78	42	120	407	90	497
Walk	75	72	147	361	4	365	160	111	271	391	282	673	987	469	1,456	
Total	261	302	563	13,365	135	13,500	1,135	714	1,849	2,404	1,195	3,599	17,165	2,346	19,511	
Post-game (10-11 PM)	Auto	12	4	16	53	5,438	5,491	81	8	89	162	11	173	308	5,461	5,769
	Taxi	2	1	3	5	454	459	8	1	9	15	3	18	30	459	489
	Subway	62	22	84	76	7,074	7,150	387	41	428	842	64	906	1,367	7,201	8,568
	LIRR	2	2	4	12	1,454	1,466	6	3	9	12	0	12	32	1,459	1,491
	Bus	3	2	5	3	318	321	18	3	21	39	7	46	63	330	393
Walk	27	21	48	4	409	413	73	22	95	171	72	243	275	524	799	
Total	108	52	160	153	15,147	15,300	573	78	651	1,241	157	1,398	2,075	15,434	17,509	
Saturday (1-2 PM)	Auto	22	21	43	5,346	54	5,400	137	130	267	263	258	521	5,768	463	6,231
	Taxi	10	8	18	401	4	405	22	19	41	43	38	81	476	69	545
	Subway	97	85	182	5,881	59	5,940	319	305	624	747	710	1,457	7,044	1,159	8,203
	LIRR	1	1	2	1,069	11	1,080	6	6	12	13	13	26	1,089	31	1,120
	Bus	19	15	34	267	3	270	37	33	70	86	77	163	409	128	537
Walk	252	208	460	401	4	405	409	360	769	1,065	938	2,003	2,127	1,510	3,637	
Total	401	338	739	13,365	135	13,500	930	853	1,783	2,217	2,034	4,251	16,913	3,360	20,273	
Saturday (4-5 PM)	Auto	22	26	48	61	6,059	6,120	140	140	280	265	270	535	488	6,495	6,983
	Taxi	8	10	18	5	454	459	21	20	41	38	43	81	72	527	599
	Subway	85	98	183	67	6,665	6,732	318	348	666	725	762	1,487	1,195	7,873	9,068
	LIRR	1	1	2	12	1,212	1,224	7	11	18	13	13	26	33	1,237	1,270
	Bus	14	19	33	3	303	306	33	36	69	77	86	163	127	444	571
Walk	202	261	463	5	454	459	354	387	741	950	1,077	2,027	1,511	2,179	3,690	
Total	332	415	747	153	15,147	15,300	873	942	1,815	2,068	2,251	4,319	3,426	18,755	22,181	

Notes:

⁽¹⁾ Includes blocks 1120, 1121, 1128, 1129.

Table 4
Travel Demand Forecast for the Commercial Mixed-Use Variation - 2016
(Person Trips)

Person Trips by Mode:	Site 5			Arena Block						Residential Blocks ⁽¹⁾			Total Trips		
	Office/Local Retail			Arena			Residential/Office/Local Retail			Residential/Local Retail			Total Trips		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM (8-9)															
Auto	139	8	147	120	5	125	339	120	459	99	378	477	697	511	1,208
Taxi	14	3	17	10	0	10	31	11	42	16	35	51	71	48	120
Subway	758	49	807	172	7	179	1,836	626	2,462	537	1,969	2,506	3,303	2,651	5,954
LIRR	137	6	143	27	1	28	313	20	333	7	26	33	484	53	537
Bus	72	7	79	7	0	7	165	32	197	35	95	130	279	134	413
Walk	109	65	174	9	0	9	180	130	310	269	448	717	567	643	1,210
Total	1,229	138	1,367	345	13	358	2,864	939	3,803	963	2,951	3,914	5,401	4,041	9,442
MD (12-1)															
Auto	22	29	51	49	79	128	70	83	153	160	153	313	301	344	645
Taxi	22	25	47	4	7	11	30	37	67	64	64	128	120	133	253
Subway	150	172	322	70	103	173	371	415	786	994	969	1,963	1,585	1,659	3,244
LIRR	0	0	0	11	21	32	2	2	4	9	9	18	22	32	54
Bus	67	89	156	3	5	8	124	175	299	118	118	236	312	387	699
Walk	855	1,121	1,976	4	6	10	1,457	2,061	3,518	1,354	1,352	2,706	3,670	4,540	8,210
Total	1,116	1,436	2,552	141	221	362	2,054	2,773	4,827	2,699	2,665	5,364	6,010	7,095	13,105
PM (5-6)															
Auto	14	163	177	532	97	629	124	416	540	374	210	584	1,044	886	1,930
Taxi	9	21	30	46	8	54	17	42	59	54	41	95	126	112	238
Subway	100	905	1,005	760	126	886	669	2,264	2,933	2,010	1,168	3,178	3,539	4,463	8,002
LIRR	8	157	165	118	26	144	26	361	387	26	13	39	178	557	735
Bus	18	92	110	32	6	38	43	204	247	122	88	210	215	390	605
Walk	197	246	443	41	7	48	252	336	588	873	768	1,641	1,363	1,357	2,720
Total	346	1,584	1,930	1,529	270	1,799	1,131	3,623	4,754	3,459	2,288	5,747	6,465	7,765	14,230
Pre-game (7-8 PM)															
Auto	12	41	53	4,651	48	4,699	108	126	234	301	132	433	5,072	347	5,419
Taxi	4	6	10	401	4	405	10	12	22	30	18	48	445	40	485
Subway	69	226	295	6,642	63	6,705	565	676	1,241	1,583	712	2,295	8,859	1,677	10,536
LIRR	10	39	49	1,029	13	1,042	28	91	119	21	9	30	1,088	152	1,240
Bus	9	23	32	281	3	284	33	56	89	78	42	120	401	124	525
Walk	64	74	138	361	4	365	118	109	227	391	282	673	934	469	1,403
Total	168	409	577	13,365	135	13,500	862	1,070	1,932	2,404	1,195	3,599	16,799	2,809	19,608
Post-game (10-11 PM)															
Auto	2	6	8	53	5,438	5,491	49	14	63	162	11	173	266	5,469	5,735
Taxi	1	1	2	5	454	459	4	2	6	15	3	18	25	460	485
Subway	13	32	45	76	7,074	7,150	252	76	328	842	64	906	1,183	7,246	8,429
LIRR	1	5	6	12	1,454	1,466	6	11	17	12	0	12	31	1,470	1,501
Bus	2	3	5	3	318	321	12	7	19	39	7	46	56	335	391
Walk	20	22	42	4	409	413	49	25	74	171	72	243	244	528	772
Total	39	69	108	153	15,147	15,300	372	135	507	1,241	157	1,398	1,805	15,508	17,313
Saturday (1-2 PM)															
Auto	7	6	13	5,346	54	5,400	76	74	150	263	258	521	5,692	392	6,084
Taxi	9	7	16	401	4	405	12	11	23	43	38	81	465	60	525
Subway	63	51	114	5,881	59	5,940	218	205	423	747	710	1,457	6,909	1,025	7,934
LIRR	0	0	0	1,069	11	1,080	3	3	6	13	13	26	1,085	27	1,112
Bus	18	14	32	267	3	270	31	27	58	86	77	163	402	121	523
Walk	249	198	447	401	4	405	386	322	708	1,065	938	2,003	2,101	1,462	3,563
Total	346	276	622	13,365	135	13,500	726	642	1,368	2,217	2,034	4,251	16,654	3,087	19,741
Saturday (4-5 PM)															
Auto	6	14	20	61	6,059	6,120	78	93	171	265	270	535	410	6,436	6,846
Taxi	7	10	17	5	454	459	11	13	24	38	43	81	61	520	581
Subway	56	102	158	67	6,665	6,732	221	310	531	725	762	1,487	1,069	7,839	8,908
LIRR	1	8	9	12	1,212	1,224	7	21	28	13	13	26	33	1,254	1,287
Bus	13	19	32	3	303	306	25	34	59	77	86	163	118	442	560
Walk	173	214	387	5	454	459	269	310	579	950	1,077	2,027	1,397	2,055	3,452
Total	256	367	623	153	15,147	15,300	611	781	1,392	2,068	2,251	4,319	3,088	18,546	21,634

Notes:
⁽¹⁾ Includes blocks 1120, 1121, 1128, 1129.

Table 5
Comparison of 2016 Peak Hour Travel
Residential Variation vs. Commercial Variation

Person Trips

Peak Hour	Residential Variation	Commercial Variation	Net Difference	% Difference
8-9 AM	7,698	9,442	(1,744)	(23%)
12-1 PM (midday)	10,411	13,105	(2,694)	(26%)
5-6 PM	12,221	14,230	(2,009)	(16%)
7-8 PM (pre-game)	19,511	19,608	(97)	(1%)
10-11 PM (post-game)	17,509	17,313	196	1%
Saturday 1-2 PM	20,273	19,741	532	3%
Saturday 4-5 PM	22,181	21,634	547	3%

Vehicle Trips (Auto/Taxi/Truck)

Peak Hour	Residential Variation	Commercial Variation	Net Difference	% Difference
8-9 AM	972	1,099	(127)	(13%)
12-1 PM (midday)	718	728	(10)	(1%)
5-6 PM	1,331	1,489	(158)	(12%)
7-8 PM (pre-game)	3,020	2,989	31	1%
10-11 PM (post-game)	2,981	2,952	29	1%
Saturday 1-2 PM	3,050	2,919	131	4%
Saturday 4-5 PM	3,380	3,251	129	4%

Transit Trips (Subway/Bus/LIRR)

Peak Hour	Residential Variation	Commercial Variation	Net Difference	% Difference
8-9 AM	5,362	6,904	(1,542)	(29%)
12-1 PM (midday)	3,881	3,997	(116)	(3%)
5-6 PM	7,564	9,342	(1,778)	(24%)
7-8 PM (pre-game)	12,131	12,301	(170)	(1%)
10-11 PM (post-game)	10,452	10,321	131	1%
Saturday 1-2 PM	9,860	9,569	291	3%
Saturday 4-5 PM	10,909	10,755	154	1%

store) currently located on Block 927 (Site 5). However, the travel demand forecast conservatively assumes no credit for the travel demand from these existing uses that would be displaced in the Build condition.

As shown in Table 5, the number of person trips generated by the residential mixed-use variation (inbound and outbound combined) would range from 7,698 in the AM peak hour to 22,181 in the Saturday 4-5 PM post-game peak hour. The commercial mixed-use variation, would generate from 9,442 peak hour person trips (in the AM) to 21,634 (in the Saturday 4-5 PM post-game). The commercial mixed-use variation would generate 1,744 more trips than the proposed project in the weekday AM peak hour, 2,694 more trips in the midday, 2,009 more trips in the PM peak hour. By contrast, the residential mixed-use variation would generate 532 more person trips than the commercial mixed-use variation during the Saturday 1-2 PM pre-game peak hour, and 547 more trips in the Saturday 4-5 PM post-game peak hour. During the weekday 7-8 PM pre-game and 10-11 PM post-game periods, the travel demand from the two variations would differ by roughly one percent (fewer than 200 trips).

The numbers of peak hour vehicle trips that would be generated by the residential mixed-use variation and the commercial mixed-use variation are also summarized in Table 5, and are shown in detail in Tables 6 and 7, respectively. As was the case for person trips, the commercial mixed-use variation would generate more vehicle trips (from 10 to 158 more) in the AM, midday and PM peak hours, while the residential mixed-use variation would generate a higher number of trips in the Saturday pre-game and post-game peak hours (131 and 129 more, respectively). During the weekday 7-8 PM pre-game and 10-11 PM post-game periods, the number of vehicle trips generated by the two variations are virtually the same, differing by roughly one percent (31 and 29 trips, respectively).

As demonstrated by the data in Table 5, the commercial mixed-use variation would generate a substantially higher level of total travel demand (from 16 to 26 percent higher) compared to the residential mixed-use variation in the key weekday AM, midday and PM peak hours. During the weekday 7-8 PM and 10-11 PM periods, the demand from the two variations would be roughly equivalent, differing by approximately one percent. By contrast, on Saturdays the residential mixed-use variation would generate approximately three percent more trips than the commercial mixed-use variation during the 1-2 PM and 4-5 PM peak hours. The commercial mixed-use variation was therefore selected as the reasonable worst case scenario (RWCS) for the weekday transportation analyses, while the residential mixed-use variation is analyzed as the RWCS for the two Saturday peak hours.

As shown in Table 4, under the commercial mixed-use variation, new trips by subway are expected to total 5,954, 8,002 and 10,536 during the analyzed weekday 8-9 AM, 5-6 PM and 7-8 PM peak hours, respectively. New bus trips would total 413 and 605 during the weekday 8-9 AM and 5-6 PM peak hours analyzed for potential bus impacts. New weekday peak hour trips on the Long Island Rail Road would range from 54 (in the midday) to 1,501 (in the 10-11 PM post-game peak hour). As shown in Table 7, the commercial mixed-use variation is expected to add between 438 and 2,581 autos to the study area street system in each weekday peak hour, and from 120 to 412 new taxi trips. Peak hour truck trips would increase by from 6 to 84 in each weekday peak hour. In general, the highest numbers of new weekday vehicle trips would occur during the 7-8 PM (pre-game) and 10-11 PM (post-

**Table 6
Travel Demand Forecast for the Residential Mixed-Use Variation - 2016
(Vehicle Trips)**

Peak Hour Vehicle Trips	Site 5			Arena			Arena Block			Residential Blocks ⁽¹⁾			Total Trips		
	Residential/Office/Local Retail			Arena			Residential/Office/Hotel/Local Retail			Residential/Retail			Total Trips		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM (8-9)	53	23	76	51	2	53	100	154	254	81	318	399	285	497	782
Auto	5	5	10	3	3	6	36	36	72	27	21	48	53	53	106
Taxi ⁽²⁾	4	4	8	4	4	8	13	13	26	21	21	42	42	42	84
Truck	4	4	8	4	4	8	13	13	26	21	21	42	42	42	84
Total	62	32	94	58	9	67	131	185	316	129	366	495	380	592	972
MD (12-1 PM)	16	17	33	21	34	55	68	63	131	122	117	239	227	231	458
Auto	16	16	32	4	4	8	26	26	52	50	50	100	96	96	192
Taxi ⁽²⁾	1	1	2	1	1	2	2	2	4	3	3	6	6	6	12
Truck	4	4	8	4	4	8	9	9	18	17	17	34	34	34	68
Total	36	37	73	29	42	71	103	98	201	189	184	373	357	361	718
PM (5-6 PM)	20	66	86	227	41	268	152	149	301	309	170	479	713	426	1,139
Auto	12	12	24	16	16	32	22	22	44	39	39	78	89	89	178
Taxi ⁽²⁾	1	1	2	1	1	2	2	2	4	4	3	6	7	7	14
Truck	1	1	2	1	1	2	2	2	4	3	3	6	7	7	14
Total	38	79	117	244	58	302	176	173	349	351	212	563	809	522	1,331
Pre-Game (7-8 PM)	20	21	41	1,979	21	2,000	127	71	198	255	110	365	2,381	223	2,604
Auto	3	6	9	165	165	330	18	18	36	20	20	40	206	206	412
Taxi ⁽²⁾	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Truck	24	25	49	2,144	186	2,330	146	90	236	275	130	405	2,589	431	3,020
Total	47	53	100	4,148	352	4,500	273	169	442	550	240	790	5,176	657	5,833
Post-Game (10-11 PM)	9	2	11	23	2,314	2,337	67	5	72	136	7	143	235	2328	2563
Auto	1	1	2	191	191	382	6	6	12	10	10	20	208	208	416
Taxi ⁽²⁾	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	3	13	214	2,505	2,719	74	12	86	146	17	163	444	2,537	2,981
Saturday (1-2 PM)	16	15	31	1,944	20	1,964	109	106	215	214	214	428	2,283	355	2,638
Auto	8	8	16	137	137	274	23	23	46	33	33	66	201	201	402
Taxi ⁽²⁾	0	0	0	0	0	0	2	2	4	2	2	4	5	5	10
Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	24	23	47	2,083	159	2,242	133	130	263	249	249	498	2,489	561	3,050
Saturday (4-5 PM)	16	20	36	22	2,203	2,225	111	112	223	219	219	438	368	2,554	2,922
Auto	9	9	18	161	161	322	24	24	48	35	35	70	229	229	458
Taxi ⁽²⁾	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	25	29	54	183	2,364	2,547	135	136	271	254	254	508	597	2,783	3,380

Notes:
⁽¹⁾ Balanced taxi trips shown.
⁽²⁾ Includes blocks 1120, 1121, 1128, 1129.

**Table 7
Travel Demand Forecast for the Commercial Mixed-Use Variation - 2016
(Vehicle Trips)**

Peak Hour Vehicle Trips	Site 5 Office/Local Retail			Arena Block Arena			Arena Block Residential/Office/ Local Retail			Residential Blocks ⁽²⁾ Residential/Local Retail			Total Trips		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
	AM (9-9)	97	5	102	51	2	53	242	99	341	81	318	399	471	424
Axles	9	9	18	3	3	6	21	21	42	27	27	54	60	60	120
Taxi ⁽¹⁾	4	4	8	4	4	8	13	13	26	21	21	42	42	42	84
Truck	110	18	128	58	9	67	276	133	409	129	366	495	573	526	1,099
Total	13	18	31	21	34	55	52	61	113	122	117	239	208	230	438
MD (12-1 PM)	13	20	40	4	4	8	34	34	68	50	100	100	108	108	216
Axles	4	4	8	4	4	8	12	12	24	17	17	34	37	37	74
Taxi ⁽¹⁾	37	42	79	29	42	71	98	107	205	189	184	373	353	375	728
Truck	9	113	122	227	41	268	101	301	402	309	170	479	646	625	1,271
Total	15	15	30	17	17	34	23	23	46	39	39	78	100	100	200
PM (5-5 PM)	25	129	154	245	59	304	134	334	468	351	212	563	755	734	1,489
Axles	8	28	36	1,979	21	2,000	87	93	180	255	110	365	2,329	252	2,581
Taxi ⁽¹⁾	4	4	8	164	164	328	13	13	26	20	20	40	201	201	402
Truck	1	1	2	2	0	2	2	2	4	0	0	0	3	3	6
Total	13	33	46	2,143	185	2,328	102	108	210	275	130	405	2,533	456	2,989
Pre-Game (7-9 PM)	1	3	4	23	2,314	2,337	40	10	50	136	7	143	200	2,334	2,534
Axles	0	1	1	193	193	386	3	3	6	10	10	20	206	206	412
Taxi ⁽¹⁾	1	1	2	2	0	2	2	2	4	0	0	0	3	3	6
Truck	2	4	6	216	2,507	2,723	45	15	60	148	17	163	409	2,543	2,952
Total	4	2	6	1,944	20	1,964	62	61	123	214	214	428	2,224	297	2,521
Saturday (1-2 PM)	7	7	14	141	141	282	12	12	24	33	33	66	193	193	386
Axles	0	0	0	2	2	4	2	2	4	2	2	4	6	6	12
Taxi ⁽¹⁾	11	9	20	2,087	163	2,250	76	75	151	249	249	498	2,423	496	2,919
Truck	3	8	11	22	2,203	2,225	64	75	139	219	219	438	308	2,505	2,813
Total	7	7	14	163	163	326	14	14	28	35	35	70	219	219	438
Saturday (4-5 PM)	10	15	25	185	2,366	2,551	78	89	167	254	254	508	527	2,724	3,251
Axles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxi ⁽¹⁾	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck	10	15	25	185	2,366	2,551	78	89	167	254	254	508	527	2,724	3,251
Total															

Notes:
⁽¹⁾ Balanced taxi trips shown.
⁽²⁾ Includes blocks 1120, 1121, 1128, 1129.

game) peak hours, primarily as a result of demand en route to and from the arena. As shown in Table 6, on Saturdays, the residential mixed-use variation (the RWCS for the Saturday analyses) would add an estimated 2,638 auto, 402 taxi and 10 truck trips to the street system in the 1-2 PM peak hour, and 2,922 auto, 458 taxi and no truck trips in the 4-5 PM peak hour.

PARKING DEMAND

Based on the travel demand assumptions discussed above, the proposed arena is expected to generate a daily parking demand of approximately 2,800 spaces on a typical Nets weekday game day, and approximately 2,600 spaces on weekends. Although some of this parking demand would be generated by arena employees and non-spectator visitors over the course of a day, the majority of the demand would occur during game times on weekday evenings, as well as on weekends.

Parking demand generated by new residential development will be forecast assuming a rate of 0.4 spaces per dwelling unit based on auto ownership data from the 2000 Census for neighborhoods in the vicinity of the site. (This rate is also consistent with the rate assumed for the residential component of the Downtown Brooklyn Development project.) The rate assumed for parking demand from new hotel space – 0.20 spaces per room overnight – is based on data from the *Renaissance Plaza Expansion EAS*. Parking demand from new office and retail space will be derived from the forecasts of daily auto trips for these uses.

To accommodate projected parking demand, it is anticipated that both the residential mixed-use variation and the commercial mixed-used variation would include approximately 3,800 spaces in parking garages located on Site 5, the Arena Block and blocks 1120, 1128 and 1129. These shared parking facilities would service demand from all project components – arena, residential and commercial. Office and retail demand would peak in the midday period and decline during the afternoon and evening, allowing for additional capacity to be used for residential and hotel demand (which typically peak in the overnight) and for demand from the arena. With the exception of the arena, parking demand generated under either variation would be fully accommodated in the off-street parking facilities that would be developed on-site. Accounting for commercial and residential demand, it is anticipated that approximately 1,100 spaces would be available on-site on weekdays to accommodate the parking needs of the arena, while the remaining arena demand (totaling approximately 1,700 spaces) would be accommodated at public off-street parking facilities located in the vicinity. The analysis of off-street parking will therefore examine conditions at public off-street parking facilities within a 1/2-mile radius of the arena. On-street parking conditions within 1/4-mile of the site will also be examined to determine the effects of street closures and other changes in on-street parking supply in the vicinity of the project site.

TRIP ASSIGNMENT

Auto/Taxi

The distribution of auto and taxi trips for each project component (office, residential, hotel, local retail and arena) by borough/county or region is shown in Table 8. The distributions for office, residential and hotel uses were based on data from the 2000 Census, while the assignment for the arena component was based on data from both the Downtown Brooklyn Development project and the expected geographical distribution of demand to the arena (see "Transportation Planning Assumptions," above). Given the differences in their travel demand characteristics, each project component is expected to have a unique trip assignment pattern. For example, a majority of the auto trips generated by the residential and hotel components are expected to have endpoints in Manhattan (60%) and Brooklyn (33%), while office trips are expected to be more widely dispersed, with five percent en route to/from Manhattan, 53 percent to/from Brooklyn, 17 percent to/from Queens, eight percent to/from Long Island and five percent to/from New Jersey. The arena is expected to draw not only from Brooklyn, Queens and Manhattan, but also from New Jersey and Long Island. As previously discussed, separate assignments for trips arriving and departing the arena on weekdays are assumed in order to reflect the fact that on weekdays some spectators would likely travel to the arena from their workplaces, and then depart to residences in a different borough or county at the conclusion of a game. As the project's retail component is expected to consist primarily of local retail uses serving the surrounding worker and residential populations, all of its trips are expected to be local Brooklyn-based.

Auto and taxi trips will be assigned to the primary corridors providing access to and from the project site based on their origin or destination as well as the most direct routes to major access points such as the Brooklyn-Queens Expressway and Brooklyn and Manhattan bridges. The auto and taxi trip assignment patterns along the corridors providing access to Site 5 and the Arena Block are illustrated in Appendix B, while the assignments for auto and taxi trips en route to and from Blocks 1120, 1121, 1128 and 1129 are provided in Appendix C. The assignments of auto and taxi (as well as truck) trips will take into account changes to the study area traffic network that are expected to occur by the 2010 and 2016 Build years as a result of No Build developments and initiatives by NYCDOT and other agencies. These include street closures and changes in street directions proposed as mitigation for the Downtown Brooklyn Development project.

As discussed above, it is anticipated that approximately 1,100 spaces would be available on-site to accommodate the parking needs of the arena, while the remaining arena demand (totaling approximately 1,700 spaces on weekdays) would be accommodated at public off-street facilities located in the vicinity. The assignment of arena auto trips will therefore reflect this distribution of trips to both on-site parking facilities and directly to off-site parking facilities.

Truck

Truck trips en route to and from the site will be assigned to designated local and through truck routes in Downtown Brooklyn. These include Atlantic, Flatbush, Third, and Fourth Avenues, and portions of Fifth Avenue and Bergen Street.

**Table 8
Project Increment Auto and Taxi Trip Assignment Patterns**

Auto Trips		West/Put/Duc Rock/Orange Connecticut							Total
		Bronx	Brooklyn	Manhattan	Queens	Staten Isl.	Long Island	New Jersey	
Office ¹	5.0%	53.0%	5.0%	17.0%	5.0%	8.0%	2.0%	5.0%	100.0%
Residential/Hotel ¹	1.0%	33.0%	60.0%	2.5%	0.5%	1.0%	0.5%	1.5%	100.0%
Local Retail	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Arena weekday (inbound)	5.5%	34.5%	8.6%	10.1%	10.5%	9.7%	5.0%	16.1%	100.0%
Arena weekday (outbound)	5.4%	33.4%	6.7%	9.8%	10.2%	11.6%	4.9%	18.0%	100.0%
Arena weekend (in/out)	4.1%	29.9%	6.0%	8.5%	10.0%	15.0%	6.0%	20.5%	100.0%

Taxi/Black Car Trips		West/Put/Duc Rock/Orange Connecticut							Total
		Bronx	Brooklyn	Manhattan	Queens	Staten Isl.	Long Island	New Jersey	
Office ¹	5.0%	53.0%	5.0%	17.0%	5.0%	8.0%	2.0%	5.0%	100.0%
Residential/Hotel ¹	1.0%	33.0%	60.0%	2.5%	0.5%	1.0%	0.5%	1.5%	100.0%
Local Retail	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Arena - weekday (inbound)	1.0%	40.3%	33.6%	3.0%	3.4%	8.0%	2.0%	8.7%	100.0%
Arena - weekday (outbound)	1.0%	41.7%	27.8%	3.1%	3.5%	10.4%	2.1%	10.4%	100.0%
Arena - weekend	1.0%	40.4%	26.9%	6.1%	3.4%	10.1%	2.0%	10.1%	100.0%

Notes:
¹Source: 2000 Census data.



Atlantic Yards Arena and Redevelopment Project

Traffic Study Area

Figure 3

Diverted Traffic

In addition to the project's generating new travel demand by autos, taxis and trucks, permanent roadway closures and changes in street direction associated with the proposed project would alter traffic flows in the vicinity of the project site in the 2010 and 2016 analysis years. These would include the permanent closure of Pacific Street between Flatbush and Sixth Avenues, and between Carlton and Vanderbilt Avenues; and the permanent closure of Fifth Avenue between Flatbush and Atlantic Avenues. Sixth Avenue would be converted from one-way southbound to two-way operation between Atlantic and Flatbush Avenues both to facilitate access to and from the project site and to provide an alternative route for some of the traffic diverted off of Fifth Avenue. Carlton Avenue would be converted from one-way northbound to two-way operation between Atlantic Avenue and Pacific Street, also to provide for local circulation. The analysis of 2010 and 2016 Build traffic conditions will assume that No Build traffic diverted off of Fifth Avenue would be distributed among parallel north-south corridors, including Fourth Avenue, Flatbush Avenue and Sixth Avenue. As the segments of Pacific Street to be closed primarily provide access to adjacent land uses, diversions as a result of these closures are expected to be localized.

Transit/Pedestrian

The distribution of project-generated subway trips for each project component by borough/county or region is shown in Table 9. As was the case for auto and taxi trips, these assignment patterns were based on Census data and data from the Downtown Brooklyn Development project and the arena demand distribution. They differ from the assignment of auto trips primarily with respect to the project's arena component. As shown in Table 9, from 36 to 43 percent of subway trips generated by the arena are expected to be en route to or from Manhattan, 24 to 26 percent en route to or from Brooklyn and 10 to 12 percent en route to or from Queens. Arena spectators en route to or from New Jersey via PATH or NJ Transit trains and buses would account for approximately 14 to 18 percent of subway trips.

Project-generated bus and walk trips are assumed to be local within Brooklyn. Trips by commuter rail (i.e., Long Island Rail Road) are assumed to have origins or destinations primarily in Nassau or Suffolk counties.

TRAFFIC STUDY AREA

As shown in Figure 3, the traffic study area, which extends upwards of 1.2 miles from the project site, is bounded on the north by Tillary Street/Park Avenue, on the south by Eastern Parkway/Union Street, on the east by Grand Avenue, and on the west by Hicks Street. The study area encompasses a total of 93 intersections along local streets proximate to the project site or that would likely be affected by project-related changes to the street network, as well as along arterials that would provide access to or from the site. Given the numerous corridors providing access to the project site, including Atlantic, Flatbush, Carlton, Vanderbilt, Washington, Third, Fourth, Fifth and Sixth avenues, project-generated traffic is expected to be widely dispersed to the north, south, east and west, and is expected to become rapidly

**Table 9
Project Increment Subway Trip Assignment Patterns**

Land Use	Bronx	Brooklyn	Manhattan	Queens	Staten Isi.	Long Island	West/Put/Duc		Total
							Rock/Orange Connecticut	New Jersey	
Office ¹	5.0%	53.0%	5.0%	17.0%	5.0%	8.0%	2.0%	5.0%	100.0%
Residential/Hotel ¹	1.0%	33.0%	60.0%	2.5%	0.5%	1.0%	0.5%	1.5%	100.0%
Local Retail	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Arena - weekday (inbound)	2.1%	24.2%	42.3%	10.9%	2.5%	1.2%	2.4%	14.4%	100.0%
Arena - weekday (outbound)	2.2%	25.7%	36.0%	11.6%	2.7%	1.5%	2.6%	17.7%	100.0%

Notes:

¹Source: 2000 Census data.

less concentrated with increasing distance from the project site. The traffic study area therefore focuses on locations where new traffic is expected to be most concentrated, and does not include more distant locations along regional access corridors such as the BQE, Brooklyn-Battery Tunnel or across the East River Bridges to Manhattan. The study area does, however, include key intersections along corridors connecting these regional access routes and the project site (including all intersections along Flatbush Avenue Extension as far north as Tillary Street).

SUBWAY STATIONS SELECTED FOR ANALYSIS

As part of the proposed project, improvements to the Atlantic Avenue/Pacific Street subway station complex would provide direct access between the project site and the subway routes serving this facility (the B, D, M, N, Q, R and Nos. 2, 3, 4 and 5 trains). The large majority of project-generated subway trips are therefore expected to utilize this station complex. However, some trips are also expected to occur at other stations that are either served by trains not accessible at Atlantic Avenue/Pacific Street or that would also provide reasonably convenient access to the project site. For example, some trips by Nos. (2) and (3) trains would likely use the Bergen Street station given its proximity to the proposed buildings along Sixth Avenue and on blocks to the east. The Fulton Street (G) station, the Lafayette Avenue (C) station, and the Washington-Clinton Avenues (C) station would also be used by project-generated trips as neither (C) train nor (G) train service is available at Atlantic Avenue/Pacific Street.

Table 10 shows the numbers of new entering and exiting subway trips that would be generated by the commercial mixed-use variation at each of these stations in the three peak hours analyzed for subway station impacts (weekday AM, PM and 7-8 PM pre-game). The *CEQR Technical Manual* typically requires a detailed analysis of a subway station when the incremental increase in peak hour trips totals 200 persons per hour or more. As shown in Table 10, new subway trips generated by the commercial mixed-use variation would exceed this threshold in one or more analyzed peak hours at the Atlantic Avenue/Pacific Street station complex (upwards of 9,549 new trips in each peak hour), Bergen Street station (upwards of 346 new trips in each analyzed peak hour), the Lafayette Avenue station (upwards of 467 new trips in each peak hour), and the Fulton Street station (246 and 254 new trips in the 5-6 PM and 7-8 PM peak hours, respectively). These stations were therefore selected for quantitative analysis in the EIS.

The analysis of subway station conditions will examine key station elements, including stairways, escalators, walkways and fare arrays, under peak 15-minute flow conditions. As subway demand generated by the arena is expected to be heavily surged, especially at the conclusion of an event such as a Nets basketball game, the analysis will incorporate peaking factors of 1.36 for arena subway trips during the 7-8 PM pre-game period and 1.84 for trips during the 10-11 PM post-game period. These factors were derived from data in the *Madison Square Garden Modal Split Analysis* study and MTA ridership data from stations serving Madison Square Garden.

Table 10
2016 Peak Hour Trips Generated by the
Commercial Mixed-Use Variation at Area Subway Stations

Subway Station	8-9 AM Peak Hour			5-6 PM Peak Hour			7-8 PM (Pre-Game) Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Atlantic Ave (2,3,4,5)	1,241	1,334	2,575	1,794	1,671	3,465	716	4,737	5,453
Atlantic Ave (B,Q)	515	567	1,082	783	694	1,477	306	1,782	2,088
Pacific St (D,M,N,R)	501	915	1,416	1,202	698	1,900	402	1,606	2,008
Bergen St (2,3)	157	107	264	178	168	346	79	129	208
Lafayette Ave (C)	122	236	358	305	162	467	101	354	455
Clinton-Wash. Aves (C)	60	17	77	38	64	102	22	48	70
Fulton St (G)	56	126	182	163	83	246	52	202	254
Total	2,652	3,302	5,954	4,463	3,540	8,003	1,678	8,858	10,536



Not To Scale

- Project Site
- Analyzed Pedestrian Facility
- C1 Corner and Adjacent Crosswalks
- S2— Sidewalk
- X3— Crosswalk

ASSIGNMENT OF PROJECT-GENERATED BUS TRIPS

Downtown Brooklyn is well served by numerous bus routes operated by MTA New York City Transit (NYC Transit), and many of these routes operate in close proximity to the project site along Atlantic, Flatbush, Third, Fifth and Vanderbilt Avenues, and Dean, Bergen and Fulton Streets. Bus patrons en route to and from the project site would therefore likely find it unnecessary to walk substantial distances to access a needed bus service. Consequently, the analysis of project-generated bus trips focuses on the 12 routes located within 1/4-mile of the site, as it is on these routes that project trips would be most heavily concentrated. These routes include the B25, B26, B37, B38, B41, B45, B52, B63, B65, B67, B69 and B103. Assignment of project increment bus trips to individual routes will be based on existing demand patterns and the relative proximity of each route to the proposed development blocks.

ASSIGNMENT OF PROJECT-GENERATED PEDESTRIAN TRIPS

Figure 4 shows the sidewalk, corner area and crosswalk locations selected for analysis of potential pedestrian impacts. These locations were selected as they serve as key links between the project site and the surrounding street system, and/or would be used by concentrations of project-generated pedestrian demand linked to other modes (i.e., en route to subway stations, bus stops or off-site parking garages). The majority of subway-linked

pedestrian trips would be assigned to the proposed new on-site entrance to the Atlantic Avenue/Pacific Street station complex. Additional subway-linked pedestrian trips would be assigned to corridors connecting the site to other nearby stations. Pedestrians linked to the bus mode are expected to be most concentrated along Flatbush and Atlantic Avenues where stops for many of the routes are located. Some pedestrian trips are also expected to cross Atlantic Avenue to access bus routes operating along Fulton Street. Pedestrians walking between off-site parking facilities and the arena are expected to be most concentrated at the crosswalks at the intersection of Flatbush and Atlantic Avenues as the majority of off-site parking facilities are located to the north and west of the project site. Parking demand from the project's commercial and residential components would be fully accommodated at on-site facilities, and are not expected to generate substantial walk trips outside of the project site. Walk-only trips (i.e., walk trips not associated with other modes) would be widely dispersed among links between the project site and the surrounding street system.

APPENDIX A

TRIP ORIGIN AND MODAL SPLIT ASSUMPTIONS FOR WEEKDAY AND WEEKEND SPORTING EVENTS AT THE PROPOSED ATLANTIC YARDS ARENA

Atlantic Yards Arena and Redevelopment Project
Atlantic Yards Arena Trip Origin/Destination and Modal Split Assumptions
Weekday Sporting Event (Arriving)

Madison Square Garden (MSG) Trip Origins ⁽¹⁾	Atlantic Yards Arena Estimated Range		Trip O/D Assumed for Atlantic Yards Arena	
Manhattan	36%	15%-25%	25%	
Bronx	4%	2%-4%	3%	
Brooklyn	7%	25%-35%	30%	
Queens	6%	8%-10%	9%	
Staten Island	3%	4%-6%	5%	
Nassau/Suffolk	12%	12%-18%	12%	
Westchester	5%	2%-4%	3%	
New Jersey	21%	10%-20%	13%	
Other	6%	0%	0%	
Total	100%		100%	

MSG: Modal Split by Origin ⁽¹⁾		Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	9%	18%	41%	3%	29%	0%	0%	100%	
Bronx	58%	0%	37%	4%	0%	0%	1%	100%	
Brooklyn	51%	3%	42%	1%	3%	0%	0%	100%	
Queens	37%	0%	45%	5%	0%	13%	0%	100%	
Staten Island	72%	2%	16%	10%	0%	0%	0%	100%	
Nassau/Suffolk	21%	0%	2%	0%	0%	77%	0%	100%	
Westchester	56%	2%	4%	0%	0%	0%	38%	100%	
New Jersey	38%	2%	1%	0%	0%	0%	59%	100%	
Other	48%	3%	9%	3%	3%	15%	19%	100%	

MSG: Trip Distribution by Origin and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
3.2%	6.5%	14.8%	1.1%	10.4%	0.0%	0.0%	36%	
2.3%	0.0%	1.5%	0.2%	0.0%	0.0%	0.0%	4%	
3.6%	0.2%	2.9%	0.1%	0.2%	0.0%	0.0%	7%	
2.2%	0.0%	2.7%	0.3%	0.0%	0.8%	0.0%	6%	
2.2%	0.1%	0.5%	0.3%	0.0%	0.0%	0.0%	3%	
2.5%	0.0%	0.2%	0.0%	0.0%	9.2%	0.0%	12%	
2.8%	0.1%	0.2%	0.0%	0.0%	0.0%	1.9%	5%	
8.0%	0.4%	0.2%	0.0%	0.0%	0.0%	12.4%	21%	
2.9%	0.2%	0.5%	0.2%	0.2%	0.9%	1.1%	6%	
29.7%	7.5%	23.6%	2.1%	10.8%	10.9%	15.5%	100.0%	

Atlantic Yards Arena: Modal Split by Origin/Destination ⁽²⁾								
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	12%	4%	84%	0%	0%	0%	0%	100%
Bronx	64%	1%	35%	0%	0%	0%	0%	100%
Brooklyn	40%	4%	40%	7%	9%	0%	0%	100%
Queens	39%	1%	60%	0%	0%	0%	0%	100%
Staten Island	73%	2%	25%	0%	0%	0%	0%	100%
Nassau/Suffolk	28%	2%	5%	0%	0%	65%	0%	100%
Westchester	58%	2%	40%	0%	0%	0%	0%	100%
New Jersey	43%	2%	55%	0%	0%	0%	0%	100%

Atlantic Yards Arena: Distribution by Origin/Destination and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
3.0%	1.0%	21.0%	0.0%	0.0%	0.0%	0.0%	25.0%	
1.9%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	3.0%	
12.0%	1.2%	12.0%	2.1%	2.7%	0.0%	0.0%	30.0%	
3.5%	0.1%	5.4%	0.0%	0.0%	0.0%	0.0%	9.0%	
3.7%	0.1%	1.3%	0.0%	0.0%	0.0%	0.0%	5.0%	
3.4%	0.2%	0.6%	0.0%	0.0%	7.8%	0.0%	12.0%	
1.7%	0.1%	1.2%	0.0%	0.0%	0.0%	0.0%	3.0%	
5.6%	0.3%	7.2%	0.0%	0.0%	0.0%	0.0%	13.0%	
34.8%	3.0%	49.7%	2.1%	2.7%	7.8%	0.0%	100.0%	

MSG: Total Modal Split		Atlantic Yards Arena: Total Modal Split	
Auto	29.7%	Auto	34.8%
Taxi	7.5%	Taxi	3.0%
Subway	23.6%	Subway	49.7%
Bus	2.1%	Bus	2.1%
Walk	10.8%	Walk	2.7%
LIRR	10.9%	LIRR	7.8%
Other ⁽³⁾	15.5%	Other ⁽³⁾	0.0%
Total	100.0%	Total	100.0%

Atlantic Yards Arena: Trip Assignment by Mode						
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR
Manhattan	8.6%	33.6%	42.3%	0.0%	0.0%	0.0%
Bronx	5.5%	1.0%	2.1%	0.0%	0.0%	0.0%
Brooklyn	34.5%	40.3%	24.2%	100.0%	100.0%	0.0%
Queens	10.1%	3.0%	10.9%	0.0%	0.0%	0.0%
Staten Island	10.5%	3.4%	2.5%	0.0%	0.0%	0.0%
Nassau/Suffolk	9.7%	8.1%	1.2%	0.0%	0.0%	100.0%
Westchester	5.0%	2.0%	2.4%	0.0%	0.0%	0.0%
New Jersey	16.1%	8.7%	14.4%	0.0%	0.0%	0.0%
100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

⁽¹⁾ Source: Madison Square Garden Modal Split Analysis, August 26, 2003.

⁽²⁾ Based on data developed for the Downtown Brooklyn Development project.

⁽³⁾ "Other" category for MSG includes: PATH, Metro-North, NJ Transit.

Patrons attending Atlantic Yards Arena events who use these "Other" transit modes are assumed to arrive/depart Downtown Brooklyn via subway.

Atlantic Yards Arena and Redevelopment Project
Atlantic Yards Arena Trip Origin/Destination and Modal Split Assumptions
Weekday Sporting Event (Departing)

Madison Square Garden (MSG) Trip Origins ⁽¹⁾	Atlantic Yards Arena Estimated Range		Trip O/D Assumed for Atlantic Yards Arena	
Manhattan	36%	15%-25%	20%	
Bronx	4%	2%-4%	3%	
Brooklyn	7%	25%-35%	30%	
Queens	6%	8%-10%	9%	
Staten Island	3%	4%-6%	5%	
Nassau/Suffolk	12%	12%-18%	15%	
Westchester	5%	2%-4%	3%	
New Jersey	21%	10%-20%	15%	
Other	6%	0%	0%	
Total	100%		100%	

MSG: Modal Split by Origin ⁽¹⁾		Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	9%	18%	41%	3%	29%	0%	0%	100%	
Bronx	58%	0%	37%	4%	0%	0%	1%	100%	
Brooklyn	51%	3%	42%	1%	3%	0%	0%	100%	
Queens	37%	0%	45%	5%	0%	13%	0%	100%	
Staten Island	72%	2%	16%	10%	0%	0%	0%	100%	
Nassau/Suffolk	21%	0%	2%	0%	0%	77%	0%	100%	
Westchester	56%	2%	4%	0%	0%	0%	38%	100%	
New Jersey	38%	2%	1%	0%	0%	0%	59%	100%	
Other	48%	3%	9%	3%	3%	15%	19%	100%	

MSG: Trip Distribution by Origin and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
3.2%	6.5%	14.8%	1.1%	10.4%	0.0%	0.0%	36%	
2.3%	0.0%	1.5%	0.2%	0.0%	0.0%	0.0%	4%	
3.6%	0.2%	2.9%	0.1%	0.2%	0.0%	0.0%	7%	
2.2%	0.0%	2.7%	0.3%	0.0%	0.8%	0.0%	6%	
2.2%	0.1%	0.5%	0.3%	0.0%	0.0%	0.0%	3%	
2.5%	0.0%	0.2%	0.0%	0.0%	9.2%	0.0%	12%	
2.8%	0.1%	0.2%	0.0%	0.0%	0.0%	1.9%	5%	
8.0%	0.4%	0.2%	0.0%	0.0%	0.0%	12.4%	21%	
2.9%	0.2%	0.5%	0.2%	0.2%	0.9%	1.1%	6%	
29.7%	7.5%	23.6%	2.1%	10.8%	10.9%	15.5%	100.0%	

Atlantic Yards Arena: Modal Split by Origin/Destination ⁽²⁾								
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	12%	4%	84%	0%	0%	0%	0%	100%
Bronx	64%	1%	35%	0%	0%	0%	0%	100%
Brooklyn	40%	4%	40%	7%	9%	0%	0%	100%
Queens	39%	1%	60%	0%	0%	0%	0%	100%
Staten Island	73%	2%	25%	0%	0%	0%	0%	100%
Nassau/Suffolk	28%	2%	5%	0%	0%	65%	0%	100%
Westchester	58%	2%	40%	0%	0%	0%	0%	100%
New Jersey	43%	2%	55%	0%	0%	0%	0%	100%

Atlantic Yards Arena: Distribution by Origin/Destination and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
2.4%	0.8%	16.8%	0.0%	0.0%	0.0%	0.0%	20.0%	
1.9%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	3.0%	
12.0%	1.2%	12.0%	2.1%	2.7%	0.0%	0.0%	30.0%	
3.5%	0.1%	5.4%	0.0%	0.0%	0.0%	0.0%	9.0%	
3.7%	0.1%	1.3%	0.0%	0.0%	0.0%	0.0%	5.0%	
4.2%	0.3%	0.8%	0.0%	0.0%	9.8%	0.0%	15.0%	
1.7%	0.1%	1.2%	0.0%	0.0%	0.0%	0.0%	3.0%	
6.5%	0.3%	8.3%	0.0%	0.0%	0.0%	0.0%	15.0%	
35.9%	2.9%	46.7%	2.1%	2.7%	9.8%	0.0%	100.0%	

MSG: Total Modal Split		Atlantic Yards Arena: Total Modal Split	
Auto	29.7%	Auto	35.9%
Taxi	7.5%	Taxi	2.9%
Subway	23.6%	Subway	46.7%
Bus	2.1%	Bus	2.1%
Walk	10.8%	Walk	2.7%
LIRR	10.9%	LIRR	9.8%
Other ⁽³⁾	15.5%	Other ⁽³⁾	0.0%
Total	100.0%	Total	100.0%

Atlantic Yards Arena: Trip Assignment by Mode						
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR
Manhattan	6.7%	27.8%	36.0%	0.0%	0.0%	0.0%
Bronx	5.4%	1.0%	2.2%	0.0%	0.0%	0.0%
Brooklyn	33.5%	41.7%	25.7%	100.0%	100.0%	0.0%
Queens	9.8%	3.1%	11.6%	0.0%	0.0%	0.0%
Staten Island	10.2%	3.5%	2.7%	0.0%	0.0%	0.0%
Nassau/Suffolk	11.7%	10.4%	1.6%	0.0%	0.0%	100.0%
Westchester	4.9%	2.1%	2.6%	0.0%	0.0%	0.0%
New Jersey	18.0%	10.4%	17.7%	0.0%	0.0%	0.0%
100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

⁽¹⁾ Source: Madison Square Garden Modal Split Analysis, August 26, 2003.

⁽²⁾ Based on data developed for the Downtown Brooklyn Development project.

⁽³⁾ "Other" category for MSG includes: PATH, Metro-North, NJ Transit.

Patrons attending Atlantic Yards Arena events who use these "Other" transit modes are assumed to arrive/depart Downtown Brooklyn via subway.

Atlantic Yards Arena and Redevelopment Project
Atlantic Yards Arena Trip Origin/Destination and Modal Split Assumptions
Weekend Sporting Event (Arriving and Departing)

Madison Square Garden (MSG) Trip Origins ⁽¹⁾	Atlantic Yards	
	Arena Estimated Range	Trip O/D Assumed for Atlantic Yards Arena
Manhattan	15%-25%	20%
Bronx	2%-4%	3%
Brooklyn	25%-35%	30%
Queens	8%-10%	9%
Staten Island	4%-6%	5%
Nassau/Suffolk	12%-18%	15%
Westchester	2%-4%	3%
New Jersey	10%-20%	15%
Other	0%	0%
Total	100%	100%

MSG: Modal Split by Origin ⁽¹⁾								
Origin	Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	14%	23%	28%	2%	33%	0%	0%	100%
Bronx	50%	0%	41%	8%	0%	0%	1%	100%
Brooklyn	51%	3%	46%	0%	0%	0%	0%	100%
Queens	54%	4%	28%	0%	0%	14%	0%	100%
Staten Island	83%	0%	17%	0%	0%	0%	0%	100%
Nassau/Suffolk	33%	2%	0%	0%	0%	65%	0%	100%
Westchester	92%	0%	0%	0%	0%	0%	8%	100%
New Jersey	54%	0%	0%	0%	0%	0%	46%	100%
Other	61%	6%	8%	0%	0%	6%	19%	100%

MSG: Trip Distribution by Origin and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
4.2%	6.9%	8.4%	0.6%	9.9%	0.0%	0.0%	30%	
1.5%	0.0%	1.2%	0.2%	0.0%	0.0%	0.0%	3%	
4.6%	0.3%	4.1%	0.0%	0.0%	0.0%	0.0%	9%	
3.8%	0.3%	2.0%	0.0%	0.0%	1.0%	0.0%	7%	
0.8%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	1%	
4.6%	0.3%	0.0%	0.0%	0.0%	9.1%	0.0%	14%	
6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	7%	
12.4%	0.0%	0.0%	0.0%	0.0%	0.0%	10.6%	23%	
3.7%	0.4%	0.5%	0.0%	0.0%	0.4%	1.1%	6%	
42.0%	8.1%	16.4%	0.8%	9.9%	10.4%	12.3%	100.0%	

Atlantic Yards Arena: Modal Split by Origin ⁽²⁾								
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total
Manhattan	12%	4%	84%	0%	0%	0%	0%	100%
Bronx	55%	1%	44%	0%	0%	0%	0%	100%
Brooklyn	40%	4%	40%	6%	10%	0%	0%	100%
Queens	38%	2%	58%	2%	0%	0%	0%	100%
Staten Island	80%	2%	18%	0%	0%	0%	0%	100%
Nassau/Suffolk	40%	2%	4%	0%	0%	54%	0%	100%
Westchester	80%	2%	18%	0%	0%	0%	0%	100%
New Jersey	55%	2%	43%	0%	0%	0%	0%	100%

Atlantic Yards Arena: Distribution by Origin/Destination and Mode								
Auto	Taxi	Subway	Bus	Walk	LIRR	Other ⁽³⁾	Total	
2.4%	0.8%	16.8%	0.0%	0.0%	0.0%	0.0%	20.0%	
1.7%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	3.0%	
12.0%	1.2%	12.0%	1.8%	3.0%	0.0%	0.0%	30.0%	
3.4%	0.2%	5.2%	0.2%	0.0%	0.0%	0.0%	9.0%	
4.0%	0.1%	0.9%	0.0%	0.0%	0.0%	0.0%	5.0%	
6.0%	0.3%	0.6%	0.0%	0.0%	8.1%	0.0%	15.0%	
2.4%	0.1%	0.5%	0.0%	0.0%	0.0%	0.0%	3.0%	
8.2%	0.3%	6.5%	0.0%	0.0%	0.0%	0.0%	15.0%	
40.1%	3.0%	43.8%	2.0%	3.0%	8.1%	0.0%	100.0%	

MSG: Total Modal Split			Atlantic Yards Arena: Total Modal Split		
Auto	42.0%		Auto	40.1%	
Taxi	8.1%		Taxi	3.0%	
Subway	16.4%		Subway	43.8%	
Bus	0.8%		Bus	2.0%	
Walk	9.9%		Walk	3.0%	
LIRR	10.4%		LIRR	8.1%	
Other ⁽³⁾	12.3%		Other ⁽³⁾	0.0%	
Total	100.0%		Total	100.0%	

Atlantic Yards Arena: Trip Assignment by Mode						
Origin/Destination	Auto	Taxi	Subway	Bus	Walk	LIRR
Manhattan	6.0%	26.9%	38.3%	0.0%	0.0%	0.0%
Bronx	4.1%	1.0%	3.0%	0.0%	0.0%	0.0%
Brooklyn	29.9%	40.4%	27.4%	90.9%	100.0%	0.0%
Queens	8.5%	6.1%	11.9%	9.1%	0.0%	0.0%
Staten Island	10.0%	3.4%	2.1%	0.0%	0.0%	0.0%
Nassau/Suffolk	15.0%	10.1%	1.4%	0.0%	0.0%	100.0%
Westchester	6.0%	2.0%	1.2%	0.0%	0.0%	0.0%
New Jersey	20.5%	10.1%	14.7%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

⁽¹⁾ Source: Madison Square Garden Modal Split Analysis, August 26, 2003.

⁽²⁾ Based on data developed for the Downtown Brooklyn Development project.

⁽³⁾ "Other" category for MSG includes: PATH, Metro-North, NJ Transit.

Patrons attending Atlantic Yards Arena events who use these "Other" transit modes are assumed to arrive/depart Downtown Brooklyn via subway.

TRANSPORTATION PLANNING ASSUMPTIONS FOR THE
MADISON SQUARE GARDEN RELOCATION AND EXPANSION



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 New York, NY 10004
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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
 M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: November 11, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Madison Square Garden Relocation and Expansion Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1689

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for a potential relocation and expansion of Madison Square Garden (MSG) in the traffic, parking, transit, and pedestrian analyses of the DGEIS. Under the proposed action, MSG – currently located on the western portion of the block bounded by West 31st Street, West 33rd Street, Seventh Avenue, and Eighth Avenue – would move approximately one and a half blocks to the west (to the eastern portion of the block bounded by West 31st Street, West 33rd Street, Ninth Avenue, and Tenth Avenue). Regardless of its future location¹, the DGEIS will also assume that the overall seating capacity of MSG would be increased.²

Background

MSG is the home of three sports franchises: the New York Rangers (NHL hockey), New York Knicks (NBA basketball), and New York Liberty (WNBA basketball). Its 19,500-seat³ arena serves as a venue for a number of other events including concerts, college basketball games, and the circus. MSG also includes a theater that can accommodate up to 5,600 spectators, which currently hosts concerts, boxing, family shows, and annual events such as the NBA and NFL drafts. A 36,000 square foot expo center is located adjacent to the arena and is used for trade shows, consumer fairs, and also provides additional storage space for certain events held on the arena floor.

A comprehensive list of all events held at MSG in 2002 (including events held in the arena, theater, and expo center) is provided in Table 1. For clarity, dark days (days when no events were scheduled), including days reserved for loading, unloading, and storage activities are designated by shading. As shown in Table 1, MSG's peak period throughout the year generally coincides with the New York Rangers' and New York Knicks' seasons during the late fall, winter, and early spring. In 2002, a total of 266 arena events were held on 224 days (there were 30 days on which multiple events were held; nearly half of these days involved circus

Table 1: 2002 Madison Square Garden Events

Date	Day of Week	Event	ARENA		THEATER (includes lobby)		EXPO CENTER		
			Start Time	Event	Start Time	Event	Start Time	Event	
1/1/02	Tuesday								
1/2/02	Wednesday								
1/3/02	Thursday	NBA Basketball: Knicks vs. Dallas	7:30 PM	Load-Out					
1/4/02	Friday								
1/5/02	Saturday	College Basketball: St. John's vs. West Virginia	2:00 PM	Load-Out					
1/6/02	Sunday	NBA Basketball: Knicks vs. Boston	7:30 PM	Load-Out					
1/7/02	Monday	Load-In							
1/7/02	Monday	Wrestling: WWF RAW	7:45 PM	Restoration					
1/8/02	Tuesday	Wrestling: WWF Smackdown	7:30 PM	Restoration					
1/9/02	Wednesday	NHL Hockey: Rangers vs. Los Angeles	8:00 PM	Restoration					
1/10/02	Thursday								
1/11/02	Friday								
1/12/02	Saturday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM						
1/13/02	Sunday								
1/14/02	Monday	NHL Hockey: Rangers vs. Columbus	7:00 PM						
1/15/02	Tuesday								
1/16/02	Wednesday			Comedy: David Brenner (lobby)	8:00 PM	Load-In			
1/17/02	Thursday			Comedy: David Brenner (lobby)	8:00 PM	Load-In			
1/18/02	Friday			Comedy: David Brenner (lobby)	8:00 PM		Burlington Coat Sale	9:00 AM	
1/19/02	Saturday	Ice Show: Super Skate	7:00 PM		Comedy: David Brenner (lobby)	10:30 PM			
1/19/02	Saturday			Comedy: David Brenner (lobby)	8:00 PM		Burlington Coat Sale	9:00 AM	
1/20/02	Sunday	College Basketball: St. John's vs. Villanova	2:00 PM	Comedy You Can't Refuse (lobby)	7:00 PM		Burlington Coat Sale	11:00 AM	
1/21/02	Monday	NBA Basketball: Knicks vs. Charlotte	1:00 PM	Comedy You Can't Refuse (lobby)	10:00 PM		Burlington Coat Sale	9:00 AM	
1/22/02	Tuesday						Load-Out		
1/22/02	Wednesday	NHL Hockey: Rangers vs. Boston	7:00 PM						
1/24/02	Thursday	NBA Basketball: Knicks vs. Phoenix	7:30 PM						
1/25/02	Friday	Rangers Skating Party	9:00 AM	Load-In				Rangers Skating Party	9:00 AM
1/26/02	Saturday	NHL Hockey: Rangers vs. Washington	1:00 PM		Boxing: Mosley vs. Forrest	7:00 PM			
1/27/02	Sunday	College Basketball: St. John's vs. Providence	9:00 PM						
1/27/02	Sunday	Rangers Skating Party	9:00 AM					Rangers Skating Party	9:00 AM
1/28/02	Monday	NHL Hockey: Rangers vs. Tampa Bay	7:00 PM					Track Storage	
1/29/02	Tuesday	NBA Basketball: Knicks vs. Philadelphia	7:30 PM		Awards: Archer	6:30 PM		Track Storage	
1/30/02	Wednesday	NHL Hockey: Rangers vs. NY Islanders	7:00 PM					Track Storage	
1/31/02	Thursday	Load-In						Track Storage	
2/1/02	Friday	Milrose Games	5:00 PM		Comedy: Class Clowns (lobby)	8:00 PM		Warmup Area	N/A
2/2/02	Saturday	Colgate Track	11:00 AM		Comedy: Class Clowns (lobby)	11:00 PM		Warmup Area & Carnival	N/A
2/3/02	Sunday	NBA Basketball: Knicks vs. Miami	12:00 PM						
2/4/02	Monday	Ice Maintenance							
2/5/02	Tuesday	NBA Basketball: Knicks vs. LA Clippers	7:30 PM	Load-In				Load-In	
2/6/02	Wednesday							Dog Show Setup	
2/7/02	Thursday	NBA Basketball: Knicks vs. Atlanta	7:30 PM		Family Show: Sesame Street	10:30 AM		Dog Show Setup	
2/8/02	Friday	Dream Game	12:00 PM		Family Show: Sesame Street	10:30 AM		Dog Show Benching	
2/8/02	Friday	Harlem Globetrotters	7:00 PM		Family Show: Sesame Street	2:00 PM			
2/9/02	Saturday	College Basketball: St. John's vs. Connecticut	7:00 PM		Family Show: Sesame Street	10:30 AM		Dog Show Benching	
2/9/02	Saturday				Family Show: Sesame Street	2:00 PM			
2/9/02	Saturday				Family Show: Sesame Street	5:30 PM			
2/10/02	Sunday	NHL Hockey: Rangers vs. Pittsburgh	1:00 PM		Family Show: Sesame Street	10:30 AM		Dog Show Benching	
2/10/02	Sunday				Family Show: Sesame Street	2:00 PM			
2/10/02	Sunday				Family Show: Sesame Street	5:30 PM			
2/11/02	Monday	Dog Show	8:00 AM		Family Show: Sesame Street	10:00 AM		Dog Show Benching	
2/11/02	Monday				Family Show: Sesame Street	2:00 PM			
2/12/02	Tuesday	Dog Show	8:00 AM		Storage			Dog Show Benching	
2/13/02	Wednesday	NBA Basketball: Knicks vs. Toronto	7:30 PM		Family Show: Sesame Street	10:30 AM		Load-Out	
2/14/02	Thursday	Concert: Luis Miguel	8:00 PM		Family Show: Sesame Street	10:30 AM			
2/15/02	Friday	NBA Basketball: Knicks vs. Detroit	7:30 PM		Family Show: Sesame Street	10:30 AM			
2/16/02	Saturday	Concert: Concierto Del Amor	8:00 PM		Family Show: Sesame Street	10:30 AM			
2/16/02	Saturday				Family Show: Sesame Street	2:00 PM			
2/16/02	Saturday				Family Show: Sesame Street	5:30 PM			
2/17/02	Sunday	NBA Basketball: Knicks vs. Utah	7:00 PM		Family Show: Sesame Street	10:30 AM			
2/17/02	Sunday				Family Show: Sesame Street	2:00 PM			
2/17/02	Sunday				Family Show: Sesame Street	5:30 PM			
2/18/02	Monday	College Basketball: St. John's vs. Boston College	7:00 PM		Family Show: Sesame Street	10:30 AM			
2/18/02	Monday				Family Show: Sesame Street	2:00 PM			
2/19/02	Tuesday	Maintenance							
2/20/02	Wednesday	Maintenance							
2/21/02	Thursday	Maintenance							
2/22/02	Friday	Concert: Crosby, Stills, Nash & Young	8:00 PM						
2/23/02	Saturday	Concert: Crosby, Stills, Nash & Young	8:00 PM						
2/24/02	Sunday	NBA Basketball: Knicks vs. LA Lakers	12:00 PM						
2/25/02	Monday	Ice Maintenance							
2/26/02	Tuesday	NHL Hockey: Rangers vs. New Jersey	7:00 PM					NY'S Bar Exam	9:00 AM
2/27/02	Wednesday	College Basketball: St. John's vs. Notre Dame	7:30 PM					NY'S Bar Exam	9:00 AM
2/28/02	Thursday	NHL Hockey: Rangers vs. Ottawa	7:00 PM						
3/1/02	Friday	NBA Basketball: Knicks vs. Seattle	7:30 PM					Load-In	
3/2/02	Saturday	NHL Hockey: Rangers vs. Philadelphia	3:00 PM					Teachers' Exam	8:30 AM
3/2/02	Saturday	NYPD vs. FDNY	8:00 PM						
3/3/02	Sunday	NBA Basketball: Knicks vs. San Antonio	3:00 PM					Knicks Kids' Day	1:00 PM
3/4/02	Monday	NHL Hockey: Rangers vs. Calgary	7:00 PM					Load-In	
3/5/02	Tuesday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM					Press	
3/6/02	Wednesday	College Basketball: Big East Doubleheader	12:00 PM					Press	
3/6/02	Wednesday	College Basketball: Big East Doubleheader	7:00 PM					Press	
3/7/02	Thursday	College Basketball: Big East Doubleheader	12:00 PM					Press	
3/7/02	Thursday	College Basketball: Big East Doubleheader	7:00 PM					Press	
3/8/02	Friday	College Basketball: Big East Doubleheader	7:00 PM		Concert: Beres Hammond	8:00 PM		Press	
3/9/02	Saturday	College Basketball: Big East Championship	8:00 PM					Press	
3/10/02	Sunday								
3/11/02	Monday	NHL Hockey: Rangers vs. Montreal	7:30 PM						
3/12/02	Tuesday	NBA Basketball: Knicks vs. Philadelphia	7:30 PM						
3/13/02	Wednesday	NHL Hockey: Rangers vs. Boston	8:00 PM						
3/14/02	Thursday	NBA Basketball: Knicks vs. Sacramento	7:30 PM						
3/15/02	Friday	Concert: Billy Joel & Elton John	7:30 PM						
3/16/02	Saturday	PSAL	11:00 AM						
3/16/02	Saturday	PSAL	1:00 PM						
3/16/02	Saturday	NBA Basketball: Knicks vs. Cleveland	7:30 PM						
3/17/02	Sunday	NHL Hockey: Rangers vs. Detroit	3:00 PM						

¹ An alternative to the proposed action includes MSG remaining at its present location.

² The NYCDP Hudson Yards Development Scenarios indicate that the arena seating capacity of MSG would increase from 19,500 to 23,000.

³ Actual attendance capacity varies by event (see Table 5).

Table 1: 2002 Madison Square Garden Events

Date	Day of Week	ARENA		THEATER (includes lobby)		EXPO CENTER	
		Event	Start Time	Event	Start Time	Event	Start Time
3/18/02	Monday						
3/19/02	Tuesday	NHL Hockey: Rangers vs. Vancouver	7:00 PM			Circus Stabling	
3/20/02	Wednesday					Circus Stabling	
3/21/02	Thursday	Circus: Ringling Brothers and Barnum & Bailey	7:30 PM			Circus Stabling	
3/22/02	Friday	Circus: Ringling Brothers and Barnum & Bailey NHL Hockey: Rangers vs. Atlanta	10:30 AM 7:00 PM	AFT Mayor's Circus	N/A	Circus Stabling	
3/23/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM	Concert: El Vacillon	8:00 PM	Circus Stabling	
3/24/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM			Circus Stabling	
3/25/02	Monday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Denver	10:30 AM 7:30 PM			Circus Stabling	
3/26/02	Tuesday	College Basketball: NIT Doubleheader	7:00 PM			Circus Stabling	
3/27/02	Wednesday	Graduation: NYPD NHL Hockey: Rangers vs. Philadelphia	11:00 AM 8:00 PM			Circus Stabling	
3/28/02	Thursday	College Basketball: NIT Doubleheader	6:30 PM			Circus Stabling	
3/29/02	Friday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Minnesota	12:00 PM 7:30 PM			Circus Stabling	
3/30/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM	Comedy: Garden Competition (lobby) Comedy: Garden Competition (lobby)	8:00 PM 10:30 PM	Circus Stabling	
3/31/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/1/02	Monday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM	Concert: Hot 97	8:00 PM	Circus Stabling	
4/2/02	Tuesday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Charlotte	12:00 PM 8:00 PM	Load-In		Circus Stabling	
4/3/02	Wednesday	Circus: Ringling Brothers and Barnum & Bailey Basketball: McDonald's Games	12:00 PM 5:00 PM	Press Conference	12:00 PM	Circus Stabling	
4/4/02	Thursday	Basketball: McDonald's Games	8:00 PM			Circus Stabling	
4/5/02	Friday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/6/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	3:00 PM 7:30 PM			Circus Stabling	
4/7/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM			Circus Stabling	
4/8/02	Monday	NHL Hockey: Rangers vs. Pittsburgh	7:00 PM			Clean	
4/9/02	Tuesday	Dream Game NBA Basketball: Knicks vs. Orlando	1:00 PM 7:30 PM	Comedy: KISS-FM (lobby)	8:00 PM	Clean	
4/10/02	Wednesday	NHL Hockey: Rangers vs. Toronto	7:00 PM	Load-In		Clean	
4/11/02	Thursday	NBA Basketball: Knicks vs. Chicago	7:30 PM	Boxing: Golden Gloves	7:30 PM	Clean	
4/12/02	Friday	Concert: Luis Miguel	8:00 PM	Boxing: Golden Gloves	7:30 PM		
4/13/02	Saturday	Ice Show: Target Stars on Ice	8:00 PM	Load-In			
4/14/02	Sunday			Load-In			
4/15/02	Monday			Load-In			
4/16/02	Tuesday			Load-In			
4/17/02	Wednesday	NBA Basketball: Knicks vs. New Jersey	7:30 PM	Meeting: Coca-Cola Shareholders	9:30 AM		
4/18/02	Thursday			Load-In			
4/19/02	Friday			Load-In			
4/20/02	Saturday	Concert: HOLA New York	8:00 PM	NFL Draft	12:00 PM		
4/21/02	Sunday			NFL Draft	12:00 PM		
4/22/02	Monday					Load-In	
4/23/02	Tuesday			Comedy: KISS-FM (lobby)	8:00 PM	Job Fair	11:00 AM
4/24/02	Wednesday			Load-In			
4/25/02	Thursday			Load-In		Destinations Showcase	12:00 PM
4/26/02	Friday	Concert: Paul McCartney	8:00 PM	Load-In			
4/27/02	Saturday	Concert: Paul McCartney	8:00 PM	CPR Seminar (lobby) Boxing: McCline vs. Briggs	9:00 AM 6:30 PM		
4/28/02	Sunday						
4/29/02	Monday			Liberty Media Day	10:00 AM		
4/30/02	Tuesday						
5/1/02	Wednesday			Religious: Bountiful Blessings	7:00 PM		
5/2/02	Thursday			Religious: Bountiful Blessings	11:00 AM	Load-In	
5/3/02	Friday			Religious: Bountiful Blessings	7:00 PM		
5/4/02	Saturday			Religious: Bountiful Blessings	11:00 AM	Load-In	
5/5/02	Sunday			Religious: Bountiful Blessings	7:00 PM		
5/6/02	Monday					Storage	
5/7/02	Tuesday			Off-Price Sale	9:00 AM		
5/8/02	Wednesday			Comedy: KISS-FM (lobby)	8:00 PM	Off-Price Sale	9:00 AM
5/9/02	Thursday			Load-In		Load-Out	
5/10/02	Friday	Concert: Kid Rock	8:00 PM	Meeting: Regional Coke	10:00 AM		
5/11/02	Saturday			Set-Up		Teachers' Exam	8:30 AM
5/12/02	Sunday			Load-In			
5/13/02	Monday			Load-In			
5/14/02	Tuesday			Load-In			
5/15/02	Wednesday			Load-In			
5/16/02	Thursday	Set-Up		UPN Event	10:30 AM	Set-Up	
5/17/02	Friday	Emmys Dinner	5:30 PM	Awards: Daytime Emmys	9:00 PM	Emmys Dinner	5:30 PM
5/18/02	Saturday	WNBA Basketball: Liberty vs. Houston (preseason)	4:00 PM	Load-Out		Local 3 Elections	6:00 AM
5/19/02	Sunday						
5/20/02	Monday	Liberty Open Practice	7:00 PM	Graduation: NYU Law	10:30 AM	Court Repair	
5/21/02	Tuesday			Comedy: KISS-FM (lobby)	8:00 PM	Court Repair	
5/22/02	Wednesday			Graduation: New School	3:00 PM	Court Repair	
5/23/02	Thursday			Graduation: Yeshiva	11:00 AM	Court Repair	
5/24/02	Friday			Graduation: College of Dentistry	10:30 AM	Court Repair	
5/25/02	Saturday	Concert: Latin Show	8:00 PM	Comedy: Eddie Griffin	8:00 PM	Court Repair	
5/26/02	Sunday	Religious: Yogeshwar	3:00 PM	Religious: Yogeshwar	N/A	Court Repair	
5/27/02	Monday					Court Repair	

Table 1: 2002 Madison Square Garden Events

Date	Day of Week	ARENA		THEATER (includes lobby)		EXPO CENTER	
		Event	Start Time	Event	Start Time	Event	Start Time
5/28/02	Tuesday	Concert: Dave Matthews	7:30 PM				
5/29/02	Wednesday	Concert: Dave Matthews	7:30 PM	Graduation: Baruch	11:00 AM	Court Repair	
5/30/02	Thursday	Graduation: John Jay	10:30 AM	Graduation: Baruch	3:30 PM	Court Repair	
5/31/02	Friday	Concert: Blink 182 & Green Day	7:30 PM	Graduation: BMCC	11:30 AM	Court Repair	
6/1/02	Saturday					Court Repair	
6/2/02	Sunday	WNBA Basketball: Liberty vs. Miami	12:00 PM			Court Repair	
6/3/02	Monday			Graduation: NYC Tech	1:00 PM	Court Repair	
6/4/02	Tuesday			Meeting (lobby)	10:00 AM	Court Repair	
6/5/02	Wednesday	WNBA Basketball: Liberty vs. Detroit	7:30 PM			Court Repair	
6/6/02	Thursday					Court Repair	
6/7/02	Friday					Court Repair	
6/8/02	Saturday			Comedy: Chuck Nice Comedy: Chuck Nice	8:00 PM	Court Repair	
6/9/02	Sunday					Court Repair	
6/10/02	Monday					Court Repair	
6/11/02	Tuesday			Meeting: Port Authority	10:00 AM	Court Repair	
6/12/02	Wednesday					Court Repair	
6/13/02	Thursday	Concert: Andrea Bocelli	8:00 PM	Comedy: Grr! Genius Night (lobby)	8:00 PM	Court Repair	
6/14/02	Friday			Comedy Forum (lobby)	N/A	Court Repair	
6/15/02	Saturday					Court Repair	
6/16/02	Sunday	WNBA Basketball: Liberty vs. Charlotte	2:00 PM			Court Repair	
6/17/02	Monday	Dream Game	5:00 PM			Court Repair	
6/18/02	Tuesday	WNBA Basketball: Liberty vs. Orlando	7:30 PM			Court Repair	
6/19/02	Wednesday			Dinner (lobby)	5:30 PM	Court Repair	
6/20/02	Thursday			Graduation: Edward R. Murrow	6:30 PM	Court Repair	
6/21/02	Friday	Concert: Incubus	8:00 PM			Court Repair	
6/22/02	Saturday	Concert: Latin Concert	8:00 PM			Court Repair	
6/23/02	Sunday					Court Repair	
6/24/02	Monday	Concert: Korn	8:00 PM	Load-In		Court Repair	
6/25/02	Tuesday	WNBA Basketball: Liberty vs. Indiana	7:30 PM	Load-In		Court Repair	
6/26/02	Wednesday	Concert: Cher	8:00 PM	NBA Draft	7:00 PM	Court Repair	
6/27/02	Thursday	Concert: Cher	8:00 PM	Graduation (lobby)	11:00 AM	Load-In	
6/28/02	Friday	WNBA Basketball: Liberty vs. Cleveland	7:30 PM			Comic & Fantasy Expo	3:00 PM
6/29/02	Saturday	Wrestling: WWE RAW	8:00 PM			Comic & Fantasy Expo	10:00 AM
6/30/02	Sunday	WNBA Basketball: Liberty vs. Portland	4:00 PM			Comic & Fantasy Expo	10:00 AM
7/1/02	Monday	Film Shoot	12:00 PM	Film Shoot	8:00 AM	Load-Out	
7/2/02	Tuesday						
7/3/02	Wednesday						
7/4/02	Thursday						
7/5/02	Friday						
7/6/02	Saturday						
7/7/02	Sunday						
7/8/02	Monday	WNBA Basketball: Liberty vs. Phoenix	7:30 PM	Load-In			
7/9/02	Tuesday			Load-In			
7/10/02	Wednesday			Load-In			
7/11/02	Thursday			N/A	9:45 AM		
7/12/02	Friday	Concert: Marc Anthony	7:30 PM			Load-In	
7/13/02	Saturday			Tampax Tour	1:00 PM	Tour Exhibit	3:00 PM
7/14/02	Sunday			Concert: Chayanne	8:00 PM		
7/15/02	Monday						
7/16/02	Tuesday						
7/17/02	Wednesday						
7/18/02	Thursday	WNBA Basketball: Liberty vs. Los Angeles	8:00 PM	Blood Drive (lobby)	9:00 AM		
7/19/02	Friday						
7/20/02	Saturday	Concert: PA Colombia	7:30 PM			Teachers' Exam	8:30 AM
7/21/02	Sunday						
7/22/02	Monday	Dream Game WNBA Basketball: Liberty vs. Cleveland	1:00 PM 7:30 PM				
7/23/02	Tuesday			Load-In		Load-In	
7/24/02	Wednesday			Load-In		Load-In	
7/25/02	Thursday	Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 2:00 PM			Religious: Creflo Dollar	N/A
7/26/02	Friday	Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 2:00 PM			Religious: Creflo Dollar	N/A
7/27/02	Saturday	Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 7:00 PM			Religious: Creflo Dollar	N/A
7/28/02	Sunday	WNBA Basketball: Liberty vs. Houston	2:00 PM				
7/29/02	Monday	Dream Games Dream Games	1:00 PM 6:00 PM				
7/30/02	Tuesday	Liberty Open Practice	8:00 PM				
7/31/02	Wednesday	Concert: The Who	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
8/1/02	Thursday	Concert: The Who	7:30 PM			Storage	
8/2/02	Friday	WNBA Basketball: Liberty vs. Miami	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
8/3/02	Saturday	Concert: The Who	7:30 PM			Storage	
8/4/02	Sunday	Concert: The Who	7:30 PM			Storage	
8/5/02	Monday						
8/6/02	Tuesday	WNBA Basketball: Liberty vs. Minnesota	7:30 PM				
8/7/02	Wednesday	Concert: Lil Bow Wow	7:30 PM				
8/8/02	Thursday	WNBA Basketball: Liberty vs. Washington	7:30 PM				
8/9/02	Friday						
8/10/02	Saturday			Wedding Expo	11:00 AM		
8/11/02	Sunday	WNBA Basketball: Liberty vs. Charlotte	4:00 PM				
8/12/02	Monday	Concert: Bruce Springsteen	7:30 PM			Storage	
8/13/02	Tuesday	Knicks City Dancer Auditions	N/A	Comedy: Garden Competition (lobby)	8:00 PM		
8/14/02	Wednesday	Knicks City Dancer Auditions	N/A	Comedy: Garden Competition (lobby)	8:00 PM		
8/15/02	Thursday						
8/16/02	Friday					Avon Launch	N/A
8/17/02	Saturday						
8/18/02	Sunday	WNBA Basketball: Liberty vs. Indiana (playoffs)	12:00 PM				
8/19/02	Monday						
8/20/02	Tuesday	WNBA Basketball: Liberty vs. Indiana (playoffs)	8:00 PM				
8/21/02	Wednesday						
8/22/02	Thursday			Teacher's Seminar	9:00 AM	Teacher's Exhibits	12:00 PM

Table 1: 2002 Madison Square Garden Events

Date	Day of Week	ARENA		THEATER (includes lobby)		EXPO CENTER	
		Event	Start Time	Event	Start Time	Event	Start Time
8/23/02	Friday						
8/24/02	Saturday	WNBA Basketball: Liberty vs. Washington (playoffs)	8:00 PM				
8/25/02	Sunday	WNBA Basketball: Liberty vs. Washington (playoffs)	7:00 PM				
8/26/02	Monday	Wrestling: WWE RAW	7:45 PM				
8/27/02	Tuesday						
8/28/02	Wednesday						
8/29/02	Thursday	WNBA Basketball: Liberty vs. Los Angeles (playoffs)	7:30 PM				
8/30/02	Friday			Concert: Caribbean Concert	7:00 PM		
8/31/02	Saturday						
9/1/02	Sunday						
9/2/02	Monday						
9/3/02	Tuesday						
9/4/02	Wednesday						
9/5/02	Thursday						
9/6/02	Friday						
9/7/02	Saturday	Concert: Salsa Fest	8:00 PM				
9/8/02	Sunday						
9/9/02	Monday					Load-In	
9/10/02	Tuesday	Load-In				Job Fair	11:00 AM
9/11/02	Wednesday	Day of Hope and Healing	7:00 PM			Holding Area	
9/12/02	Thursday						
9/13/02	Friday			Load-In		Set-Up	
9/14/02	Saturday			Religious: 7th Day Adventists	9:30 AM	Religious: Adventists' Luncheon	1:30 PM
9/15/02	Sunday	Ice Maintenance					
9/16/02	Monday	Ice Maintenance					
9/17/02	Tuesday	Basketball: Wheelchair Basketball Classic	7:00 PM				
9/18/02	Wednesday	Ice Maintenance					
9/19/02	Thursday	Load-In		Season Opener (lobby)	5:30 PM		
9/20/02	Friday	Ice Show: Stars, Stripes & Skates	8:00 PM			Load-In	
9/21/02	Saturday	Concert: Viva Mexico	7:30 PM			Fannie Mae Home Fair	10:00 AM
9/22/02	Sunday	NHL Hockey: Rangers vs. Philadelphia (preseason)	5:00 PM				
9/23/02	Monday	Concert: Billy Joel & Elton John	7:30 PM				
9/24/02	Tuesday	NHL Hockey: Rangers vs. New Jersey (preseason)	7:00 PM	Graduation: LaGuardia	10:30 AM		
9/25/02	Wednesday	Load-In				Storage	
9/26/02	Thursday	Concert: Rolling Stones	8:00 PM			Storage	
9/27/02	Friday	Concert: Enrique Iglesias	8:00 PM			Load-In	
9/28/02	Saturday			Comedy: Vacion 69	8:00 PM		
9/29/02	Sunday	NHL Hockey: Rangers vs. Boston (preseason)	5:00 PM				
9/30/02	Monday			Load-In			
10/1/02	Tuesday			Concert: One Night With Light	8:00 PM		
10/2/02	Wednesday						
10/3/02	Thursday						
10/4/02	Friday						
10/5/02	Saturday	Concert: Marc Anthony & Carlos Vives	8:00 PM				
10/6/02	Sunday	Concert: Radio Jesus	3:00 PM				
10/7/02	Monday	Set-Up					
10/8/02	Tuesday	Concert: Music to My Ears	7:30 PM			Storage	
10/9/02	Wednesday	Set-Up		Employee Dinner (lobby)	5:30 PM		
10/10/02	Thursday	NBA Basketball: Knicks vs. San Antonio (preseason)	7:30 PM			Load-In	
10/11/02	Friday	NHL Hockey: Rangers vs. Montreal	7:00 PM			Load-In	
10/12/02	Saturday	FDNY Memorial	10:00 AM	Bar Mitzvah (lobby)	8:00 PM	Load-In	
10/13/02	Sunday	NBA Basketball: Knicks vs. Phoenix (preseason)	7:30 PM			Off-Price Sale	9:00 AM
10/14/02	Monday	Girl Scouts' Anniversary	2:00 PM			Off-Price Sale	9:00 AM
10/15/02	Tuesday	NHL Hockey: Rangers vs. Toronto	7:00 PM			Off-Price Sale	9:00 AM
10/16/02	Wednesday			Comedy: Garden Competition (lobby)	8:00 PM	Load-Out	
10/17/02	Thursday	Concert: Cher	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
10/18/02	Friday	Concert: Cher	8:00 PM	Comedy: Dave Chappelle	8:00 PM	Storage	
10/19/02	Saturday	NHL Hockey: Rangers vs. Nashville	7:00 PM	Concert: Rock & Roll Revival	7:30 PM		
10/20/02	Sunday	Concert: Vicente & Alejandro Fernandez	7:00 PM	Bar Mitzvah (lobby)	12:00 PM		
10/21/02	Monday	NHL Hockey: Rangers vs. Tampa Bay	7:00 PM				
10/22/02	Tuesday	NBA Basketball: Knicks vs. Utah (preseason)	7:30 PM	Learning Annex	6:30 PM		
10/23/02	Wednesday	NHL Hockey: Rangers vs. Washington	7:00 PM	Big East Media Day (lobby)	9:30 AM		
10/24/02	Thursday	Concert: Rush	8:00 PM	Awards: AFB (lobby)	5:30 PM		
10/25/02	Friday	NHL Hockey: Rangers vs. Los Angeles	7:00 PM	Religious: Church of Christ	7:00 PM		
10/26/02	Saturday			Religious: Church of Christ	9:00 AM		
				Religious: Church of Christ	2:00 PM		
				Religious: Church of Christ	7:00 PM		
10/27/02	Sunday	Religious: Church of Christ	3:00 PM				
10/28/02	Monday	NHL Hockey: Rangers vs. Phoenix	7:00 PM	Concert: Mana	8:00 PM		
10/29/02	Tuesday						
10/30/02	Wednesday						
10/31/02	Thursday						
11/1/02	Friday			Concert: Hopeville Tour	8:00 PM		
11/2/02	Saturday	NBA Basketball: Knicks vs. Boston	7:30 PM	Comedy: J. Anthony Brown	7:30 PM		
11/3/02	Sunday	NHL Hockey: Rangers vs. St. Louis	5:00 PM				
11/4/02	Monday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM				
11/5/02	Tuesday	NHL Hockey: Rangers vs. Edmonton	7:00 PM				
11/6/02	Wednesday	NBA Basketball: Knicks vs. Sacramento	7:00 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/7/02	Thursday	NHL Hockey: Rangers vs. Calgary	7:00 PM	Load-In			
11/8/02	Friday	Basketball: St. John's vs. Harlem Globetrotters	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/9/02	Saturday	Concert: Hispanos Unidos	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/10/02	Sunday	NBA Basketball: Knicks vs. New Orleans	4:00 PM	Load-In			
11/11/02	Monday	Concert: Bob Dylan	8:00 PM			Storage	
11/12/02	Tuesday	NBA Basketball: Knicks vs. Utah	7:30 PM	Load-In		Storage	
11/13/02	Wednesday	Concert: Bob Dylan	8:00 PM	Load-In		Storage	
11/14/02	Thursday	College Basketball: AT&T Doubleheader	7:00 PM	Load-In			
11/15/02	Friday	College Basketball: AT&T Doubleheader	6:30 PM	Load-In			
11/16/02	Saturday	NBA Basketball: Knicks vs. Philadelphia	1:00 PM	Comedy: Garden Competition (lobby)	9:00 PM	Storage	
11/17/02	Sunday	Wrestling: WWE Survivor Series	7:45 PM	Load-In		Storage	
11/18/02	Monday	NBA Basketball: Knicks vs. Detroit	7:30 PM	Load-In			
11/19/02	Tuesday	NHL Hockey: Rangers vs. Anaheim	7:00 PM	Load-In			
11/20/02	Wednesday	Concert: Shakira	9:00 PM	Load-In		Storage	
11/21/02	Thursday	Concert: Peter Gabriel	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
11/22/02	Friday			Load-In			
11/23/02	Saturday	NHL Hockey: Rangers vs. NY Islanders	1:00 PM	Rehearsal			

Table 1: 2002 Madison Square Garden Events

Date	Day of Week	ARENA		THEATER (includes lobby)		EXPO CENTER	
		Event	Start Time	Event	Start Time	Event	Start Time
11/24/02	Sunday	NBA Basketball: Knicks vs. Minnesota	7:00 PM	Rehearsal			
11/25/02	Monday	NHL Hockey: Rangers vs. Carolina	7:00 PM	Rehearsal			
11/26/02	Tuesday	Concert: The Other Ones	7:30 PM	Rehearsal		Storage	
11/27/02	Wednesday	College Basketball: NIT Doubleheader	7:00 PM	Rehearsal			
11/28/02	Thursday						
11/29/02	Friday	College Basketball: NIT Doubleheader	6:30 PM	Musical: A Christmas Carol	1:00 PM		
				Musical: A Christmas Carol	5:00 PM		
				Musical: A Christmas Carol	8:00 PM		
11/30/02	Saturday	NBA Basketball: Knicks vs. New Orleans	1:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
				Musical: A Christmas Carol	8:00 PM		
12/1/02	Sunday	NHL Hockey: Rangers vs. Tampa Bay	1:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
12/2/02	Monday	NBA Basketball: Knicks vs. Cleveland	7:30 PM				
12/3/02	Tuesday	NHL Hockey: Rangers vs. Columbus	7:00 PM				
12/4/02	Wednesday	NBA Basketball: Knicks vs. Orlando	7:30 PM	Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	7:30 PM		
12/5/02	Thursday	Concert: Guns & Roses	7:30 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	7:30 PM	Storage	
12/6/02	Friday	NHL Hockey: Rangers vs. Buffalo	7:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	5:00 PM	Load-In	
				Musical: A Christmas Carol	8:00 PM		
12/7/02	Saturday	College Basketball Tripleheader	12:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM	Teachers' Exam	8:30 AM
				Musical: A Christmas Carol	8:00 PM		
12/8/02	Sunday	NHL Hockey: Rangers vs. Boston	1:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/9/02	Monday	Concert: KISS-FM R&B Jam	7:00 PM			Storage	
12/10/02	Tuesday	NBA Basketball: Knicks vs. Seattle	7:30 PM				
12/11/02	Wednesday	NHL Hockey: Rangers vs. Chicago	8:00 PM	Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	7:30 PM	Storage	
12/12/02	Thursday	Concert: Z-100 Jingle Ball	7:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	5:00 PM	Storage	
12/13/02	Friday	Concert: Tom Petty	7:30 PM	Musical: A Christmas Carol	8:00 PM		
				Musical: A Christmas Carol	11:00 AM		
12/14/02	Saturday	College Basketball Doubleheader	12:00 PM	Musical: A Christmas Carol	2:00 PM		
		NBA Basketball: Knicks vs. Boston	7:30 PM	Musical: A Christmas Carol	5:00 PM		
				Musical: A Christmas Carol	8:00 PM		
12/15/02	Sunday			Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/16/02	Monday	NHL Hockey: Rangers vs. San Jose	7:00 PM				
12/17/02	Tuesday	NBA Basketball: Knicks vs. New Jersey	7:30 PM				
12/18/02	Wednesday	Concert: WKTU's Miracle on 34th Street	7:30 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM	Storage	
				Musical: A Christmas Carol	7:30 PM		
12/19/02	Thursday	NHL Hockey: Rangers vs. Montreal	7:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	7:30 PM		
12/20/02	Friday	Concert: Dave Mathews	7:30 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	5:00 PM	Storage	
				Musical: A Christmas Carol	8:00 PM		
12/21/02	Saturday	Concert: Dave Mathews	7:30 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM	Storage	
				Musical: A Christmas Carol	5:00 PM		
				Musical: A Christmas Carol	8:00 PM		
12/22/02	Sunday	NBA Basketball: Knicks vs. Miami	7:00 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/23/02	Monday	NHL Hockey: Rangers vs. New Jersey	7:00 PM			Set-Up	
12/24/02	Tuesday					Set-Up	
12/25/02	Wednesday			Musical: A Christmas Carol	2:00 PM	Day of Giving Dinner	2:00 PM
12/26/02	Thursday	NHL Hockey: Rangers vs. Pittsburgh	7:00 PM	Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/27/02	Friday	College Basketball: Holiday Festival Doubleheader	6:30 PM	Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/28/02	Saturday	College Basketball: Holiday Festival Doubleheader	3:00 PM	Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
				Musical: A Christmas Carol	8:00 PM		
12/29/02	Sunday			Musical: A Christmas Carol	11:00 AM		
				Musical: A Christmas Carol	2:00 PM		
				Musical: A Christmas Carol	5:00 PM		
12/30/02	Monday	NBA Basketball: Knicks vs. San Antonio	7:30 PM				
12/31/02	Tuesday	Concert: Phish	8:00 PM			Storage	

Source: Madison Square Garden, 2003.

Color Key:

Dark Day (includes loading, unloading, and/or storage activities)



performances). Over the course of the year, 141 dark days occurred at the arena (109 on weekdays, 13 on Saturdays, and 19 on Sundays).

Table 1 also illustrates the pattern in the scheduling of events held at the theater and expo center. Out of the 177 events held at the theater in 2002, 83 involved performances of “Sesame Street Live” and “A Christmas Carol”, two productions that primarily occurred during the months of February and December, respectively. Multiple performances of these shows (typically three) were usually held on the same day. For this reason, there were only 120 days on which events were scheduled (there were 39 days on which multiple events were held – 22 of these involved performances of “A Christmas Carol”). Over the course of the year, there were 245 days on which there was no event at the theater (178 of the dark days were on weekdays, 27 were on Saturdays, and 40 were on Sundays). As shown in Table 1, when compared to the arena and theater, there were relatively few public events held at the expo center over the course of the entire year (there were only 38 days with events).

Arena events in 2002 were tabulated by event type based on the schedule shown in Table 1 and additionally sorted by weekdays, Saturdays, and Sundays. Table 2 shows that the majority of weekday events involve basketball games, hockey games, concerts, and circus performances; the pattern of events on Sundays is more pronounced and primarily involves basketball and hockey games. Most of the weekend concerts tended to occur on Saturdays.⁴

Table 2: Distribution of 2002 MSG Arena Events

Event Type	Weekday	Saturday	Sunday	Total
Basketball (College)	13	7	1	21
Basketball (NBA)	29	8	7	44
Basketball (Other)	5	0	0	5
Basketball (WNBA)	12	2	7	21
Circus	14	9	9	32
Concert	38	13	3	54
Dog Show	2	0	0	2
Graduation	2	0	0	2
Ice Show	1	2	0	3
Hockey (NHL)	32	4	7	43
Other	15	4	2	21
Religious	6	3	2	11
Track	1	1	0	2
Wrestling	3	1	1	5
Totals	173	54	39	266

Source: Madison Square Garden, 2003.

Table 3 provides a similar tabulation of 2002 events held in the theater, which is also sorted by weekdays, Saturdays, and Sundays. This table indicates that nearly half of all theater events involved performances of “Sesame Street Live” (categorized as a family show) or “A Christmas Carol” (categorized as a musical). Although there were a significant amount of comedy events (34), many of these were competitions that took place in the theater lobby (which has a smaller seating capacity of approximately 500-600). A review of Table 3 shows that there were substantially fewer events at the theater on Sundays (26) compared to Saturdays (49) and that approximately 80% of the Sunday events involved performances of the family show or musical.

Table 3: Distribution of 2002 MSG Theater Events

Event Type	Weekday	Saturday	Sunday	Total
Awards	3	0	0	3
Boxing	2	2	0	4
Comedy	22	10	2	34
Concert	5	3	1	9
Draft	1	1	1	3
Family Show	10	6	6	22
Graduation	11	0	0	11
Meeting	4	0	0	4
Musical	27	19	15	61
Other	12	4	0	16
Religious	5	4	1	10
Totals	102	49	26	177

Source: Madison Square Garden, 2003.

Table 4 shows the distribution of arena and theater events that were held on the same day at MSG in 2002 and compares their differences in start times. Events with overlapping arrival periods were assumed to include all events with differences in start times of less than one hour. As shown in Table 4, there were overlaps on slightly less than half of the weekdays when events were held at the two venues. A review of these events indicates that approximately half of these overlaps involve events in the theater lobby. As shown in Table 4, there were no overlapping events on Sundays since all events had differences in start times of one hour or greater.

Table 4: Relationship between 2002 Arena and Theater Events Held On Same Day

Day of Week	Difference in Start Times				Total Events
	Same	½ Hour	1 Hour	> 1 Hour	
Weekday	10	10	7	25	52
Saturday	3	6	5	6	20
Sunday	0	0	3	4	7
Totals	13	16	15	35	79

Source: Madison Square Garden, 2003.

Existing Attendance Patterns

Table 5 presents detailed data about the major types of arena events (concerts, NBA basketball, WNBA basketball, college basketball, NHL hockey, and the circus). This table includes typical event durations, attendance capacities, and existing 85th percentile attendances.⁵ Although both the New York Knicks and New York Rangers currently tend to sell out many of their games, the Knicks games have the highest 85th percentile attendance out of all events. As shown in Table 5, the 85th percentile attendances at WNBA basketball games and circus performances are significantly lower compared to the other major events; for this reason a WNBA basketball game or circus performance would not be expected to constitute the reasonable worst-case scenario for the analysis of transportation-related impacts. According to Madison Square Garden management, although concert attendance varies, a significant

⁴ Although there were a total of 9 Sunday circus performances, these occurred over a period of 3 Sundays (multiple shows were held on each date).

⁵ 85th percentile attendances will be used to develop a reasonable worst-case scenario that would occur with enough frequency to warrant consideration for analysis.



number of concerts sell out every year. Therefore, the events that have the highest 85th percentile attendances involve NBA basketball games, concerts, and NHL hockey games.

Table 5: Existing Arena Capacity and Approximate Duration of Events

Event Type	Typical Duration ¹	Attendance Capacity ²	85 th Percentile Attendances		
			Overall	Weekday	Weekend
Concert	3+ hours	20,629	17,977	18,301	16,476
NBA Basketball	2 ½ hours	20,024	19,023 ³		
WNBA Basketball	2 hours	20,024	11,605	11,221	12,126
College Basketball	2 hours	20,024	16,012	14,389	16,167
NHL Hockey	2 ¾ hours	18,295	17,380 ³		
Circus	2 ½ hours	18,295	13,687	13,686	13,062

Sources: Madison Square Garden and Sam Schwartz LLC, 2003.

Notes: (1) Listed durations are minimum times and do not include overtime or unexpected delays. (2) Includes seats and suites. (3) Most of these events are sold out; Sam Schwartz LLC estimates indicate that actual attendances range between 95% and 100% of capacity.

Travel Surveys

To establish the existing travel patterns of MSG attendees, travel surveys conducted by Vollmer Associates in the fall of 1987 were utilized.⁶ These surveys included interviews to determine modes of travel specific to the origins of attendees at the following three weeknight events:

- Cars Concert (Thursday, October 29, 1987 @ 8:00 pm);
- New York Knicks vs. Boston Celtics (Monday, November 9, 1987 @ 7:30 pm); and
- New York Rangers vs. New Jersey Devils (Tuesday, November 10, 1987 @ 7:30 pm).

Additional surveys at MSG were conducted by Sam Schwartz LLC in the spring of 2003.⁷ These surveys were used to determine temporal distributions, vehicle occupancies, and to approximate variations in travel patterns between a weekday and a Sunday sports event. Events that were surveyed included:

- New York Knicks vs. Milwaukee Bucks (Sunday, March 16, 2003 @ 7:00 pm);
- New York Knicks vs. Toronto Raptors (Monday, March 24, 2003 @ 7:30 pm);
- New York Knicks vs. New Jersey Nets (Friday, March 28, 2003 @ 8:00 pm);
- New York Rangers vs. Pittsburgh Penguins (Wednesday, March 26, 2003 @ 7:30 pm);
- New York Rangers vs. New Jersey Devils (Friday, April 4, 2003 @ 7:30 pm); and
- Red Hot Chili Peppers Concert (Tuesday, May 20, 2003 @ 8:00 pm).

Trip Origins

A comparison of trip origins from the three weeknight events surveyed (concert, Rangers game, and Knicks game) is presented in Table 6. The table also includes an average distribution of origins for the weeknight sports events and a projected distribution of origins for Sunday sports events. As shown in the table, the percentage of Manhattan origins is highest for the weeknight sports events; this variation is likely attributed to the large percentage of attendees that go to these types of MSG events directly from work in Manhattan.

⁶ Technical Memorandum A-4, Madison Square Garden Attendance Profile, Vollmer Associates, 1987.

⁷ Madison Square Garden Modal Split Analysis, Sam Schwartz LLC, August 26, 2003.



Table 6: Trip Origins of MSG Attendees

Region	Weeknight Concert	Weeknight Rangers Game	Weeknight Knicks Game	Weeknight Sports Average	Sunday Sports Event ¹
Staten Island	2.7%	1.7%	1.6%	1.6%	0.5%
Manhattan	20.8%	34.8%	38.8%	36.8%	30.3%
Brooklyn	11.6%	7.2%	8.2%	7.7%	9.8%
Bronx	4.6%	2.6%	3.7%	3.2%	2.3%
Queens	14.0%	8.3%	11.8%	10.1%	11.6%
Long Island	15.4%	13.2%	9.0%	11.1%	12.7%
Westchester	14.2%	5.7%	4.6%	5.1%	7.1%
Rockland	0.8%	1.1%	7.4%	4.3%	4.3%
New Jersey	13.9%	22.1%	9.6%	15.7%	17.0%
Connecticut	1.9%	3.2%	5.4%	4.3%	4.3%

Sources: Vollmer Associates, 1987.

Notes: (1) Estimated based on weeknight sports average using Sam Schwartz LLC surveys. (2) Sum of origins do not total 100% due to rounding.

Existing and Projected Modal Splits

In order to develop trip assignments specific for each mode of travel, modal splits expanded to a regional basis will be utilized. Table 7 shows modal splits by region for a weeknight concert, a weeknight sports event, and a Sunday sports event. The table also includes the weighted average modal splits, which were calculated by applying the respective trip origins (listed in Table 6) to the regional modal splits. The results show that overall auto usage is consistent for weeknight events (31.7% for the concert and 33.7% for the sports events) and is higher (48.4%) for a Sunday sports event. In contrast, overall transit usage is highest for a weeknight concert (51.8%) and lowest for a Sunday sports event (34.8%).

In order to account for a potential relocation of Madison Square Garden to a location one and a half blocks west of its existing location, auto and taxi modal splits were increased by 7.5% and 5%, respectively, to account for a reduced access to transit services. This is similar to the methodology that was used to develop modal split assumptions for sports events at the proposed nearby multi-use facility based the existing MSG travel surveys⁸. The resulting modal splits are shown in Table 8. It is anticipated that given the existing and projected location of MSG, the existing and projected modal splits would be affected by neither the No. 7 subway extension nor the LIRR East Side Access project.

Temporal Distributions

Table 9 shows the results of the temporal distributions obtained from the MSG door counts. Based on the results of these surveys, it will be assumed that approximately 75% percent of arrivals to sports events⁹ and 50% of arrivals to concerts would occur during the peak hour. Compared to sports events, the temporal distributions of concert events tend to exhibit less pronounced peaking characteristics because there are usually opening acts before the headliner band and a significant amount of attendees typically arrive after the concert begins.

⁸ It was assumed that arena events at the proposed multi-use facility location would have increases in auto and taxi splits of 15% and 10%, respectively. Since MSG would be relocated to a site approximately halfway between Penn Station and the proposed multi-use facility, the increases in auto/taxi modal splits were assumed to 50% of what was assumed for the proposed multi-use facility.

⁹ To provide for a conservative analysis, data from the March 16, 2003 and March 28, 2003 New York Knicks games were excluded due to their lower peak hour temporal distributions.

**Table 7: Existing Arrival Modal Splits By Region
(Without MSG Relocation)**

WEEKNIGHT CONCERT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	72%	10%	0%	0%	0%	18%	0%	0%	0%	100%
Manhattan	12%	28%	1%	21%	4%	34%	0%	0%	0%	100%
Brooklyn	44%	3%	1%	0%	0%	52%	0%	0%	0%	100%
Bronx	46%	9%	0%	3%	3%	39%	0%	0%	0%	100%
Queens	49%	1%	2%	1%	0%	37%	10%	0%	0%	100%
Long Island	22%	2%	2%	0%	0%	2%	72%	0%	0%	100%
Westchester	18%	8%	0%	8%	60%	6%	0%	0%	0%	100%
Rockland	83%	0%	0%	0%	17%	0%	0%	0%	0%	100%
New Jersey	42%	1%	1%	2%	1%	2%	0%	35%	16%	100%
Connecticut	39%	5%	0%	34%	0%	22%	0%	0%	0%	100%
Weighted Average	31.7%	8.7%	1.1%	6.7%	9.8%	22.4%	12.5%	4.9%	2.2%	100.0%

WEEKNIGHT SPORTS EVENT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	80%	4%	6%	0%	2%	10%	0%	0%	0%	100%
Manhattan	13%	17%	4%	24%	2%	42%	0%	0%	0%	100%
Brooklyn	58%	1%	0%	0%	1%	41%	0%	0%	0%	100%
Bronx	48%	2%	0%	0%	4%	47%	0%	0%	0%	100%
Queens	42%	3%	1%	1%	1%	45%	9%	0%	0%	100%
Long Island	25%	0%	1%	1%	0%	4%	70%	0%	0%	100%
Westchester	52%	7%	0%	9%	19%	14%	0%	0%	0%	100%
Rockland	46%	0%	0%	5%	50%	0%	0%	0%	0%	100%
New Jersey	54%	3%	0%	2%	5%	2%	1%	25%	9%	100%
Connecticut	44%	9%	4%	8%	20%	17%	0%	0%	0%	100%
Weighted Average	33.7%	7.9%	1.7%	10.2%	5.6%	26.9%	8.7%	3.9%	1.4%	100.0%

SUNDAY SPORTS EVENT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	92%	1%	1%	0%	1%	5%	0%	0%	0%	100%
Manhattan	19%	22%	4%	19%	1%	34%	0%	0%	0%	100%
Brooklyn	56%	1%	0%	0%	1%	42%	0%	0%	0%	100%
Bronx	41%	2%	0%	0%	4%	53%	0%	0%	0%	100%
Queens	61%	3%	1%	1%	1%	29%	6%	0%	0%	100%
Long Island	38%	0%	1%	0%	0%	3%	57%	0%	0%	100%
Westchester	83%	7%	0%	2%	5%	3%	0%	0%	0%	100%
Rockland	58%	0%	0%	4%	38%	0%	0%	0%	0%	100%
New Jersey	76%	3%	0%	1%	2%	1%	0%	12%	4%	100%
Connecticut	55%	9%	4%	6%	14%	12%	0%	0%	0%	100%
Weighted Average	48.4%	8.4%	1.7%	6.6%	3.6%	20.5%	8.0%	2.0%	0.7%	100.0%

Source: Vollmer Associates, 1987.

Note: Sunday modal splits estimated based on weeknight sports average using Sam Schwartz LLC surveys (2003).

**Table 8: Projected Arrival Modal Splits By Region
(With MSG Relocation)**

WEEKNIGHT CONCERT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	77%	11%	0%	0%	0%	12%	0%	0%	0%	100%
Manhattan	13%	29%	1%	20%	4%	33%	0%	0%	0%	100%
Brooklyn	47%	3%	1%	0%	0%	49%	0%	0%	0%	100%
Bronx	49%	9%	0%	3%	3%	36%	0%	0%	0%	100%
Queens	53%	1%	2%	1%	0%	34%	9%	0%	0%	100%
Long Island	24%	2%	2%	0%	0%	2%	70%	0%	0%	100%
Westchester	19%	8%	0%	8%	59%	6%	0%	0%	0%	100%
Rockland	89%	0%	0%	0%	11%	0%	0%	0%	0%	100%
New Jersey	45%	1%	1%	2%	1%	2%	0%	33%	15%	100%
Connecticut	42%	5%	0%	32%	0%	21%	0%	0%	0%	100%
Weighted Average	34.1%	9.1%	1.1%	6.4%	9.5%	21.0%	12.1%	4.6%	2.1%	100.0%

WEEKNIGHT SPORTS EVENT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	85%	4%	6%	0%	1%	4%	0%	0%	0%	100%
Manhattan	13%	18%	4%	23%	1%	41%	0%	0%	0%	100%
Brooklyn	62%	1%	0%	0%	0%	37%	0%	0%	0%	100%
Bronx	52%	2%	0%	0%	3%	43%	0%	0%	0%	100%
Queens	45%	3%	1%	1%	1%	42%	8%	0%	0%	100%
Long Island	27%	0%	1%	0%	0%	4%	68%	0%	0%	100%
Westchester	55%	7%	0%	8%	17%	12%	0%	0%	0%	100%
Rockland	49%	0%	0%	5%	46%	0%	0%	0%	0%	100%
New Jersey	58%	3%	0%	2%	5%	2%	0%	23%	8%	100%
Connecticut	47%	9%	4%	7%	18%	15%	0%	0%	0%	100%
Weighted Average	36.2%	8.3%	1.8%	9.8%	5.1%	25.5%	8.4%	3.6%	1.3%	100.0%

SUNDAY SPORTS EVENT										
Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	TOTAL BY REGION
Staten Island	95%	1%	1%	0%	0%	2%	0%	0%	0%	100%
Manhattan	21%	23%	5%	18%	1%	32%	0%	0%	0%	100%
Brooklyn	61%	1%	0%	0%	0%	38%	0%	0%	0%	100%
Bronx	44%	2%	0%	0%	4%	50%	0%	0%	0%	100%
Queens	65%	3%	1%	1%	1%	25%	5%	0%	0%	100%
Long Island	41%	0%	1%	0%	0%	3%	54%	0%	0%	100%
Westchester	89%	7%	0%	1%	2%	1%	0%	0%	0%	100%
Rockland	62%	0%	0%	3%	34%	0%	0%	0%	0%	100%
New Jersey	82%	3%	0%	1%	2%	1%	0%	9%	3%	100%
Connecticut	59%	9%	4%	5%	12%	10%	0%	0%	0%	100%
Weighted Average	52.0%	8.8%	1.8%	6.1%	3.0%	18.7%	7.6%	1.5%	0.5%	100.0%

Source: Vollmer Associates, 1987.

Table 9: Temporal Distribution of MSG Attendees



PB Team

NYCT – Number 7 Extension Project
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New York Rangers
Wednesday, March 26, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM	1	0%
6:30 PM - 6:45 PM	326	2%
6:45 PM - 7:00 PM	2,200	16%
7:00 PM - 7:15 PM	1,685	12%
7:15 PM - 7:30 PM	2,646	19%
7:30 PM - 7:45 PM	3,320	24%
7:45 PM - 8:00 PM	2,194	16%
8:00 PM - 8:15 PM	873	6%
8:15 PM - 8:30 PM	319	2%
8:30 PM - 8:45 PM	178	1%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	13,742	100%
Peak Hour (7:00-8:00 PM)	9,845	72%

New York Rangers
Friday, April 4, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	61	0%
6:45 PM - 7:00 PM	2,234	13%
7:00 PM - 7:15 PM	1,911	11%
7:15 PM - 7:30 PM	3,403	20%
7:30 PM - 7:45 PM	4,258	25%
7:45 PM - 8:00 PM	2,753	16%
8:00 PM - 8:15 PM	1,501	9%
8:15 PM - 8:30 PM	611	4%
8:30 PM - 8:45 PM	321	2%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	17,053	100%
Peak Hour (7:00-8:00 PM)	12,325	72%

New York Knicks
Monday, March 24, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM	1	0%
6:15 PM - 6:30 PM	1	0%
6:30 PM - 6:45 PM	178	1%
6:45 PM - 7:00 PM	1,152	9%
7:00 PM - 7:15 PM	1,362	10%
7:15 PM - 7:30 PM	2,471	19%
7:30 PM - 7:45 PM	2,985	23%
7:45 PM - 8:00 PM	2,634	20%
8:00 PM - 8:15 PM	1,204	9%
8:15 PM - 8:30 PM	606	5%
8:30 PM - 8:45 PM	324	2%
8:45 PM - 9:00 PM	132	1%
9:00 PM - 9:15 PM	63	0%
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	13,113	100%
Peak Hour (7:00-8:00 PM)	9,452	72%

New York Knicks
Friday, March 28, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	6,106	28%
6:45 PM - 7:00 PM	86	0%
7:00 PM - 7:15 PM	327	1%
7:15 PM - 7:30 PM	1,910	9%
7:30 PM - 7:45 PM	2,092	9%
7:45 PM - 8:00 PM	3,016	14%
8:00 PM - 8:15 PM	3,791	17%
8:15 PM - 8:30 PM	2,703	12%
8:30 PM - 8:45 PM	1,147	5%
8:45 PM - 9:00 PM	558	3%
9:00 PM - 9:15 PM	208	1%
9:15 PM - 9:30 PM	121	1%
9:30 PM - 9:45 PM		
Totals	22,065	100%
Peak Hour (7:30-8:00 PM)	11,602	53%

New York Knicks
Sunday, March 16, 2003

Time Period	Arrivals	Percent
5:30 PM - 5:45 PM	8,330	38%
5:45 PM - 6:00 PM	75	0%
6:00 PM - 6:15 PM	102	0%
6:15 PM - 6:30 PM	1,288	6%
6:30 PM - 6:45 PM	1,492	7%
6:45 PM - 7:00 PM	2,706	12%
7:00 PM - 7:15 PM	3,436	16%
7:15 PM - 7:30 PM	2,445	11%
7:30 PM - 7:45 PM	1,119	5%
7:45 PM - 8:00 PM	562	3%
8:00 PM - 8:15 PM	271	1%
8:15 PM - 8:30 PM	163	1%
8:30 PM - 8:45 PM	57	0%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
Totals	22,046	100%
Peak Hour (6:30-7:30 PM)	10,079	46%

Red Hot Chili Peppers
Tuesday, May 20, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	16	0%
6:45 PM - 7:00 PM	561	4%
7:00 PM - 7:15 PM	446	3%
7:15 PM - 7:30 PM	1,044	7%
7:30 PM - 7:45 PM	1,639	11%
7:45 PM - 8:00 PM	2,036	13%
8:00 PM - 8:15 PM	1,850	12%
8:15 PM - 8:30 PM	1,857	12%
8:30 PM - 8:45 PM	1,929	13%
8:45 PM - 9:00 PM	1,403	9%
9:00 PM - 9:15 PM	1,149	7%
9:15 PM - 9:30 PM	862	6%
9:30 PM - 9:45 PM	599	4%
Totals	15,391	100%
Peak Hour (7:45-8:45 PM)	7,672	50%

Similar to the projections made for the proposed multi-use facility, all event staff would be expected to arrive 2-3 hours prior to an event at MSG and would be on post prior to the gate opening time. For this reason, event staff would not be expected to travel during the peak arrival period of attendees.

Vehicle Occupancy

Table 10 shows the vehicle occupancies that will be used for attendees at a weeknight concert, weeknight sports event, and Sunday sports event; these were based on the Sam Schwartz LLC surveys.¹⁰

Table 10: Vehicle Occupancies

	Auto	Taxi
Weeknight Concert	2.5	2.6
Weeknight Sports Event	2.2	2.5
Sunday Sports Event	2.8	2.8

Source: Sam Schwartz LLC, 2003.

Projected Attendance Increases

Regardless of a potential relocation, the DGEIS will also consider that the overall attendance capacity of MSG would increase by approximately 18% (from 19,500 to 23,000). Although it has not been determined how this change would affect the event-specific seating capacities listed in Table 5, it is assumed that each capacity would increase by the same proportion. Based on a review of the existing 85th percentile attendances shown in Table 5, it is anticipated that the increased seating capacity would have an effect on three types of events (concerts, NBA basketball, and NHL hockey) because many of these events currently sell out and would be expected to draw additional attendees. As shown in Table 11, it is assumed that the 85th percentile attendances at these events would also increase by 18%. Conversely, events which do not currently sell out would not be expected to be impacted by the availability of additional seating.

Truck Trip Generation and Distribution

Incremental truck trips associated with the expansion of MSG will be forecasted using the methodologies provided within the Multi-Use Facility Transportation Planning Assumptions Technical Memorandum (November 11, 2003). Because there would be an 18% increase in attendance capacity, the number of truck deliveries on an average weekday (food, beverage, and other merchandise) would be expected to increase by the same proportion.¹¹

Table 11: Events with Projected Attendance Increases

Event Type	Existing Capacity	Projected Capacity	Existing 85 th Percentile Attendances			Projected 85 th Percentile Attendances		
			Overall	Weekday	Weekend	Overall	Weekday	Weekend
Concert	20,629	24,332	17,977	18,301	16,476	21,204	21,586	19,433
NBA Basketball	20,024	23,618	19,023			22,437		
NHL Hockey	18,295	21,579	17,380			20,499		

Source: Madison Square Garden, 2003.

Note: Projected capacities and attendances assume an 18% increase.

¹⁰ Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.

¹¹ An increase in truck trips associated with equipment for concerts and other events is not expected.



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Selection of Weekday Evening Event for Analysis Purposes

The Multi-Use Facility Transportation Planning Assumptions Technical Memorandum (November 11, 2003) evaluated potential combinations of simultaneous weekday evening events that could take place at MSG (a sports event or a concert) and at the multi-use facility (a football game, a stadium concert, an arena concert, or an arena sports event). The results of this analysis showed that the largest number of total vehicle trips would result from the combination of arrivals to a concert at MSG and arrivals to a football game at the multi-use facility. This particular combination of events will be analyzed for future conditions with the proposed action during the weekday evening peak hour (8-9 PM). A subsequent review of the simultaneous events held at the arena and theater in 2002 indicates that 8 of the 38 weekday concerts occurred on nights with concurrent theater events (not including events held in the theater lobby). It is expected that the probability of a theater event occurring at the same time of both a weeknight football game and a concert is unlikely¹²; therefore a theater event is not recommended to be included as part of the combination of reasonable worst-case events selected for analysis.¹³

Selection of Sunday Afternoon Event for Analysis Purposes

The Convention Center Expansion Transportation Planning Assumptions Technical Memorandum (October 24, 2003) determined that the Sunday 4-5 PM period would be the worst-case scenario for trips on a weekend as it would coincide with the peak hour of activity at the Convention Center and departures associated with a 1 PM football game at the adjacent multi-use facility. As shown in Table 2, the primary events held on Sundays at MSG in 2002 involved NBA basketball games and NHL hockey games.¹⁴ In order to determine how arrivals and departures to these events would interface with the selected 4-5 PM peak hour, the starting and ending times of these events were examined (using typical event durations provided by MSG); these are compared in Table 12. As shown in this table, departures associated with the 1 PM Rangers games and arrivals associated with the 5 PM Rangers games would have the potential to occur during the 4-5 PM peak hour. The pattern of starting times for Knicks games shown in Table 12 would not be expected to result in arrivals/departures occurring during the 4-5 PM peak hour.

Table 12: Start and End Times of Sunday Sports Events at MSG in 2002

New York Knicks			New York Rangers		
Date	Start Time	End Time	Date	Start Time	End Time
2/3/02	12:00 PM	2:30 PM	2/10/02	1:00 PM	3:45 PM
2/24/02	12:00 PM	2:30 PM	12/1/02	1:00 PM	3:45 PM
3/3/02	3:00 PM	5:30 PM	12/8/02	1:00 PM	3:45 PM
11/10/02	4:00 PM	6:30 PM	3/17/02	3:00 PM	5:45 PM
2/17/02	7:00 PM	9:30 PM	9/22/02	5:00 PM	7:45 PM
11/24/02	7:00 PM	9:30 PM	9/29/02	5:00 PM	7:45 PM
12/22/02	7:00 PM	9:30 PM	11/3/02	5:00 PM	7:45 PM

Source: Madison Square Garden, 2003.

¹² Including the 2003 season, the New York Jets have only hosted a total of 14 Monday Night Football games since 1970 (an average of less than one per year).

¹³ According to Madison Square Garden management, there would not be a theater in the new arena if MSG is relocated.

¹⁴ WNBA basketball games and circus performances were excluded because they had lower 85th percentile attendances.



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A review of the 2003-04 Knicks' and Rangers'

schedules indicates that a comparable pattern will occur on Sundays this season: the Knicks have one game scheduled at 1 PM, three games scheduled for 7 PM, and one game scheduled for 7:30 PM; all four of the Rangers games on Sunday are scheduled for 5 PM. Therefore, it is assumed that travel associated with Rangers games would generally have the greatest potential to overlap with the 4-5 PM peak hour.

As previously described, it was assumed that 75% of arrivals to a sports event at MSG would occur during the peak arrival hour. Based on projections made by the New York Jets for the temporal distribution of departures from the multi-use facility in an arena configuration, it is assumed that 90-95% of fans would leave MSG in the hour immediately following the end of an event, and that these departures would be concentrated within a 20-minute period (the time it would take to clear the arena). Therefore, it is expected that the majority of departures associated with a 1 PM game would occur during the 3-4 PM period. For this reason, it is recommended that the travel demand associated with arrivals to a 5 PM Rangers game should be included as part of the Sunday afternoon peak hour (4-5 PM) as this combination of events would have the greatest potential for traffic implications.

It should be noted that although there were no overlapping arena and theater events on Sundays (as shown in Table 4), there were five Sunday afternoon performances of "A Christmas Carol" in December (during the NFL football season) that began at 5 PM, and arrivals associated with this event would have a potential to overlap with the 4-5 PM peak hour. On these five Sundays, there were two Rangers games scheduled for 1 PM, one Knicks game scheduled for 7 PM, and two dark days in the arena. Because the start times of these theater events were staggered in such a way were did not coincide with arena events, it is not realistic to combine travel demand associated with both events. The travel demand associated with a Rangers game (an attendance capacity of 18,295) would be expected to be more conservative than the travel demand associated with "A Christmas Carol" (an attendance capacity of 5,600). Although the travel demand associated with a theater event will not be included in the Sunday afternoon peak hour, its associated parking demand will be included to provide for a more conservative analysis.

cc: L. Lennon
D. Fields

PROPOSED PROJECT WITHOUT TSP
TRAVEL DEMAND ESTIMATES

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT w/out Event TSP - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM

SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										PM Peak Hour Trips								Percent of Daily during PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	23,670	2,024	1,256	1,961	0	0	4,997	33,908	58%		810	182	170	265	0	0	298	1,724	45%	3.4%	9.0%	13.5%	13.5%	0.0%	0.0%	6.0%	5.1%
Transit	8,473	582	559	873	0	0	3,748	14,235	24%		737	52	75	118	0	0	506	1,489	39%	8.7%	9.0%	13.5%	13.5%	0.0%	0.0%	13.5%	10.5%
Taxi/Coach (Event)	2,695							2,695	5%		70							70	2%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%
Bike (Event)	900							900	2%		23							23	1%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%
Walk	1,961	701	373	581	0	0	1,477	5,093	9%		122	63	50	78	0	0	87	401	10%	6.2%	9.0%	13.5%	13.5%	0.0%	0.0%	5.9%	7.9%
Other	429	68	188	293	0	0	728	1,707	3%		40	6	25	40	0	0	40	151	4%	9.3%	9.0%	13.5%	13.5%	0.0%	0.0%	5.5%	8.8%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%		1,803	304	321	501	0	0	931	3,859	100%	4.7%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	6.6%
Vehicle Trips	10,722	1,092	573	895	0	0	2,542	15,824	100%		443	98	77	121	0	0	200	940	100%	4.1%	9.0%	13.5%	13.5%	0.0%	0.0%	7.9%	5.9%
<i>Avg. veh. occupancy</i>	<i>2.46</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.97</i>	<i>2.31</i>			<i>1.99</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.49</i>	<i>1.91</i>									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips										PM Peak Hour Transit-Trips								PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	7,006	203	19	40	62	0	0	80	404	81	6	9	14	0	0	42	151	37	4	7	11	0	0	9	68	7%	1.89	
Superdistrict 2	4,148	130	28	43	68	0	0	99	368	64	6	8	13	0	0	53	143	26	10	15	23	0	0	21	95	10%	1.73	
Superdistrict 3	10,602	251	172	133	208	0	0	242	1,006	106	19	31	48	0	0	101	306	44	50	24	37	0	0	40	195	21%	1.94	
Superdistrict 4	2,928	106	16	23	35	0	0	68	248	47	3	5	8	0	0	38	100	28	7	6	9	0	0	15	65	7%	1.97	
East Bay	14,730	531	17	36	55	0	0	228	867	269	8	15	24	0	0	171	487	111	5	8	12	0	0	30	166	18%	2.16	
North Bay	4,393	112	7	4	6	0	0	29	158	29	1	1	1	0	0	14	46	35	4	1	1	0	0	9	49	5%	2.23	
South Bay	12,587	411	31	32	51	0	0	161	686	118	5	4	7	0	0	73	207	155	13	14	21	0	0	71	275	29%	1.71	
Out of Region	2,143	59	14	9	15	0	0	24	121	24	3	2	4	0	0	15	48	7	5	4	6	0	0	5	27	3%	2.12	
Total	58,538	1,803	304	321	501	0	0	931	3,859	737	52	75	118	0	0	506	1,489	443	98	77	121	0	0	200	940	100%	1.91	

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound										Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Total Person Trips	1,758	135	143	222	0	0	79	2,337	45	169	178	278	0	0	852	1,522	1,803	304	321	501	0	0	931	3,859		
Transit Trips	709	16	27	42	0	0	15	808	28	37	49	76	0	0	492	681	737	52	75	118	0	0	506	1,489		
Vehicle Trips	411	46	35	55	0	0	19	566	32	53	42	66	0	0	180	374	443	98	77	121	0	0	200	940		
	93%	46%	45%	45%	0%	0%	10%	60%	7%	54%	55%	55%	0%	0%	90%	40%										

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound										Outbound								Total								Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	52	4	7	10	0	0	4	77	0	4	7	11	0	0	11	34	53	8	14	21	0	0	15	110	19		
Superdistrict 2	39	8	14	21	0	0	8	89	1	8	14	23	0	0	24	70	40	16	28	44	0	0	32	159	5		
Superdistrict 3	64	50	27	43	0	0	15	199	2	51	29	45	0	0	50	177	66	101	56	88	0	0	65	376	3		
Superdistrict 4	48	6	7	10	0	0	4	75	1	6	8	12	0	0	21	48	49	12	14	22	0	0	25	123	5		
East Bay	231	3	9	14	0	0	5	261	3	5	11	17	0	0	48	83	233	8	20	30	0	0	53	344	16		
North Bay	82	2	1	2	0	0	1	88	1	3	2	3	0	0	13	22	82	5	3	5	0	0	14	110	0		
South Bay	269	10	12	19	0	0	7	317	4	14	16	24	0	0	80	138	273	24	28	43	0	0	87	455	14		
Out of Region	15	4	3	5	0	0	2	29	0	4	3	5	0	0	6	19	15	8	6	10	0	0	8	48	9		
Total	798	87	80	125	0	0	44	1,134	12	96	90	140	0	0	253	590	810	182	170	265	0	0	298	1,724	70		

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT w/out Event TSP - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	78	2	4	6	0	0	2	92	2	4	5	8	0	0	40	59	81	6	9	14	0	0	42	151
Superdistrict 2	61	2	3	5	0	0	2	72	3	4	5	8	0	0	51	71	64	6	8	13	0	0	53	143
Superdistrict 3	101	8	13	21	0	0	7	151	5	12	17	27	0	0	94	155	106	19	31	48	0	0	101	306
Superdistrict 4	45	1	2	3	0	0	1	50	2	2	3	5	0	0	37	50	47	3	5	8	0	0	38	100
East Bay	259	1	4	6	0	0	2	271	10	8	12	18	0	0	169	216	269	8	15	24	0	0	171	487
North Bay	28	0	0	0	0	0	0	28	1	1	1	1	0	0	14	17	29	1	1	1	0	0	14	46
South Bay	114	1	0	1	0	0	0	117	4	4	4	6	0	0	72	90	118	5	4	7	0	0	73	207
Out of Region	23	1	1	1	0	0	1	27	1	2	2	2	0	0	14	21	24	3	2	4	0	0	15	48
Total	709	16	27	42	0	0	15	808	28	37	49	76	0	0	492	681	737	52	75	118	0	0	506	1,489

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	7							7	0						0	7	0	0	0	0	0	0	0	7
Superdistrict 2	2							2	0						0	2	0	0	0	0	0	0	0	2
Superdistrict 3	1							1	0						0	1	0	0	0	0	0	0	0	1
Superdistrict 4	2							2	0						0	2	0	0	0	0	0	0	0	2
East Bay	8							8	0						0	8	0	0	0	0	0	0	0	8
North Bay	0							0	0						0	0	0	0	0	0	0	0	0	0
South Bay	4							4	0						0	4	0	0	0	0	0	0	0	4
Out of Region	0							0	0						0	0	0	0	0	0	0	0	0	0
Total	23	0	0	0	0	0	0	23	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	23

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	62	2	8	13	0	0	5	90	1	3	9	14	0	0	19	46	63	5	17	27	0	0	24	136
Superdistrict 2	25	3	3	5	0	0	2	38	1	3	4	6	0	0	12	26	25	6	7	11	0	0	14	64
Superdistrict 3	75	25	22	34	0	0	12	168	3	27	24	38	0	0	63	155	78	52	46	72	0	0	76	323
Superdistrict 4	9	0	2	3	0	0	1	14	0	1	2	3	0	0	4	9	9	1	3	5	0	0	5	23
East Bay	21	1	0	0	0	0	0	22	0	1	0	1	0	0	4	6	21	1	1	1	0	0	4	28
North Bay	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	3
South Bay	15	1	0	0	0	0	0	17	0	1	0	0	0	0	1	3	16	1	1	1	0	0	1	19
Out of Region	19	2	0	0	0	0	0	22	0	2	0	0	0	0	1	4	19	3	1	1	0	0	1	26
Total	227	33	36	56	0	0	20	372	5	37	40	62	0	0	107	251	232	69	76	118	0	0	127	622

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	200	8	19	29	0	0	10	265	3	11	21	33	0	0	70	139	203	19	40	62	0	0	80	404
Superdistrict 2	126	12	20	31	0	0	11	200	4	15	23	37	0	0	87	168	130	28	43	68	0	0	99	368
Superdistrict 3	241	82	63	98	0	0	35	518	10	90	71	110	0	0	207	488	251	172	133	208	0	0	242	1,006
Superdistrict 4	103	7	10	16	0	0	6	141	3	9	13	20	0	0	62	107	106	16	23	35	0	0	68	248
East Bay	518	4	13	20	0	0	7	562	12	13	23	35	0	0	221	305	531	17	36	55	0	0	228	867
North Bay	111	3	1	2	0	0	1	118	2	4	3	4	0	0	28	40	112	7	4	6	0	0	29	158
South Bay	403	12	13	20	0	0	7	455	9	19	20	31	0	0	154	231	411	31	32	51	0	0	161	686
Out of Region	58	7	4	7	0	0	2	78	1	8	5	8	0	0	22	44	59	14	9	15	0	0	24	121
Total	1,758	135	143	222	0	0	79	2,337	45	169	178	278	0	0	852	1,522	1,803	304	321	501	0	0	931	3,859

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	30	2	3	5	0	0	2	42	7	2	4	6	0	0	8	26	37	4	7	11	0	0	9	68
Superdistrict 2	24	5	7	11	0	0	4	50	3	6	8	12	0	0	17	45	26	10	15	23	0	0	21	95
Superdistrict 3	41	24	11	18	0	0	6	101	3	26	13	20	0	0	34	94	44	50	24	37	0	0	40	195
Superdistrict 4	25	3	3	4	0	0	1	37	2	4	3	5	0	0	13	28	28	7	6	9	0	0	15	65
East Bay	103	2	3	5	0	0	2	115	7	3	5	7	0	0	29	51	111	5	8	12	0	0	30	166
North Bay	35	2	0	0	0	0	0	37	0	2	1	1	0	0	9	13	35	4	1	1	0	0	9	49
South Bay	146	5	5	8	0	0	3	168	9	8	8	13	0	0	68	106	155	13	14	21	0	0	71	275
Out of Region	7	2	2	3	0	0	1	15	0	2	2	3	0	0	4	12	7	5	4	6	0	0	5	27
Total	411	46	35	55	0	0	19	566	32	53	42	66	0	0	180	374	443	98	77	121	0	0	200	940

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT w/out Event TSP - WEEKDAY DAILY AND EVENING PEAK HOUR BETWEEN 6 AND 8 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										Evening Peak Hour Trips							Percent of Daily during Evening Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	23,670	2,024	1,256	1,961	0	0	4,997	33,908	58%		7,374	26	50	79	0	0	50	7,579	62%	31.2%	1.3%	4.0%	4.0%	0.0%	0.0%	1.0%	22.4%
Transit	8,473	582	559	873	0	0	3,748	14,235	24%		2,360	19	45	70	0	0	115	2,609	21%	27.9%	3.3%	8.1%	8.1%	0.0%	0.0%	3.1%	18.3%
Taxi/Coach (Event)	2,695							2,695	5%		916							916	7%	34.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	34.0%
Bike (Event)	900							900	2%		305							305	2%	33.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.9%
Walk	1,961	701	373	581	0	0	1,477	5,093	9%		669	9	15	23	0	0	15	731	6%	34.1%	1.3%	4.0%	4.0%	0.0%	0.0%	1.0%	14.3%
Other	429	68	188	293	0	0	728	1,707	3%		117	1	7	11	0	0	6	144	1%	27.3%	2.1%	3.9%	3.9%	0.0%	0.0%	0.9%	8.4%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%		11,742	56	118	184	0	0	186	12,285	100%	30.8%	1.7%	5.0%	5.0%	0.0%	0.0%	1.7%	21.0%
Vehicle Trips	10,722	1,092	573	895	0	0	2,542	15,824			3,326	16	27	42	0	0	39	3,449		31.0%	1.4%	4.7%	4.7%	0.0%	0.0%	1.5%	21.8%
<i>Avg. veh. occupancy</i>	<i>2.46</i>	<i>1.85</i>	<i>2.19</i>	<i>2.19</i>	<i>0.00</i>	<i>0.00</i>	<i>1.97</i>	<i>2.31</i>			<i>2.49</i>	<i>1.69</i>	<i>1.86</i>	<i>1.88</i>	<i>0.00</i>	<i>0.00</i>	<i>1.30</i>	<i>2.46</i>									

Weekday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips										Evening Peak Hour Transit-Trips							Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	7,006	1,733	4	12	19	0	0	14	1,783	476	2	4	7	0	0	9	498	396	1	2	3	0	0	1	403	12%	1.95
Superdistrict 2	4,148	538	5	14	22	0	0	18	598	84	2	5	7	0	0	12	110	145	2	4	6	0	0	3	160	5%	2.12
Superdistrict 3	10,602	649	24	40	63	0	0	42	818	68	5	12	19	0	0	21	124	151	6	7	11	0	0	7	182	5%	2.32
Superdistrict 4	2,928	517	3	8	13	0	0	14	556	54	1	3	5	0	0	9	73	180	1	2	3	0	0	3	189	5%	2.29
East Bay	14,730	3,655	8	21	32	0	0	52	3,767	962	6	13	21	0	0	40	1,042	1,034	1	3	5	0	0	6	1,050	30%	2.52
North Bay	4,393	1,049	1	3	4	0	0	7	1,064	163	1	1	2	0	0	3	170	328	1	1	1	0	0	2	333	10%	2.69
South Bay	12,587	3,131	8	16	25	0	0	35	3,214	448	3	5	8	0	0	17	482	1,040	3	7	11	0	0	16	1,077	31%	2.51
Out of Region	2,143	470	2	3	5	0	0	5	485	104	1	1	2	0	0	3	112	52	1	1	2	0	0	1	56	2%	4.74
Total	58,538	11,742	56	118	184	0	0	186	12,285	2,360	19	45	70	0	0	115	2,609	3,326	16	27	42	0	0	39	3,449	100%	2.46

Assumptions for Evening Peak Hour bet. 6 PM & 8 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	100%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	0%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 6 PM & 8 PM	Inbound										Outbound							Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Total Person Trips	11,742	15	32	50	0	0	0	11,839	0	41	86	133	0	0	186	446	11,742	56	118	184	0	0	186	12,285	
Transit Trips	2,360	2	6	9	0	0	0	2,377	0	17	39	61	0	0	115	232	2,360	19	45	70	0	0	115	2,609	
Vehicle Trips	3,346	5	8	12	0	0	0	3,371	287	10	19	30	0	0	39	384	3,632	16	27	42	0	0	39	3,755	
	92%	33%	29%	29%	0%	0%	0%	90%	8%	67%	71%	71%	0%	0%	100%	10%									

Evening Peak Hour bet. 6 PM & 8 PM	Inbound										Outbound							Total								Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	573	0	2	2	0	0	0	577	0	1	2	3	0	0	2	8	573	1	4	5	0	0	2	584	201	
Superdistrict 2	262	1	3	5	0	0	0	271	0	1	4	7	0	0	4	16	262	2	7	11	0	0	4	287	52	
Superdistrict 3	333	6	6	10	0	0	0	354	0	7	9	13	0	0	8	37	333	12	15	23	0	0	8	391	30	
Superdistrict 4	368	1	2	2	0	0	0	372	0	1	3	4	0	0	4	12	368	2	4	7	0	0	4	385	48	
East Bay	2,380	0	2	3	0	0	0	2,385	0	2	5	8	0	0	10	25	2,380	2	7	11	0	0	10	2,410	235	
North Bay	886	0	0	1	0	0	0	887	0	1	1	2	0	0	3	7	886	1	1	2	0	0	3	894	0	
South Bay	2,442	1	3	4	0	0	0	2,450	0	4	8	12	0	0	18	41	2,442	5	11	16	0	0	18	2,491	208	
Out of Region	131	0	1	1	0	0	0	133	0	1	1	2	0	0	1	4	131	1	2	3	0	0	1	137	126	
Total	7,374	10	18	28	0	0	0	7,430	0	17	32	51	0	0	50	150	7,374	26	50	79	0	0	50	7,579	900	

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT w/out Event TSP - WEEKDAY DAILY AND EVENING PEAK HOUR BETWEEN 6 AND 8 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Evening Peak Hour bet. 6 PM & 8 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	476	0	1	1	0	0	0	478	0	1	3	5	0	0	9	19	476	2	4	7	0	0	9	498
Superdistrict 2	84	0	1	1	0	0	0	86	0	2	4	6	0	0	12	24	84	2	5	7	0	0	12	110
Superdistrict 3	68	1	3	5	0	0	0	76	0	4	9	14	0	0	21	48	68	5	12	19	0	0	21	124
Superdistrict 4	54	0	0	1	0	0	0	55	0	1	3	5	0	0	9	17	54	1	3	5	0	0	9	73
East Bay	962	0	1	1	0	0	0	964	0	6	12	19	0	0	40	78	962	6	13	21	0	0	40	1,042
North Bay	163	0	0	0	0	0	0	163	0	0	1	2	0	0	3	6	163	1	1	2	0	0	3	170
South Bay	448	0	0	0	0	0	0	449	0	2	5	8	0	0	17	33	448	3	5	8	0	0	17	462
Out of Region	104	0	0	0	0	0	0	105	0	1	1	2	0	0	3	7	104	1	1	2	0	0	3	112
Total	2,360	2	6	9	0	0	0	2,377	0	17	39	61	0	0	115	232	2,360	19	45	70	0	0	115	2,609

Evening Peak Hour bet. 6 PM & 8 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	86							86	0						0		86	0	0	0	0	0	0	86
Superdistrict 2	22							22	0						0		22	0	0	0	0	0	0	22
Superdistrict 3	13							13	0						0		13	0	0	0	0	0	0	13
Superdistrict 4	20							20	0						0		20	0	0	0	0	0	0	20
East Bay	107							107	0						0		107	0	0	0	0	0	0	107
North Bay	0							0	0						0		0	0	0	0	0	0	0	0
South Bay	57							57	0						0		57	0	0	0	0	0	0	57
Out of Region	0							0	0						0		0	0	0	0	0	0	0	0
Total	305	0	0	0	0	0	0	305	0	0	0	0	0	0	0	0	305	0	0	0	0	0	0	305

Evening Peak Hour bet. 6 PM & 8 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	599	0	2	3	0	0	0	604	0	1	3	5	0	0	4	12	599	1	5	7	0	0	4	615
Superdistrict 2	169	0	1	1	0	0	0	172	0	1	1	2	0	0	3	7	169	1	2	3	0	0	3	179
Superdistrict 3	236	3	5	8	0	0	0	251	0	4	8	13	0	0	12	39	236	7	13	21	0	0	12	290
Superdistrict 4	74	0	0	1	0	0	0	75	0	0	1	1	0	0	1	2	74	0	1	1	0	0	1	78
East Bay	206	0	0	0	0	0	0	206	0	0	0	1	0	0	1	2	206	0	0	1	0	0	1	208
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
South Bay	184	0	0	0	0	0	0	184	0	0	0	0	0	0	0	1	184	0	0	0	0	0	0	184
Out of Region	235	0	0	0	0	0	0	235	0	0	0	0	0	0	1	235	0	0	0	0	0	0	0	236
Total	1,703	4	8	13	0	0	0	1,727	0	7	14	22	0	0	21	64	1,703	10	22	35	0	0	21	1,790

Evening Peak Hour bet. 6 PM & 8 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	1,733	1	4	7	0	0	0	1,745	0	3	8	13	0	0	14	39	1,733	4	12	19	0	0	14	1,783
Superdistrict 2	538	1	4	7	0	0	0	550	0	4	10	15	0	0	18	47	538	5	14	22	0	0	18	598
Superdistrict 3	649	9	14	22	0	0	0	695	0	15	26	41	0	0	42	123	649	24	40	63	0	0	42	818
Superdistrict 4	517	1	2	4	0	0	0	524	0	3	6	10	0	0	14	32	517	3	8	13	0	0	14	556
East Bay	3,655	0	3	5	0	0	0	3,663	0	7	18	28	0	0	52	104	3,655	8	21	32	0	0	52	3,767
North Bay	1,049	0	0	1	0	0	0	1,051	0	1	2	3	0	0	7	13	1,049	1	3	4	0	0	7	1,064
South Bay	3,131	1	3	5	0	0	0	3,139	0	6	13	20	0	0	35	75	3,131	8	16	25	0	0	35	3,214
Out of Region	470	1	1	2	0	0	0	473	0	1	2	4	0	0	5	12	470	2	3	5	0	0	5	485
Total	11,742	15	32	50	0	0	0	11,839	0	41	86	133	0	0	186	446	11,742	56	118	184	0	0	186	12,285

Evening Peak Hour bet. 6 PM & 8 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	304	0	1	1	0	0	0	307	92	0	1	2	0	0	95		396	1	2	3	0	0	0	403
Superdistrict 2	121	1	2	2	0	0	0	129	24	1	2	4	0	0	31		145	2	4	6	0	0	3	160
Superdistrict 3	137	3	3	4	0	0	0	153	14	4	4	7	0	0	29		151	6	7	11	0	0	7	182
Superdistrict 4	158	0	1	1	0	0	0	163	22	1	1	2	0	0	26		180	1	2	3	0	0	3	189
East Bay	958	0	1	1	0	0	0	966	76	1	3	4	0	0	84		1,034	1	3	5	0	0	6	1,050
North Bay	328	0	0	0	0	0	0	331	0	0	1	1	0	0	2		328	1	1	1	0	0	2	333
South Bay	972	1	1	2	0	0	0	992	68	3	6	9	0	0	85		1,040	3	7	11	0	0	16	1,077
Out of Region	52	0	0	1	0	0	0	54	0	0	1	1	0	0	2		52	1	1	2	0	0	1	56
Total	3,030	5	8	12	0	0	39	3,094	296	10	19	30	0	0	355		3,326	16	27	42	0	0	39	3,449

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT w/out Event TSP - WEEKDAY DAILY AND LATE PM PEAK HOUR BETWEEN 9 AND 11 PM

SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										Late PM Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	23,670	2,024	1,256	1,961	0	0	4,997	33,908	58%		8,304	12	50	79	0	0	13	8,458	64%	35.1%	0.6%	4.0%	4.0%	0.0%	0.0%	0.3%	24.9%
Transit	8,473	582	559	873	0	0	3,748	14,235	24%		2,649	9	45	70	0	0	29	2,802	21%	31.3%	1.5%	8.1%	8.1%	0.0%	0.0%	0.8%	19.7%
Taxi/Coach (Event)	2,695							2,695	5%		900							900	7%	33.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.4%
Bike (Event)	900							900	2%		301							301	2%	33.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.5%
Walk	1,961	701	373	581	0	0	1,477	5,093	9%		557	4	15	23	0	0	4	603	5%	28.4%	0.6%	4.0%	4.0%	0.0%	0.0%	0.2%	11.8%
Other	429	68	188	293	0	0	728	1,707	3%		133	1	7	11	0	0	2	154	1%	31.0%	1.0%	3.9%	3.9%	0.0%	0.0%	0.2%	9.0%
Total	38,128	3,375	2,376	3,708	0	0	10,951	58,538	100%		12,845	26	118	184	0	0	47	13,218	100%	33.7%	0.8%	5.0%	5.0%	0.0%	0.0%	0.4%	22.6%
	65%	6%	4%	6%	0%	0%	19%	100%			97%	0%	1%	1%	0%	0%	0%	100%									
Vehicle Trips	10,722	1,092	573	895	0	0	2,542	15,824			3,674	7	27	42	0	0	10	3,760		34.3%	0.7%	4.7%	4.7%	0.0%	0.0%	0.4%	23.8%
	68%	7%	4%	6%	0%	0%	16%	100%			98%	0%	1%	1%	0%	0%	0%	100%									
Avg. veh. occupancy	2.46	1.85	2.19	2.19	0.00	0.00	1.97	2.31			2.51	1.69	1.86	1.88	0.00	0.00	1.30	2.49									

Weekday Distribution	Total Daily Person-trips	Late PM Peak Hour Person-Trips								Late PM Peak Hour Transit-Trips								Late PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.		
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	7,006	1,418	2	12	19	0	0	4	1,455	395	1	4	7	0	0	2	409	322	0	2	3	0	0	0	0	327	9%	2.07
Superdistrict 2	4,148	455	2	14	22	0	0	5	498	81	1	5	7	0	0	3	97	120	1	4	6	0	0	0	1	132	4%	2.19
Superdistrict 3	10,602	570	11	40	63	0	0	10	695	77	2	12	19	0	0	5	115	129	3	7	11	0	0	2	152	4%	2.33	
Superdistrict 4	2,928	433	2	8	13	0	0	3	460	53	1	3	5	0	0	2	65	149	1	2	3	0	0	0	1	155	4%	2.34
East Bay	14,730	4,228	4	21	32	0	0	13	4,298	1,142	3	13	21	0	0	10	1,188	1,187	1	3	5	0	0	2	1,198	32%	2.49	
North Bay	4,393	1,651	1	3	4	0	0	2	1,660	259	0	1	2	0	0	1	263	516	0	1	1	0	0	1	519	14%	2.69	
South Bay	12,587	3,578	4	16	25	0	0	9	3,632	526	1	5	8	0	0	4	545	1,193	2	7	11	0	0	4	1,216	32%	2.48	
Out of Region	2,143	511	1	3	5	0	0	1	521	116	0	1	2	0	0	1	121	56	0	1	2	0	0	0	60	2%	4.59	
Total	58,538	12,845	26	118	184	0	0	47	13,218	2,649	9	45	70	0	0	29	2,802	3,674	7	27	42	0	0	10	3,760	100%	2.49	

Assumptions for Late PM Peak Hour bet. 9 PM & 11 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	45%	0%	0%
Outbound	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	55%	100%	100%	

Late PM Peak Hour bet. 9 PM & 11 PM	Inbound									Outbound									Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Total Person Trips	0	0	0	0	0	0	0	0			12,845	26	118	184	0	0	47	13,218	12,845	26	118	184	0	0	47	13,218	
Transit Trips	0	0	0	0	0	0	0	0			2,649	9	45	70	0	0	29	2,802	2,649	9	45	70	0	0	29	2,802	
Vehicle Trips	287	0	0	0	0	0	0	287			3,387	7	27	42	0	0	10	3,473	3,674	7	27	42	0	0	10	3,760	
	8%	0%	0%	0%	0%	0%	0%	8%			92%	100%	100%	100%	0%	0%	100%	92%									

Late PM Peak Hour bet. 9 PM & 11 PM Auto Trips	Inbound									Outbound									Total									Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	0	0	0	0	0	0	0	0			465	0	4	5	0	0	0	475	465	0	4	5	0	0	0	0	475	201
Superdistrict 2	0	0	0	0	0	0	0	0			217	1	7	11	0	0	1	237	217	1	7	11	0	0	1	237	52	
Superdistrict 3	0	0	0	0	0	0	0	0			278	6	15	23	0	0	2	324	278	6	15	23	0	0	2	324	30	
Superdistrict 4	0	0	0	0	0	0	0	0			302	1	4	7	0	0	1	315	302	1	4	7	0	0	1	315	48	
East Bay	0	0	0	0	0	0	0	0			2,728	1	7	11	0	0	3	2,749	2,728	1	7	11	0	0	3	2,749	235	
North Bay	0	0	0	0	0	0	0	0			1,391	0	1	2	0	0	1	1,396	1,391	0	1	2	0	0	1	1,396	0	
South Bay	0	0	0	0	0	0	0	0			2,780	2	11	16	0	0	4	2,814	2,780	2	11	16	0	0	4	2,814	208	
Out of Region	0	0	0	0	0	0	0	0			142	0	2	3	0	0	0	147	142	0	2	3	0	0	0	147	126	
Total	0	0	0	0	0	0	0	0			8,304	12	50	79	0	0	13	8,458	8,304	12	50	79	0	0	13	8,458	900	

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT w/out Event TSP - WEEKDAY DAILY AND LATE PM PEAK HOUR BETWEEN 9 AND 11 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Late PM Peak Hour bet. 9 PM & 11 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	395	1	4	7	0	0	2	409	395	1	4	7	0	0	2	409
Superdistrict 2	0	0	0	0	0	0	0	0	81	1	5	7	0	0	3	97	81	1	5	7	0	0	3	97
Superdistrict 3	0	0	0	0	0	0	0	0	77	2	12	19	0	0	5	115	77	2	12	19	0	0	5	115
Superdistrict 4	0	0	0	0	0	0	0	0	53	1	3	5	0	0	2	65	53	1	3	5	0	0	2	65
East Bay	0	0	0	0	0	0	0	0	1,142	3	13	21	0	0	10	1,188	1,142	3	13	21	0	0	10	1,188
North Bay	0	0	0	0	0	0	0	0	259	0	1	2	0	0	1	263	259	0	1	2	0	0	1	263
South Bay	0	0	0	0	0	0	0	0	526	1	5	8	0	0	4	545	526	1	5	8	0	0	4	545
Out of Region	0	0	0	0	0	0	0	0	116	0	1	2	0	0	1	121	116	0	1	2	0	0	1	121
Total	0	0	0	0	0	0	0	0	2,649	9	45	70	0	0	29	2,802	2,649	9	45	70	0	0	29	2,802

Late PM Peak Hour bet. 9 PM & 11 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	69	0	0	0	0	0	0	69	69	0	0	0	0	0	0	69
Superdistrict 2	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	18	18	0	0	0	0	0	0	18
Superdistrict 3	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	11	11	0	0	0	0	0	0	11
Superdistrict 4	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	17	17	0	0	0	0	0	0	17
East Bay	0	0	0	0	0	0	0	0	122	0	0	0	0	0	0	122	122	0	0	0	0	0	0	122
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	65	65	0	0	0	0	0	0	65
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	301	0	0	0	0	0	0	301	301	0	0	0	0	0	0	301

Late PM Peak Hour bet. 9 PM & 11 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	488	0	5	7	0	0	1	502	488	0	5	7	0	0	1	502
Superdistrict 2	0	0	0	0	0	0	0	0	140	0	2	3	0	0	1	147	140	0	2	3	0	0	1	147
Superdistrict 3	0	0	0	0	0	0	0	0	204	3	13	21	0	0	3	245	204	3	13	21	0	0	3	245
Superdistrict 4	0	0	0	0	0	0	0	0	61	0	1	1	0	0	0	64	61	0	1	1	0	0	0	64
East Bay	0	0	0	0	0	0	0	0	236	0	0	1	0	0	0	238	236	0	0	1	0	0	0	238
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
South Bay	0	0	0	0	0	0	0	0	208	0	0	0	0	0	0	208	208	0	0	0	0	0	0	208
Out of Region	0	0	0	0	0	0	0	0	253	0	0	0	0	0	0	254	253	0	0	0	0	0	0	254
Total	0	0	0	0	0	0	0	0	1,591	5	22	35	0	0	5	1,658	1,591	5	22	35	0	0	5	1,658

Late PM Peak Hour bet. 9 PM & 11 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	1,418	2	12	19	0	0	4	1,455	1,418	2	12	19	0	0	4	1,455
Superdistrict 2	0	0	0	0	0	0	0	0	455	2	14	22	0	0	5	498	455	2	14	22	0	0	5	498
Superdistrict 3	0	0	0	0	0	0	0	0	570	11	40	63	0	0	10	695	570	11	40	63	0	0	10	695
Superdistrict 4	0	0	0	0	0	0	0	0	433	2	8	13	0	0	3	460	433	2	8	13	0	0	3	460
East Bay	0	0	0	0	0	0	0	0	4,228	4	21	32	0	0	13	4,298	4,228	4	21	32	0	0	13	4,298
North Bay	0	0	0	0	0	0	0	0	1,651	1	3	4	0	0	2	1,660	1,651	1	3	4	0	0	2	1,660
South Bay	0	0	0	0	0	0	0	0	3,578	4	16	25	0	0	9	3,632	3,578	4	16	25	0	0	9	3,632
Out of Region	0	0	0	0	0	0	0	0	511	1	3	5	0	0	1	521	511	1	3	5	0	0	1	521
Total	0	0	0	0	0	0	0	0	12,845	26	118	184	0	0	47	13,218	12,845	26	118	184	0	0	47	13,218

Late PM Peak Hour bet. 9 PM & 11 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	74	0	0	0	0	0	0	74	247	0	2	3	0	0	0	253	322	0	2	3	0	0	0	327
Superdistrict 2	19	0	0	0	0	0	0	19	101	1	4	6	0	0	1	113	120	1	4	6	0	0	1	132
Superdistrict 3	11	0	0	0	0	0	0	11	118	3	7	11	0	0	2	141	129	3	7	11	0	0	2	152
Superdistrict 4	18	0	0	0	0	0	0	18	131	1	2	3	0	0	1	138	149	1	2	3	0	0	1	155
East Bay	87	0	0	0	0	0	0	87	1,100	1	3	5	0	0	2	1,111	1,187	1	3	5	0	0	2	1,198
North Bay	0	0	0	0	0	0	0	0	516	0	1	1	0	0	1	519	516	0	1	1	0	0	1	519
South Bay	77	0	0	0	0	0	0	77	1,116	2	7	11	0	0	4	1,139	1,193	2	7	11	0	0	4	1,216
Out of Region	0	0	0	0	0	0	0	0	56	0	1	2	0	0	0	60	56	0	1	2	0	0	0	60
Total	287	0	0	0	0	0	0	287	3,387	7	27	42	0	0	10	3,473	3,674	7	27	42	0	0	10	3,760

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

PROJECT w/out Event TSP - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM

SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Intensity
Arena	18,064 attendees 1,000 employees
Retail	62,500 gsf
Quick Service Rest.	11,000 gsf
Sit-down Restaurant	51,500 gsf
XXX	0 xxx
XXX	0 xxx
Office	605,000 gsf

Person-trips by Mode	Daily Trips										Evening Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	25,830	2,368	1,565	2,442	0	0	660	32,865	63%		8,219	18	74	116	0	0	7	8,435	69%	31.8%	0.8%	4.8%	4.8%	0.0%	0.0%	1.1%	25.7%
Transit	8,460	681	697	1,087	0	0	1,507	12,431	24%		2,348	13	66	104	0	0	17	2,548	21%	27.8%	2.0%	9.5%	9.5%	0.0%	0.0%	1.1%	20.5%
Taxi/Coach (Event)	1,626							1,626	3%		528							528	4%	32.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.5%
Bike (Event)	723							723	1%		235							235	2%	32.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.5%
Walk	1,241	821	464	724	0	0	192	3,442	7%		352	6	22	34	0	0	2	417	3%	28.4%	0.7%	4.7%	4.7%	0.0%	0.0%	1.1%	12.1%
Other	249	80	234	365	0	0	83	1,011	2%		59	1	11	17	0	0	1	88	1%	23.6%	1.2%	4.6%	4.6%	0.0%	0.0%	1.1%	8.7%
Total	38,128	3,950	2,959	4,618	0	0	2,442	52,098	100%		11,742	39	174	271	0	0	27	12,252	100%	30.8%	1.0%	5.9%	5.9%	0.0%	0.0%	1.1%	23.5%
Vehicle Trips	10,859	1,278	714	1,114	0	0	509	14,475			3,394	11	40	62	0	0	6	3,512		31.3%	0.8%	5.6%	5.6%	0.0%	0.0%	1.1%	24.3%
Avg. veh. occupancy	2.53	1.85	2.19	2.19	0.00	0.00	1.30	2.38			2.58	1.69	1.88	1.88	0.00	0.00	1.30	2.55									

Saturday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips								Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.		
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	5,537	1,302	3	18	29	0	0	2	1,354	396	1	6	10	0	0	1	415	294	0	3	4	0	0	0	0	302	9%	2.23
Superdistrict 2	3,068	404	4	21	33	0	0	3	464	68	1	7	11	0	0	2	89	111	1	6	9	0	0	0	0	128	4%	2.32
Superdistrict 3	7,883	488	17	59	92	0	0	6	662	55	3	18	28	0	0	3	107	126	4	10	16	0	0	1	158	4%	2.44	
Superdistrict 4	2,265	389	2	12	19	0	0	2	425	40	1	5	7	0	0	1	55	132	1	3	5	0	0	0	0	141	4%	2.46
East Bay	14,220	3,875	5	30	47	0	0	7	3,966	978	4	20	31	0	0	6	1,038	1,090	1	5	8	0	0	1	1,104	31%	2.57	
North Bay	5,036	1,526	1	4	6	0	0	1	1,538	218	0	1	2	0	0	0	223	484	0	1	2	0	0	0	488	14%	2.70	
South Bay	12,123	3,288	5	23	37	0	0	5	3,358	445	2	8	12	0	0	3	469	1,079	2	10	16	0	0	2	1,109	32%	2.56	
Out of Region	1,966	470	1	5	8	0	0	1	484	148	0	2	3	0	0	0	154	77	0	2	2	0	0	0	82	2%	3.31	
Total	52,098	11,742	39	174	271	0	0	27	12,252	2,348	13	66	104	0	0	17	2,548	3,394	11	40	62	0	0	6	3,512	100%	2.55	

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound										Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Total Person Trips	11,742	11	47	74	0	0	0	11,873	0	28	126	197	0	0	27	378	11,742	39	174	271	0	0	27	12,252		
Transit Trips	2,348	1	9	14	0	0	0	2,372	0	12	58	90	0	0	17	176	2,348	13	66	104	0	0	17	2,548		
Vehicle Trips	3,220	4	12	18	0	0	0	3,253	174	7	28	44	0	0	6	259	3,394	11	40	62	0	0	6	3,512		
	95%	33%	29%	29%	0%	0%	0%	93%	5%	67%	71%	71%	0%	0%	100%	7%										

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound										Outbound								Total								Taxi + Coach Arena
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	526	0	2	3	0	0	0	532	0	0	3	5	0	0	0	8	526	1	5	8	0	0	0	0	540	134	
Superdistrict 2	234	1	5	7	0	0	0	246	0	1	6	10	0	0	1	18	234	2	11	17	0	0	0	1	263	34	
Superdistrict 3	300	4	9	14	0	0	0	327	0	5	13	20	0	0	1	38	300	9	22	34	0	0	1	366	20		
Superdistrict 4	300	0	2	3	0	0	0	306	0	1	4	6	0	0	1	12	300	1	6	10	0	0	0	1	318	28	
East Bay	2,670	0	3	5	0	0	0	2,678	0	1	7	11	0	0	1	21	2,670	1	10	16	0	0	0	1	2,699	136	
North Bay	1,308	0	0	1	0	0	0	1,309	0	0	2	3	0	0	0	5	1,308	1	2	3	0	0	0	0	1,315	0	
South Bay	2,677	1	4	6	0	0	0	2,688	0	2	12	18	0	0	3	34	2,677	3	16	24	0	0	3	2,722	118		
Out of Region	204	0	1	2	0	0	0	207	0	0	1	2	0	0	0	4	204	1	3	4	0	0	0	0	212	59	
Total	8,219	7	27	41	0	0	0	8,294	0	11	48	75	0	0	7	141	8,219	18	74	116	0	0	7	8,435	528		

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PROJECT w/out Event TSP - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	396	0	1	2	0	0	0	399	0	1	5	8	0	0	1	15	396	1	6	10	0	0	1	415
Superdistrict 2	68	0	1	1	0	0	0	70	0	1	6	9	0	0	2	18	68	1	7	11	0	0	2	89
Superdistrict 3	55	1	4	7	0	0	0	67	0	3	13	21	0	0	3	40	55	3	18	28	0	0	3	107
Superdistrict 4	40	0	1	1	0	0	0	42	0	1	4	7	0	0	1	13	40	1	5	7	0	0	1	55
East Bay	978	0	1	2	0	0	0	981	0	4	18	29	0	0	6	57	978	4	20	31	0	0	6	1,038
North Bay	218	0	0	0	0	0	0	218	0	0	1	2	0	0	0	4	218	0	1	2	0	0	0	223
South Bay	445	0	0	0	0	0	0	446	0	2	8	12	0	0	3	23	445	2	8	12	0	0	3	469
Out of Region	148	0	0	0	0	0	0	149	0	0	2	3	0	0	5	148	0	2	3	0	0	0	0	154
Total	2,348	1	9	14	0	0	0	2,372	0	12	58	90	0	0	17	176	2,348	13	66	104	0	0	17	2,548

Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	60							60	0							0	60	0	0	0	0	0	0	0	60
Superdistrict 2	15							15	0							0	15	0	0	0	0	0	0	0	15
Superdistrict 3	9							9	0							0	9	0	0	0	0	0	0	0	9
Superdistrict 4	13							13	0							0	13	0	0	0	0	0	0	0	13
East Bay	91							91	0							0	91	0	0	0	0	0	0	0	91
North Bay	0							0	0							0	0	0	0	0	0	0	0	0	0
South Bay	48							48	0							0	48	0	0	0	0	0	0	0	48
Out of Region	0							0	0							0	0	0	0	0	0	0	0	0	0
Total	235	0	0	0	0	0	0	235	0	0	0	0	0	0	0	0	235	0	0	0	0	0	0	0	235

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	321	0	3	4	0	0	0	328	0	0	4	7	0	0	1	12	321	1	7	11	0	0	1	340
Superdistrict 2	88	0	1	2	0	0	0	91	0	0	2	3	0	0	0	6	88	1	3	5	0	0	0	97
Superdistrict 3	124	2	7	11	0	0	0	144	0	3	12	19	0	0	2	37	124	5	20	31	0	0	2	181
Superdistrict 4	36	0	1	1	0	0	0	37	0	0	1	1	0	0	0	2	36	0	1	2	0	0	0	39
East Bay	136	0	0	0	0	0	0	136	0	0	1	1	0	0	2	136	0	1	1	0	0	0	0	138
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	118	0	0	0	0	0	0	118	0	0	0	0	0	0	1	118	0	0	0	0	0	0	0	119
Out of Region	117	0	0	0	0	0	0	118	0	0	0	0	0	0	1	117	0	0	0	0	0	0	0	118
Total	939	3	12	19	0	0	0	972	0	5	21	32	0	0	3	61	939	7	33	51	0	0	3	1,033

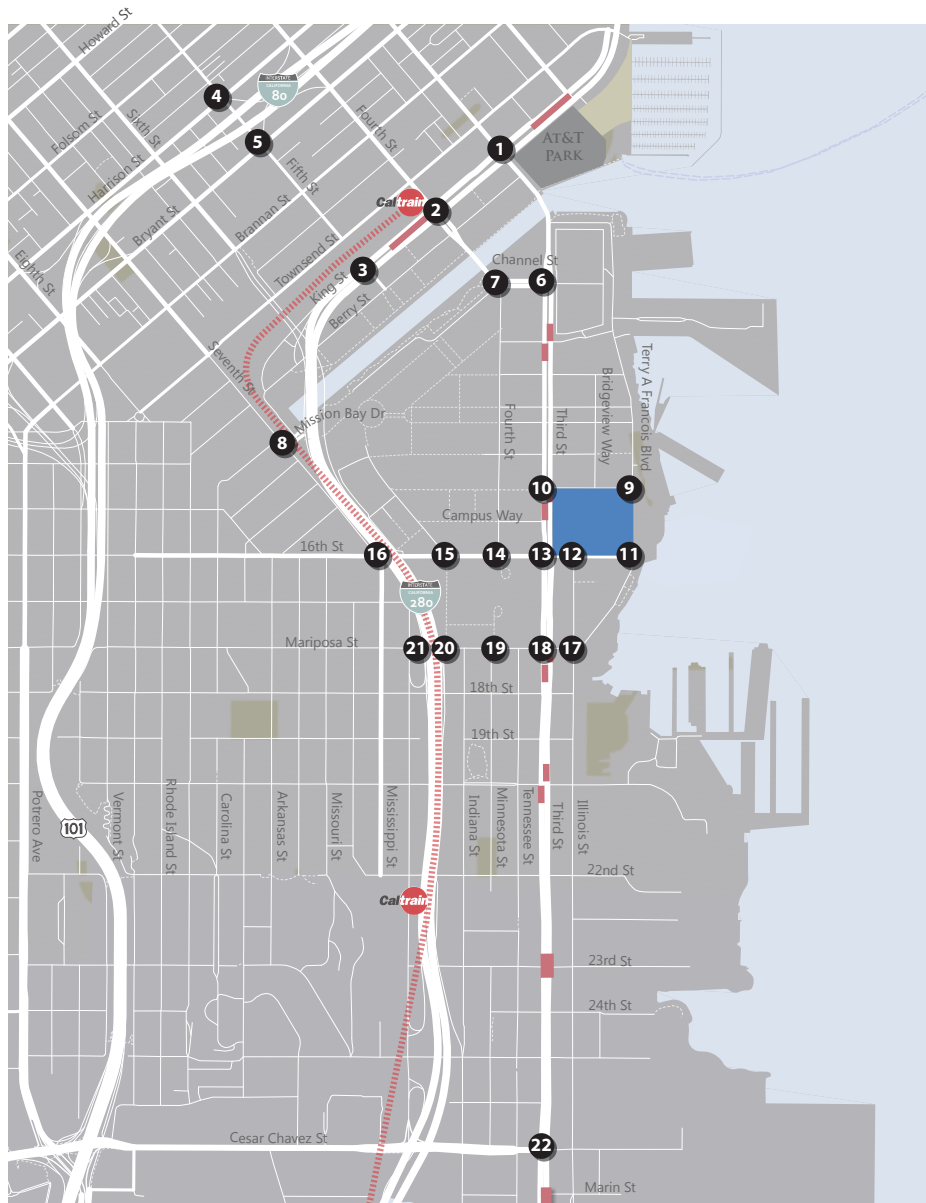
Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	1,302	1	6	10	0	0	0	1,319	0	2	12	19	0	0	2	35	1,302	3	18	29	0	0	2	1,354
Superdistrict 2	404	1	7	10	0	0	0	422	0	3	14	23	0	0	3	42	404	4	21	33	0	0	3	464
Superdistrict 3	488	6	21	33	0	0	0	548	0	10	38	60	0	0	6	115	488	17	59	92	0	0	6	662
Superdistrict 4	389	1	3	5	0	0	0	398	0	2	9	14	0	0	2	27	389	2	12	19	0	0	2	425
East Bay	3,875	0	4	7	0	0	0	3,886	0	5	26	41	0	0	7	80	3,875	5	30	47	0	0	7	3,966
North Bay	1,526	0	0	1	0	0	0	1,528	0	1	3	5	0	0	1	10	1,526	1	4	6	0	0	1	1,538
South Bay	3,288	1	4	7	0	0	0	3,300	0	4	19	30	0	0	5	59	3,288	5	23	37	0	0	5	3,358
Out of Region	470	1	1	2	0	0	0	474	0	1	3	5	0	0	1	10	470	1	5	8	0	0	1	484
Total	11,742	11	47	74	0	0	0	11,873	0	28	126	197	0	0	27	378	11,742	39	174	271	0	0	27	12,252

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	244	0	1	2	0	0	0	247	50	0	2	3	0	0	0	54	294	0	3	4	0	0	0	0	302
Superdistrict 2	99	0	2	4	0	0	0	105	12	1	4	6	0	0	0	23	111	1	6	9	0	0	0	0	128
Superdistrict 3	119	2	4	6	0	0	0	130	7	3	7	10	0	0	1	28	126	4	10	16	0	0	0	1	158
Superdistrict 4	122	0	1	1	0	0	0	124	11	1	2	3	0	0	0	17	132	1	3	5	0	0	0	0	141
East Bay	1,039	0	1	2	0	0	0	1,042	50	1	4	6	0	0	1	62	1,090	1	5	8	0	0	0	1	1,104
North Bay	484	0	0	0	0	0	0	485	0	0	1	1	0	0	0	3	484	0	1	2	0	0	0	0	488
South Bay	1,035	0	2	3	0	0	0	1,040	44	2	8	13	0	0	2	69	1,079	2	10	16	0	0	2	1,109	
Out of Region	77	0	1	1	0	0	0	79	0	0	1	1	0	0	0	3	77	0	2	2	0	0	0	0	82
Total	3,220	4	12	18	0	0	0	3,253	174	7	28	44	0	0	6	259	3,394	11	40	62	0	0	6	3,512	

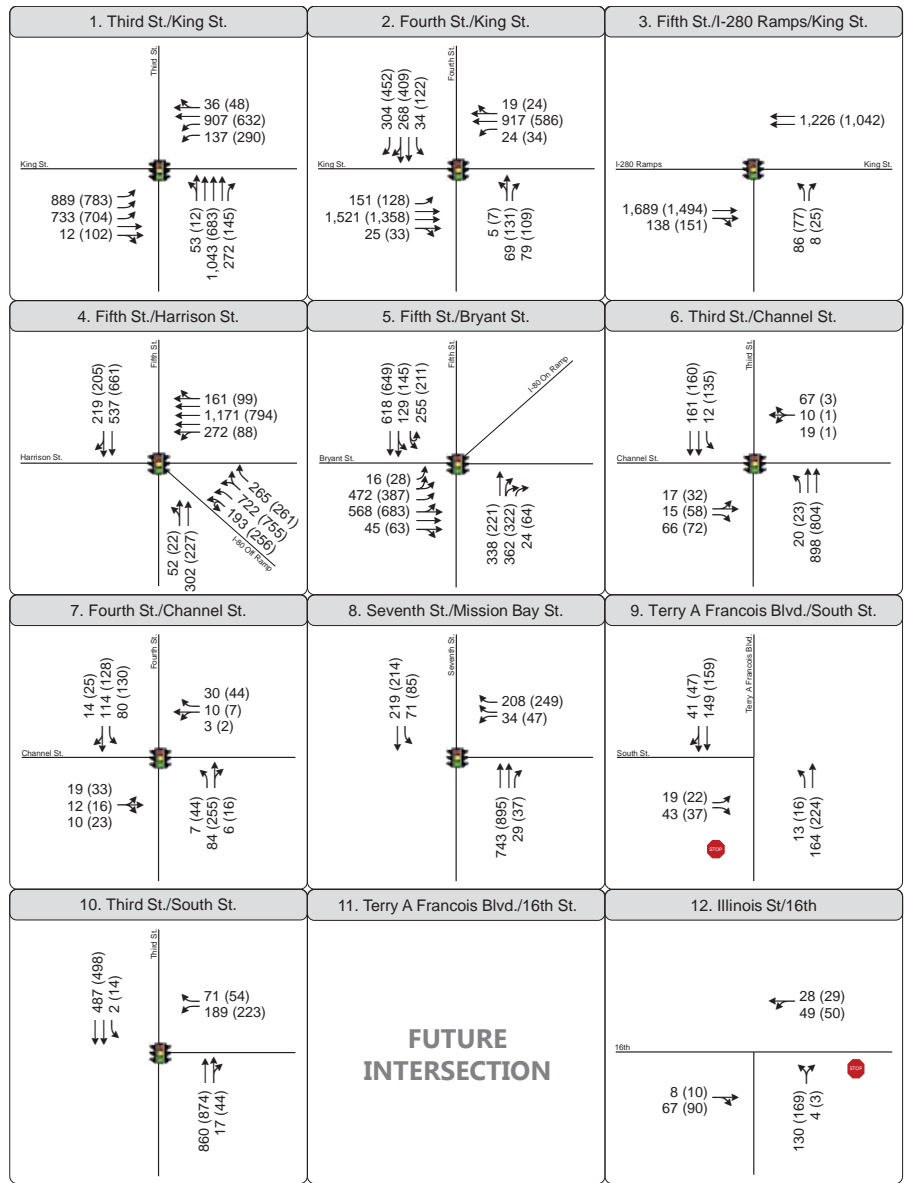
TR-3

TRAFFIC VOLUME FIGURES

EXISTING 2015 (NO PROJECT)
WEEKDAY PM PEAK



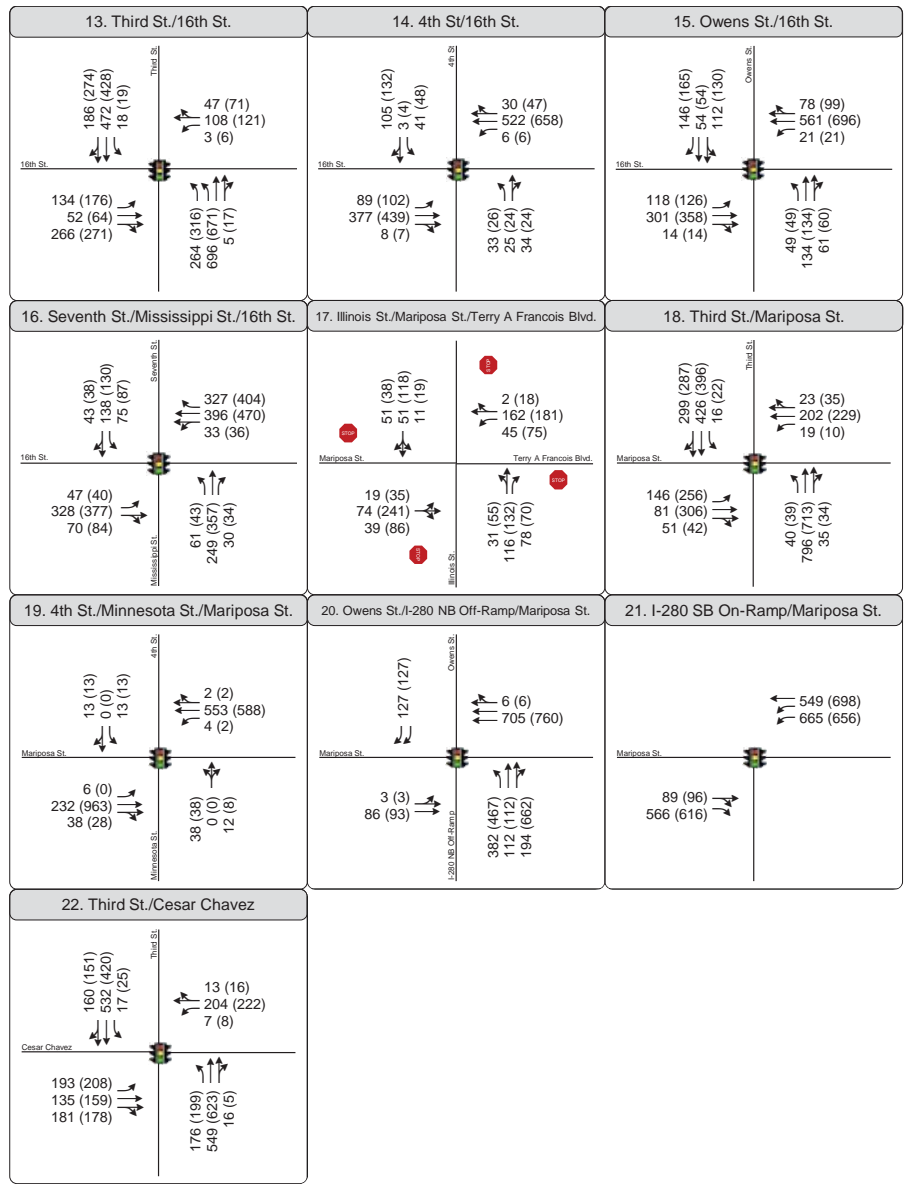
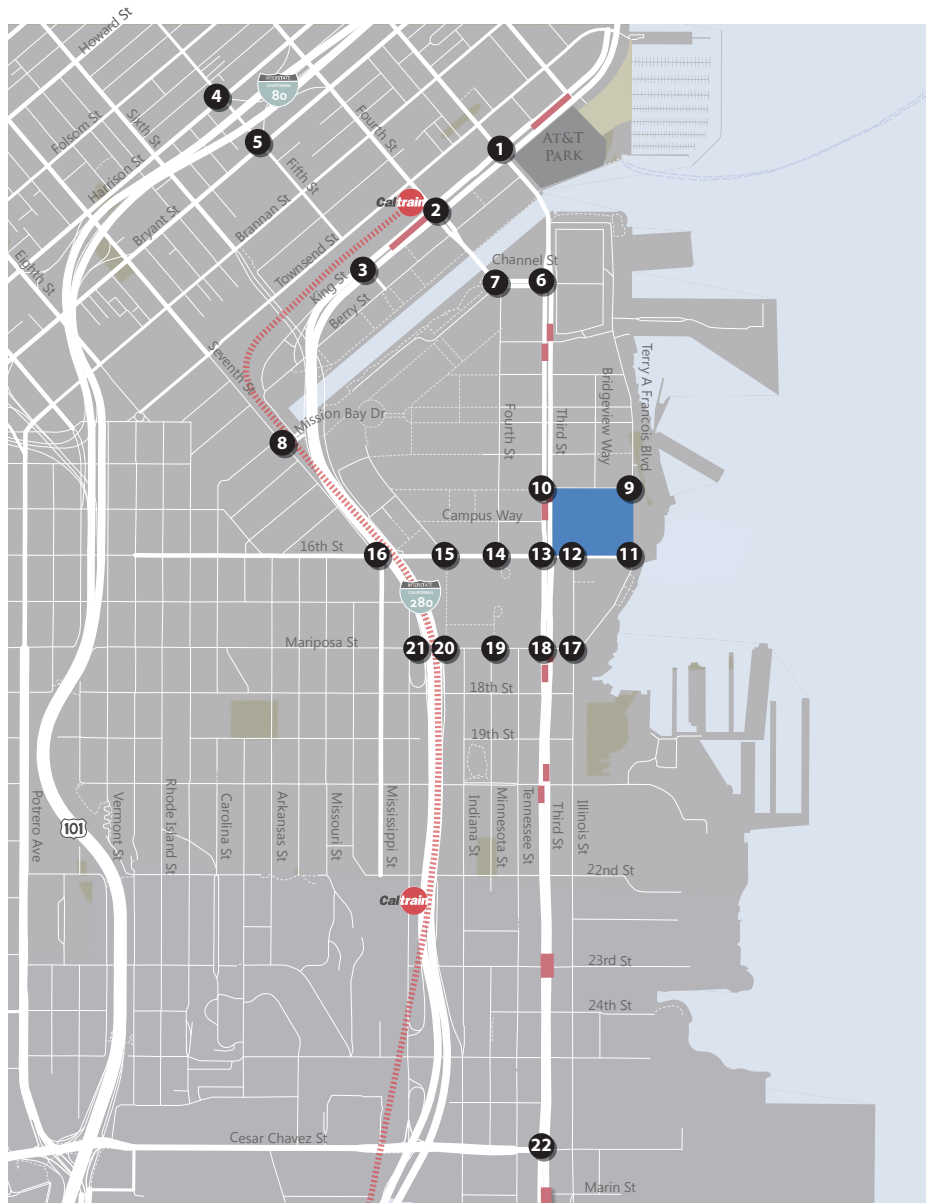
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 1a
Peak Hour Traffic Volumes and Lane Configurations
Existing (2015) Conditions - Weekday PM Peak

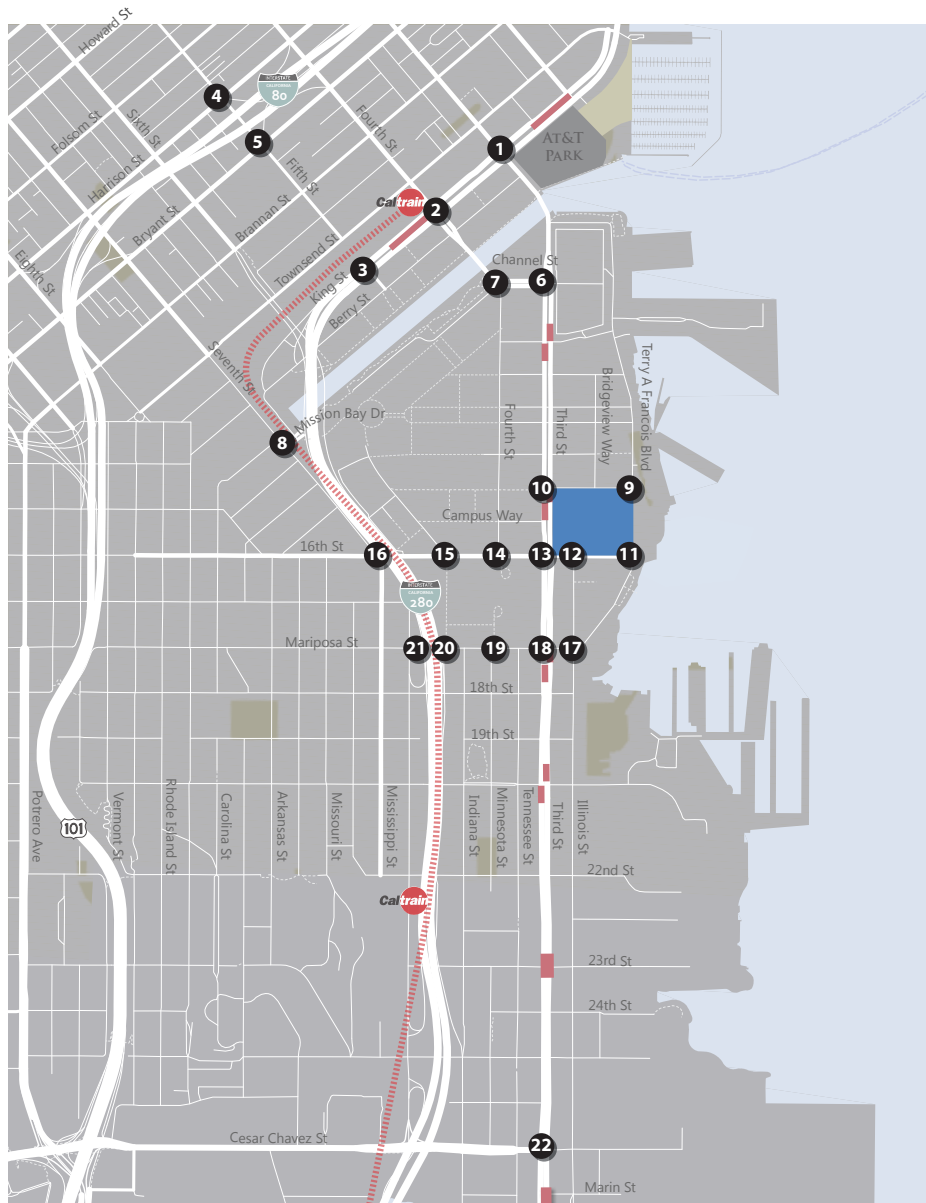




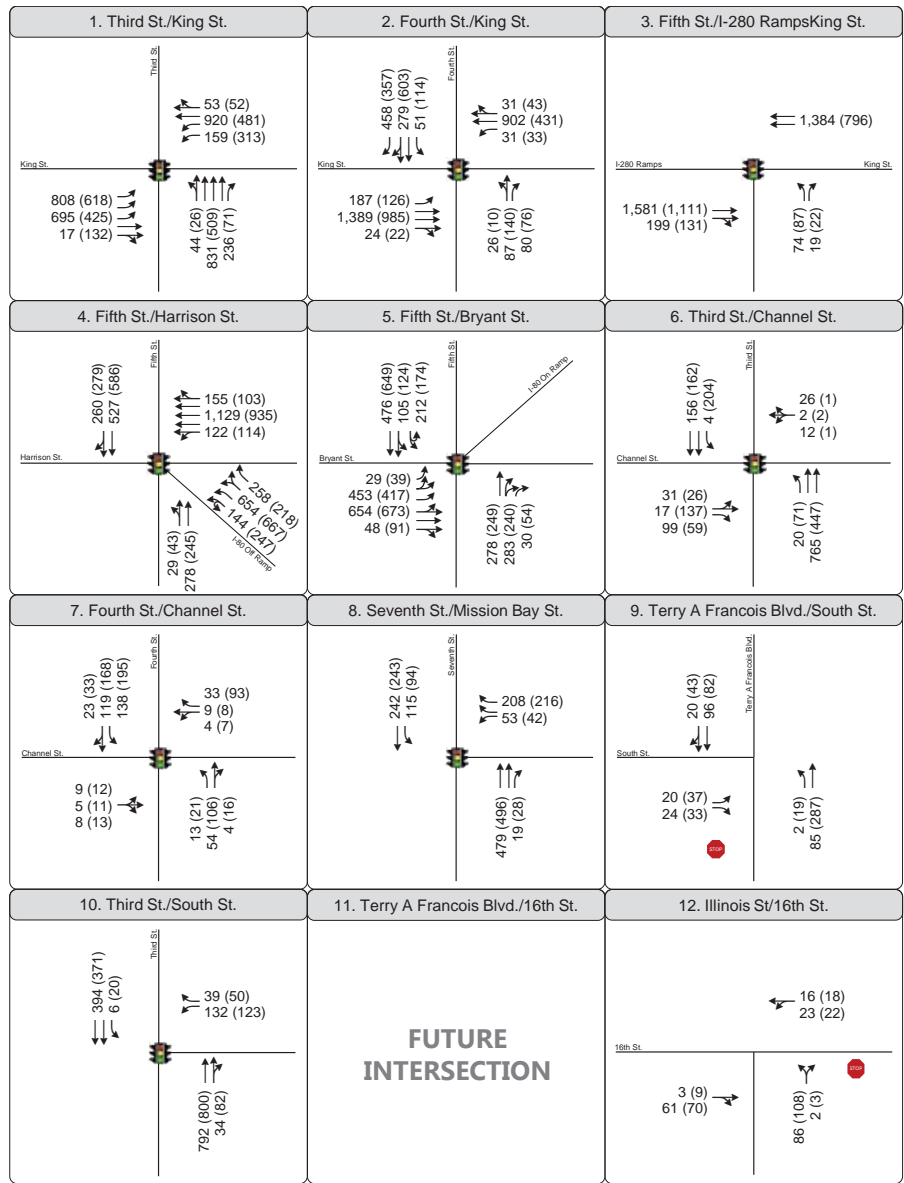
Study Intersection
 Project Site
 Muni Stop
 Turn Lane
 No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 1b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing (2015) Conditions - Weekday PM Peak

EXISTING 2015 (NO PROJECT)
WEEKDAY EVENING



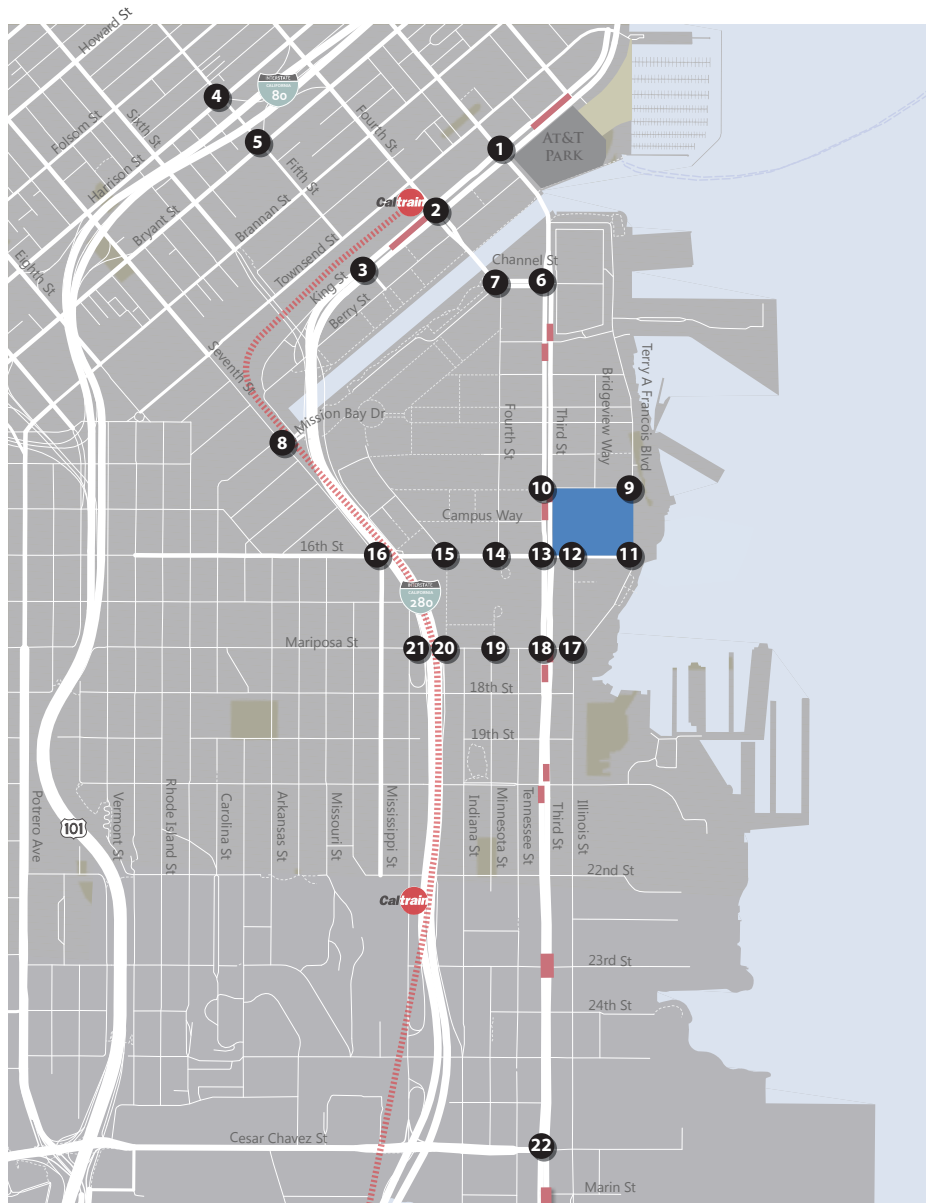
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



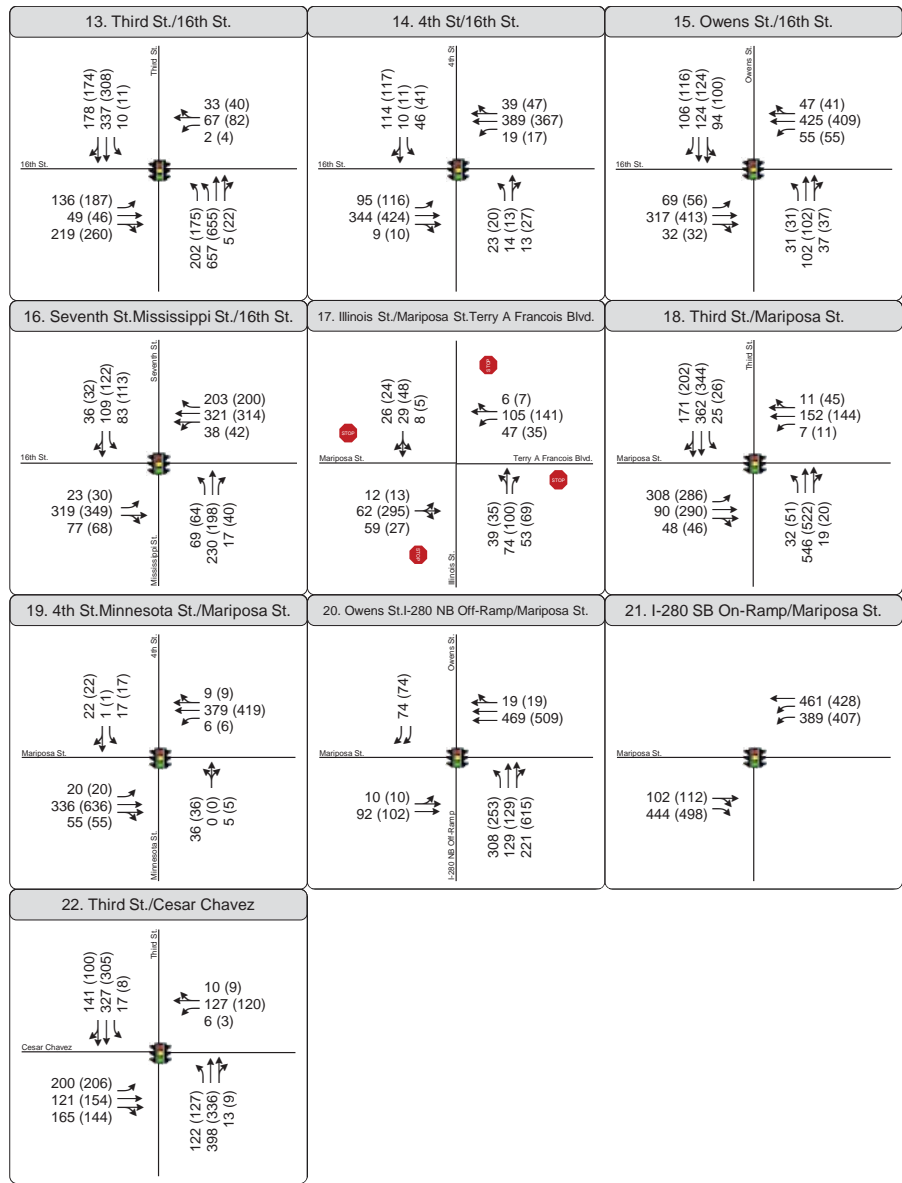
No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 2a
Peak Hour Traffic Volumes and Lane Configurations Existing (2015) Conditions - Weekday Evening





X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

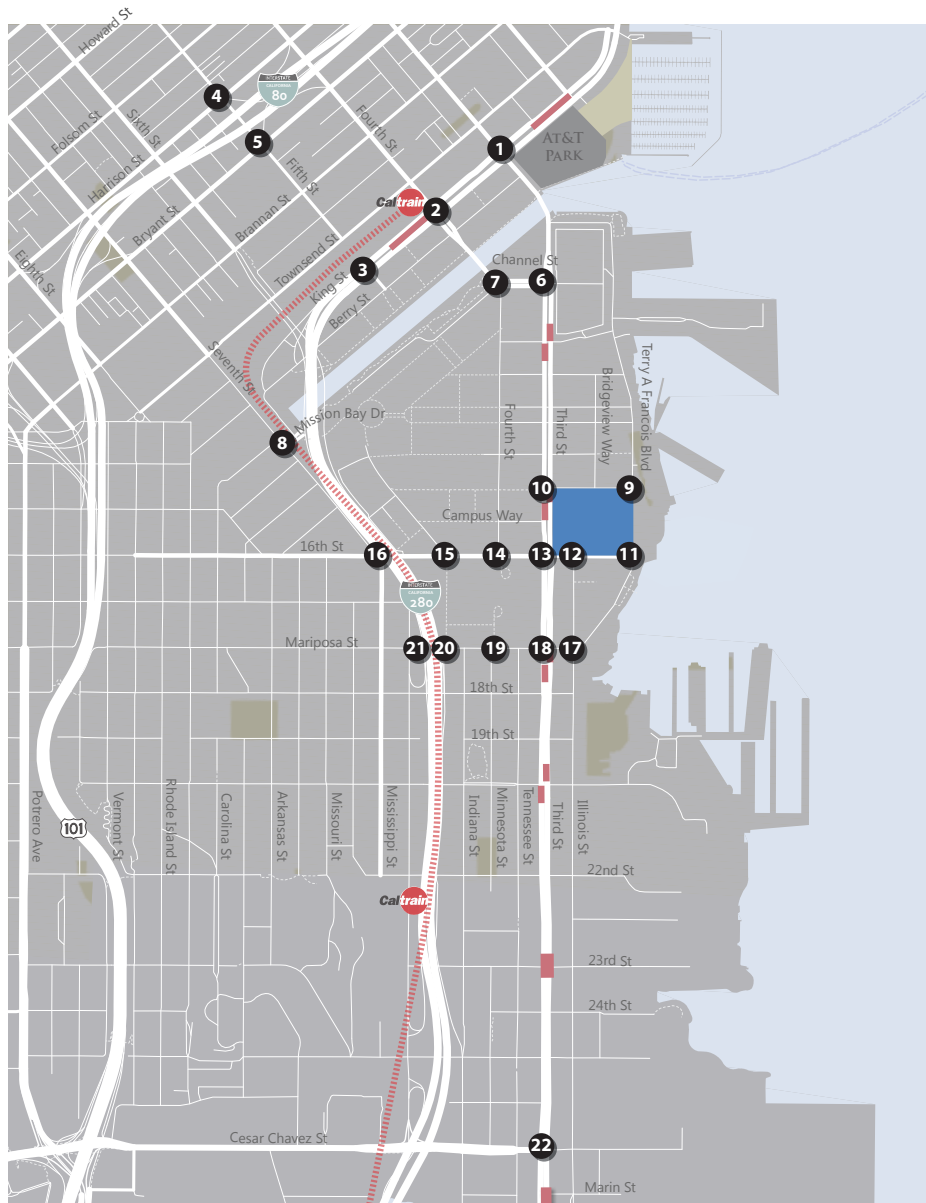


No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

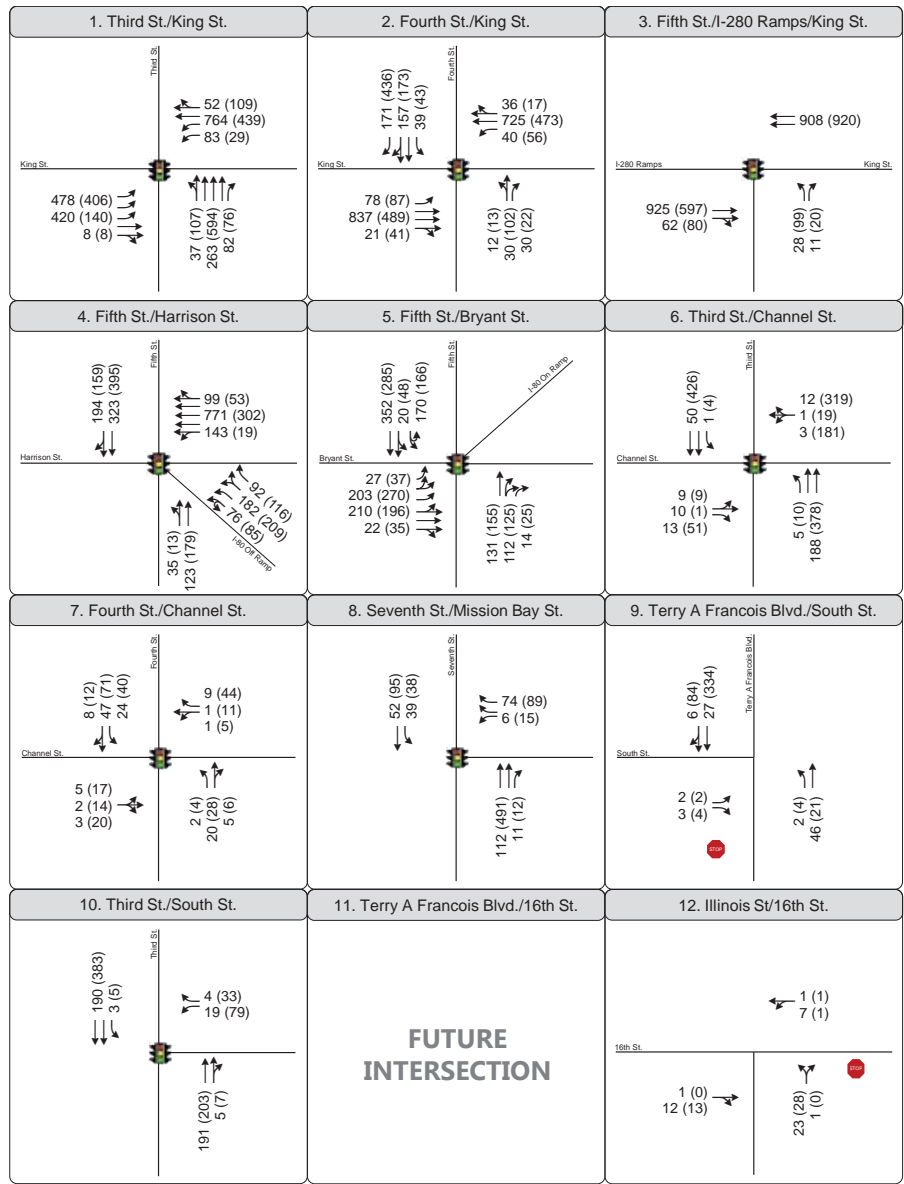
Figure 2b
Peak Hour Traffic Volumes and Lane Configurations
Existing (2015) Conditions - Weekday Evening



EXISTING 2015 (NO PROJECT)
WEEKDAY LATE EVENING

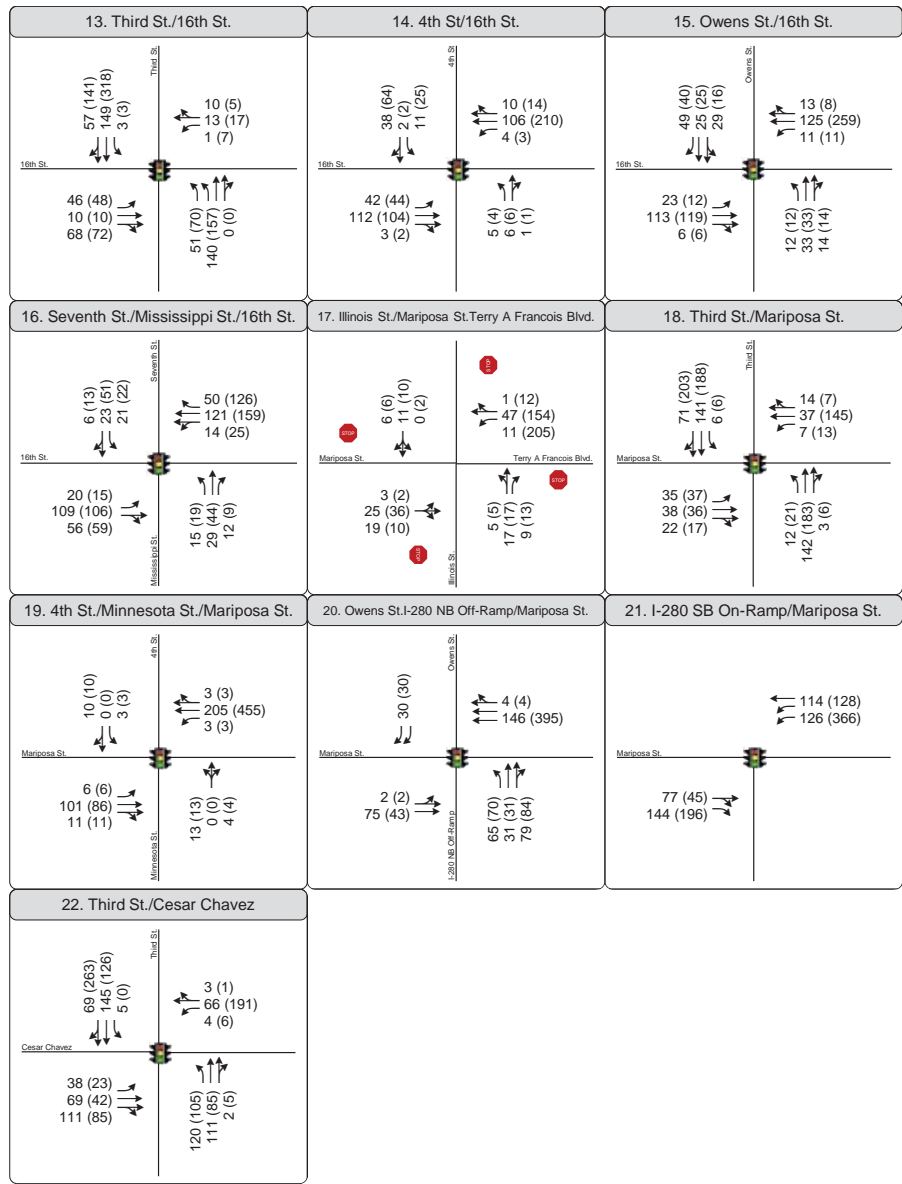
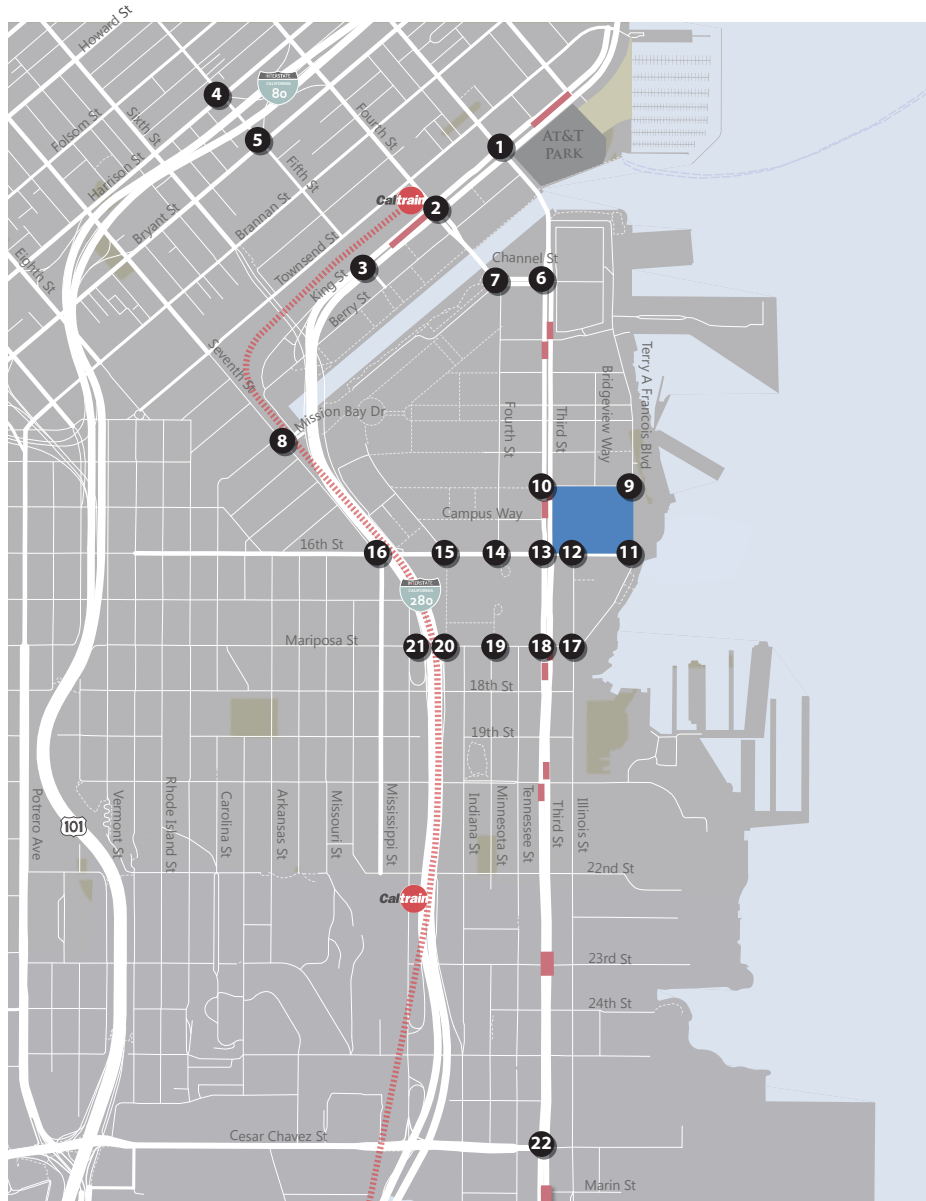


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 3a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing (2015) Conditions - Weekday Late Night

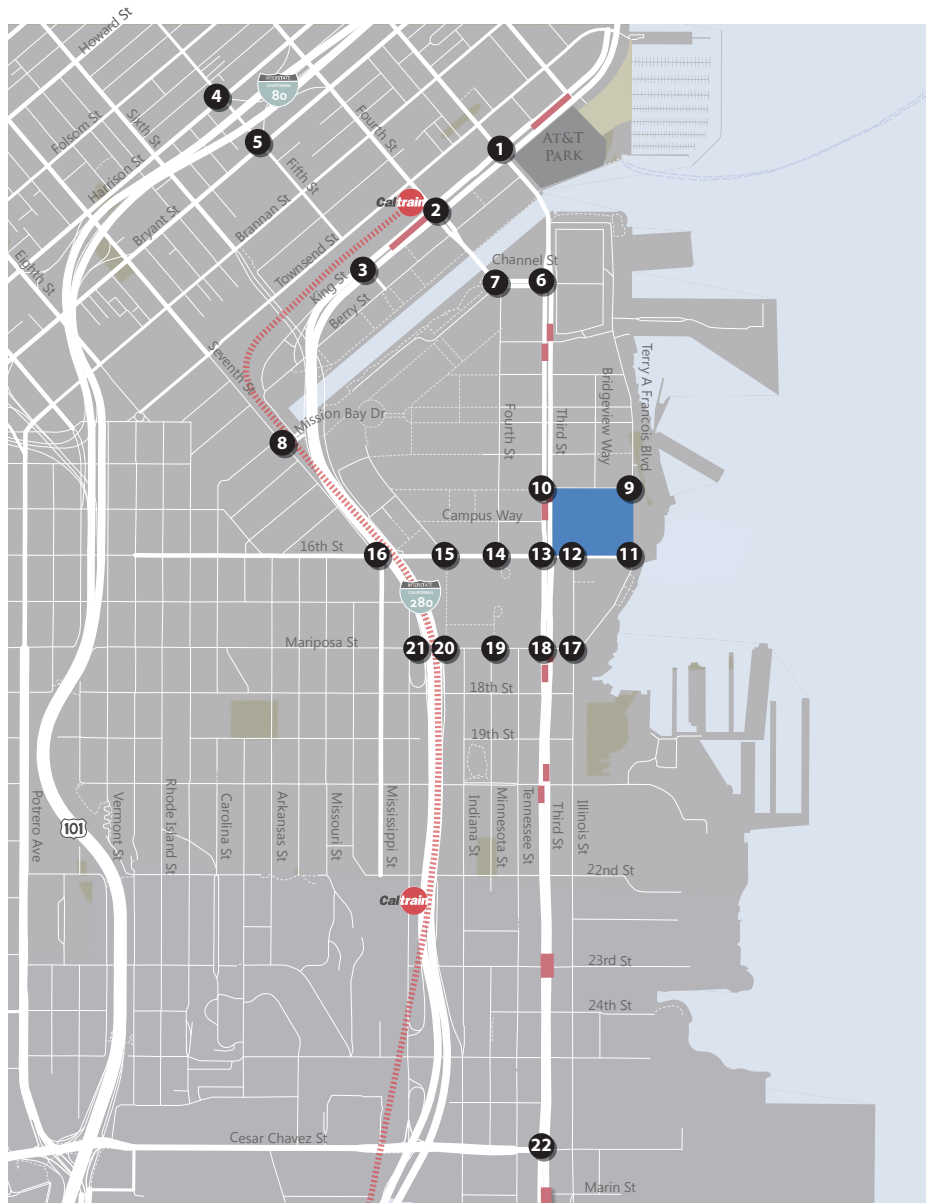


Study Intersection
 Project Site
 Muni Stop
 Turn Lane

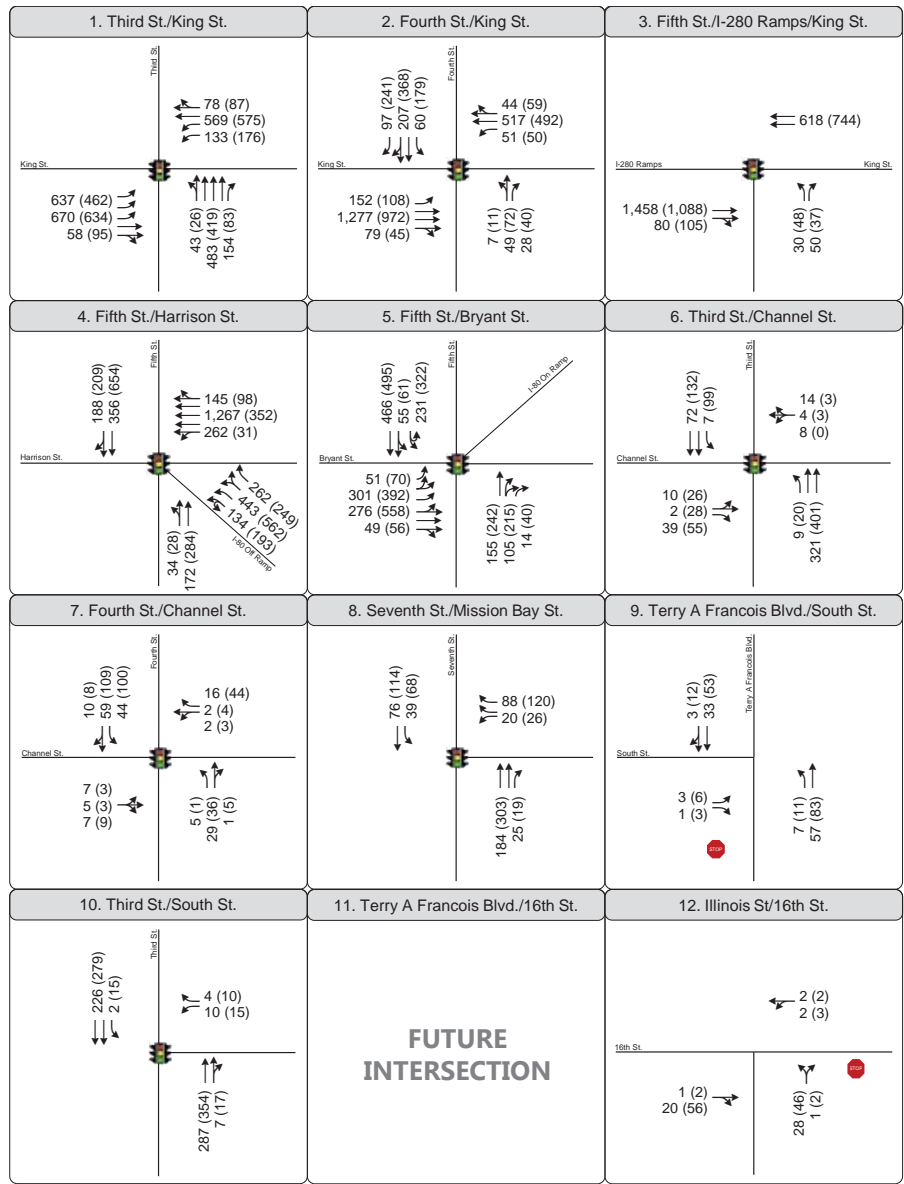
No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 3b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing (2015) Conditions - Weekday Late Night

EXISTING 2015 (NO PROJECT)
SATURDAY EVENING

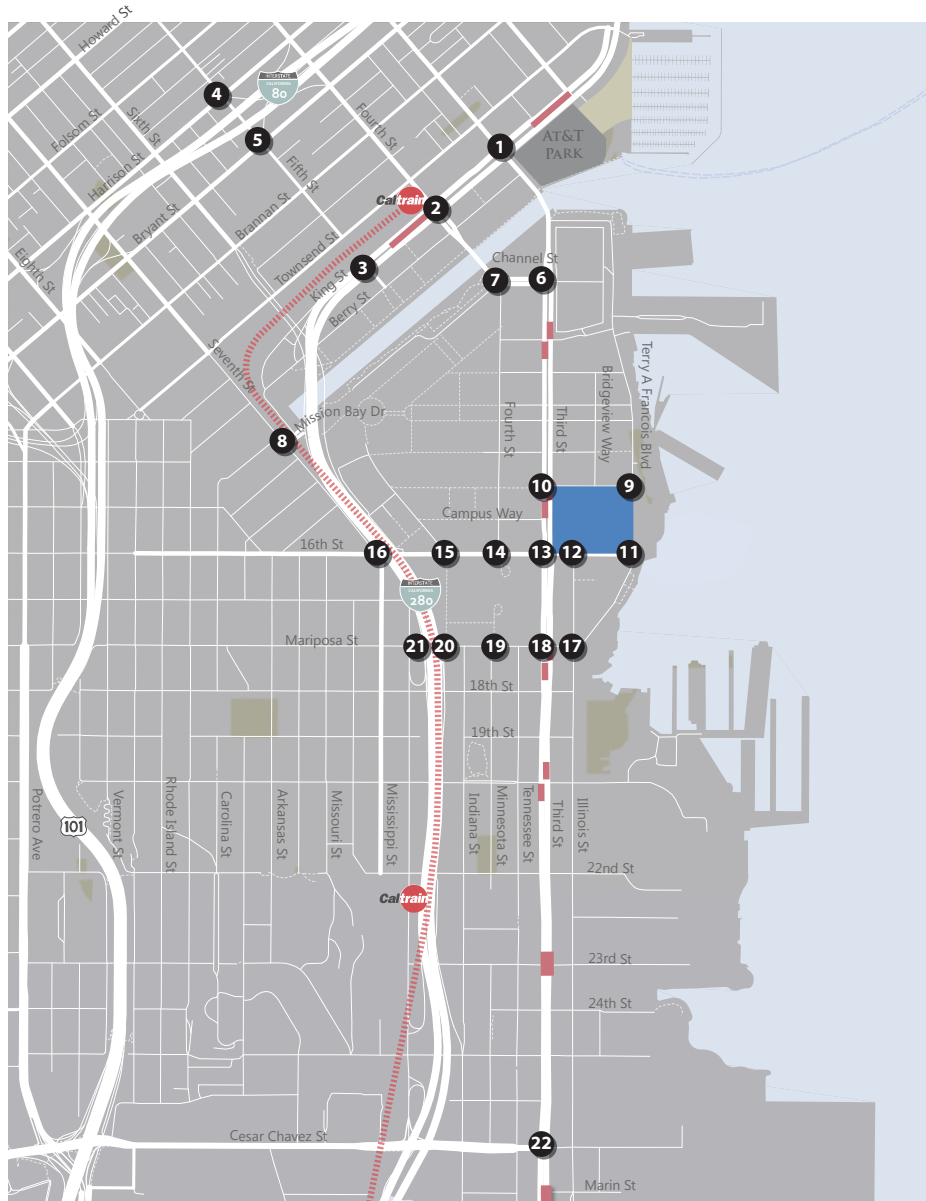


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

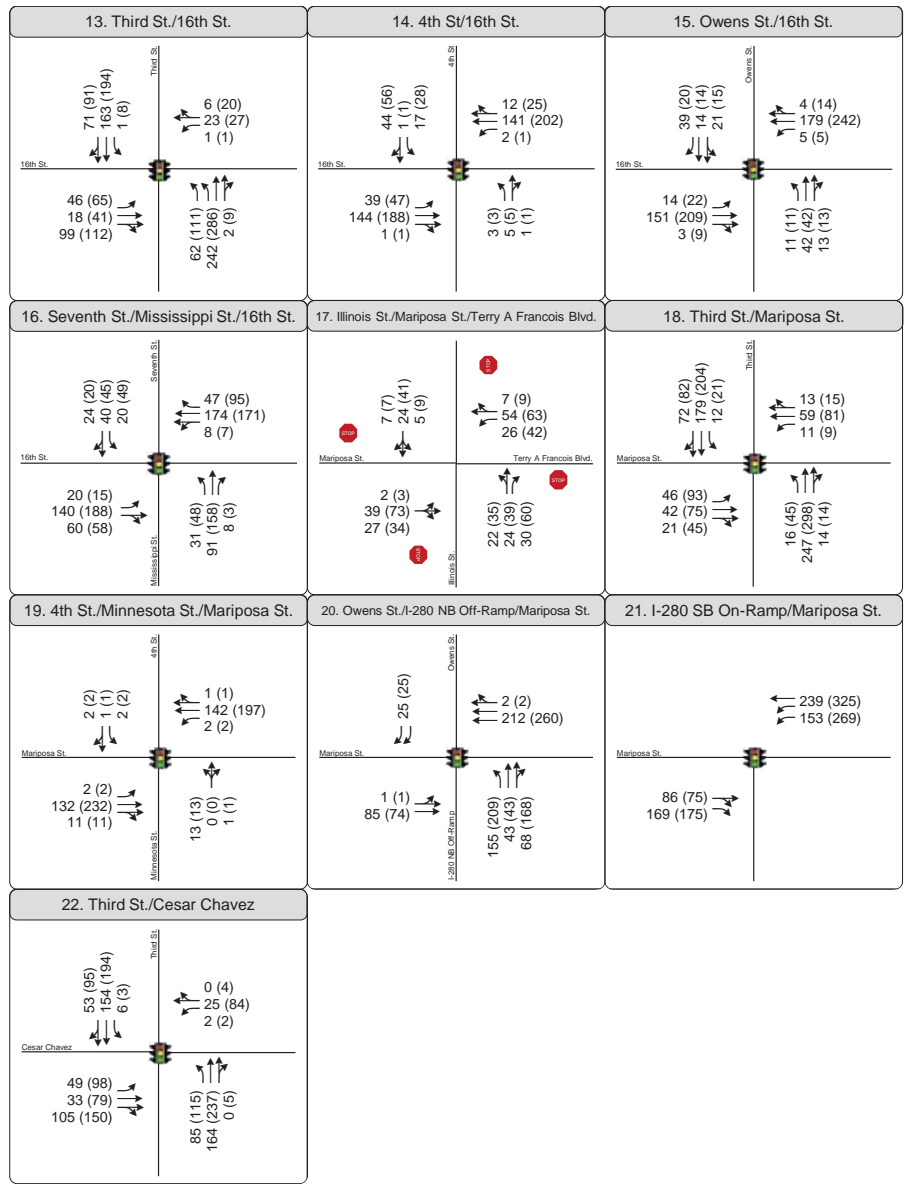


No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 4a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing (2015) Conditions - Saturday Evening



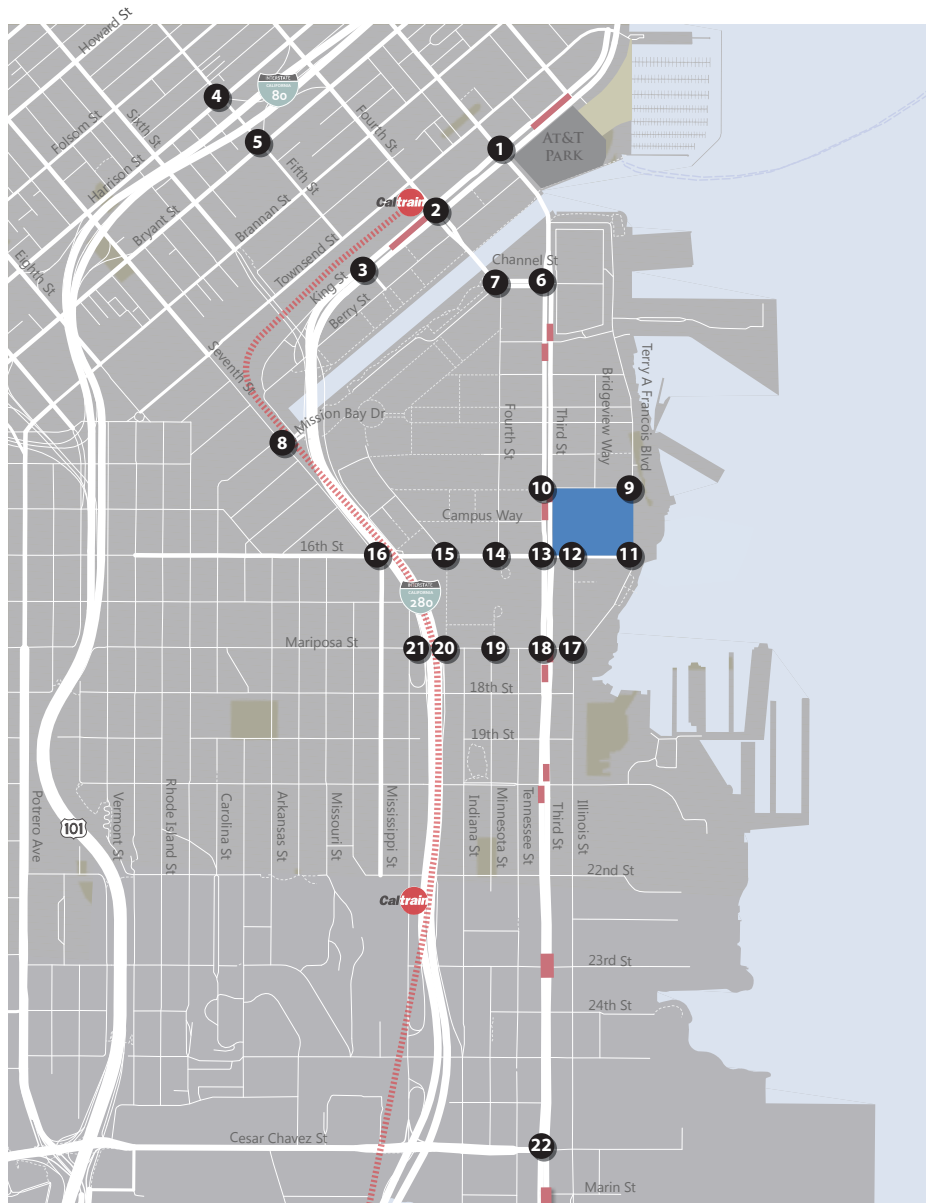
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



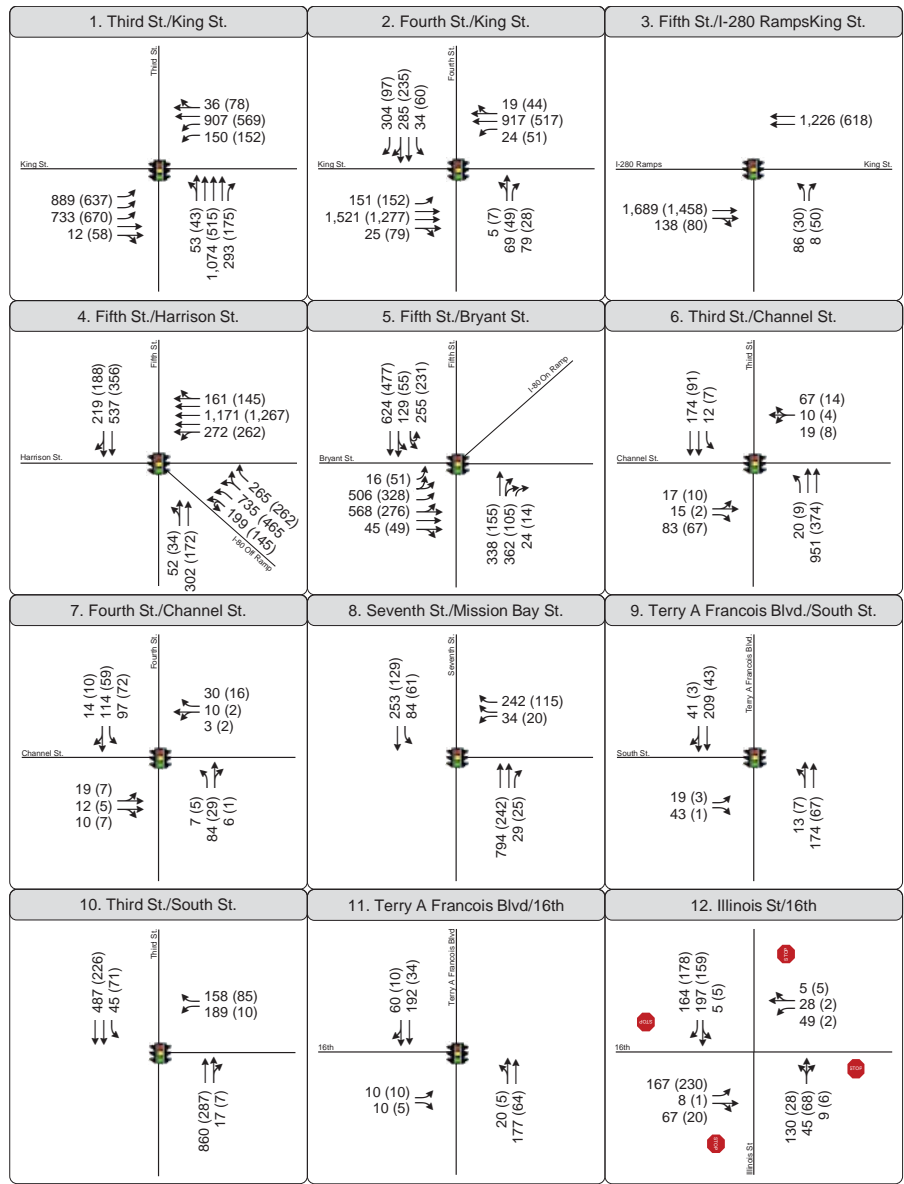
No Giants Game (With Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 4b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing (2015) Conditions - Saturday Evening

EXISTING 2015 PLUS PROJECT – NO EVENT
WEEKDAY PM PEAK / SATURDAY EVENING

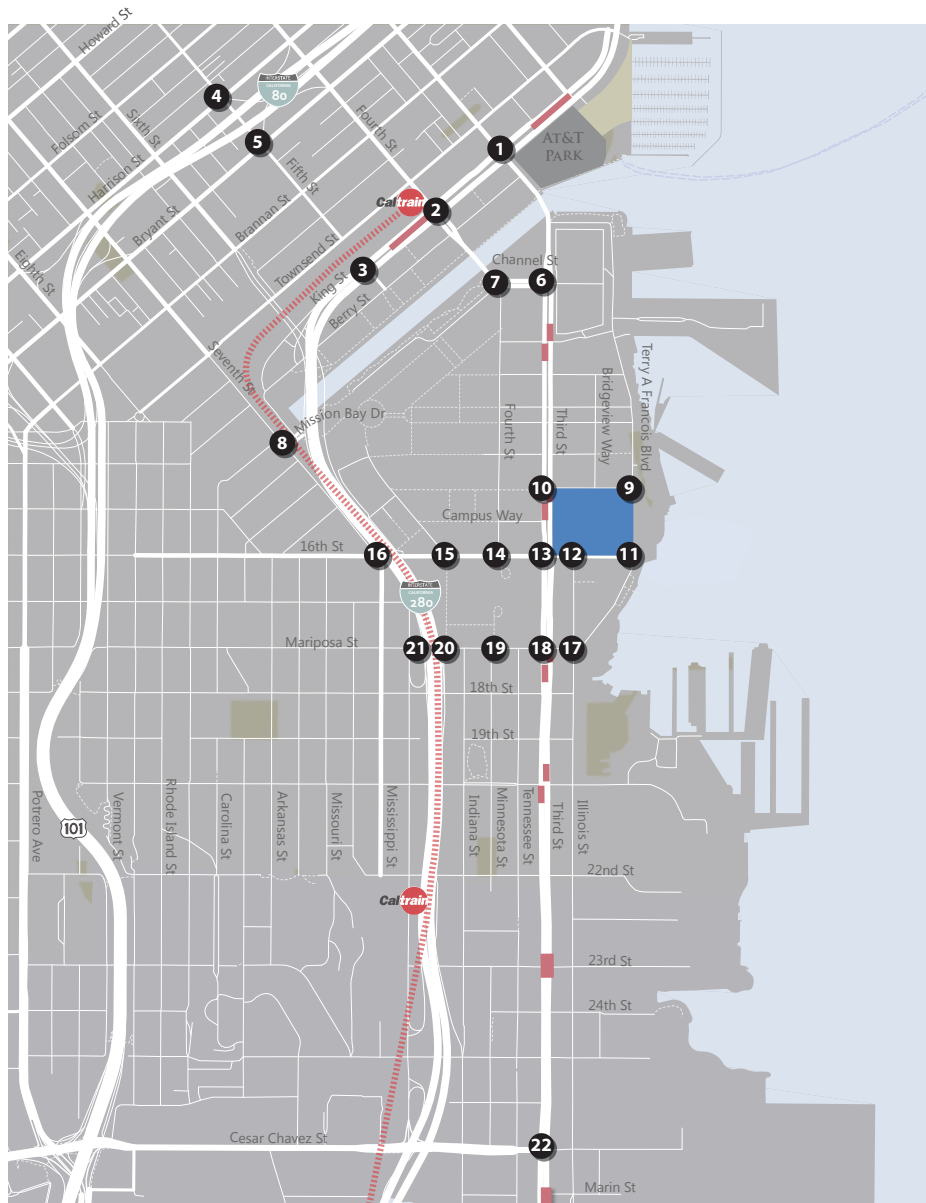


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

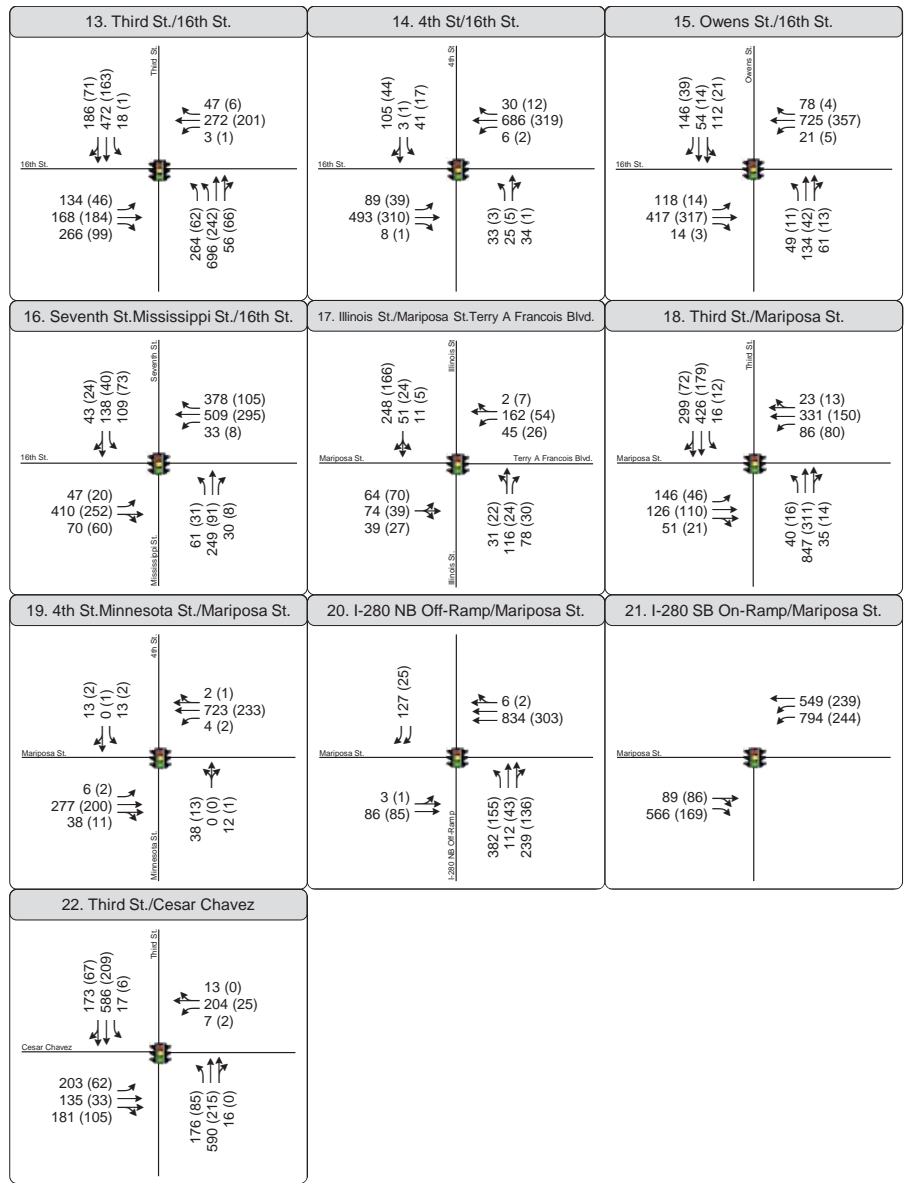


PM Peak (Saturday)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 5a
Peak Hour Traffic Volumes and Lane Configurations
Existing Plus Project (2015) Conditions - No Event



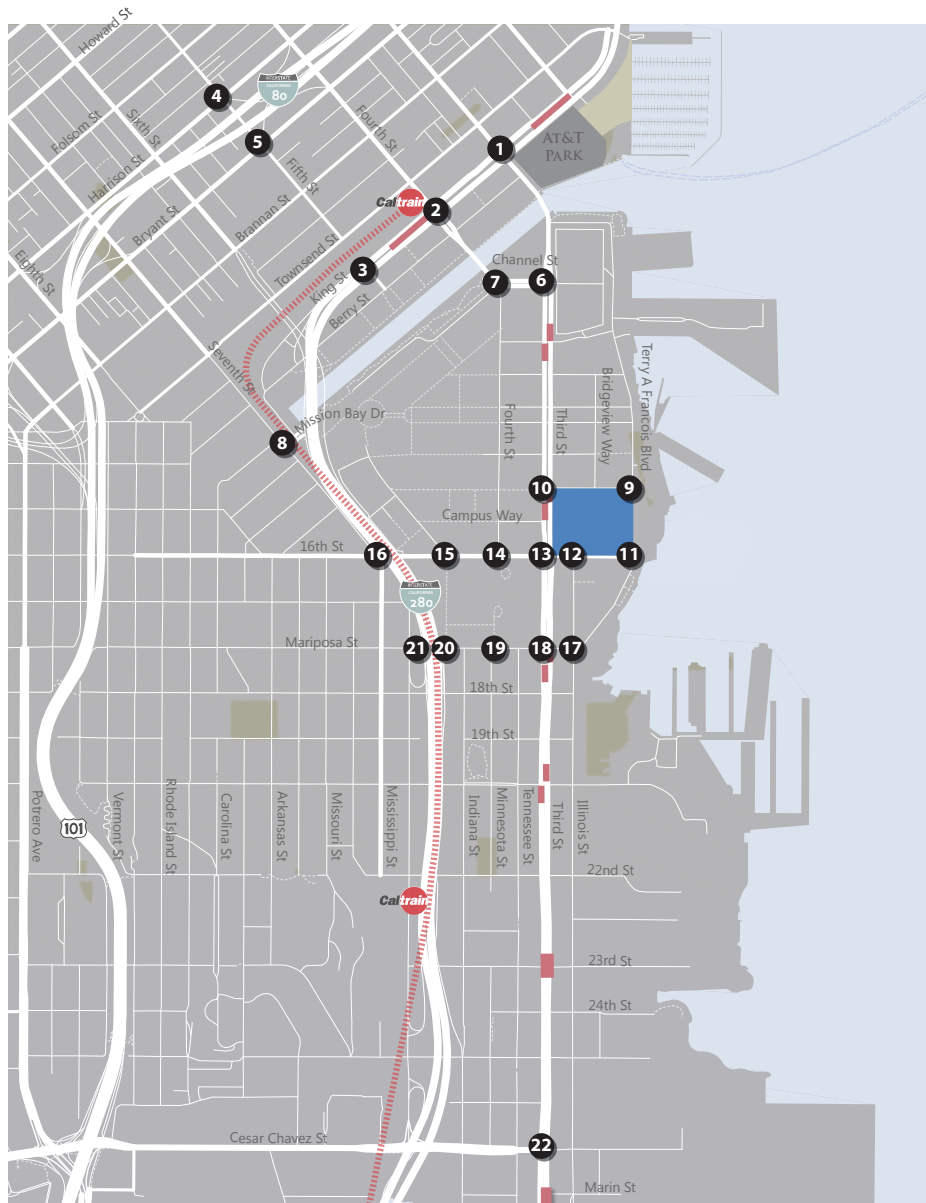
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



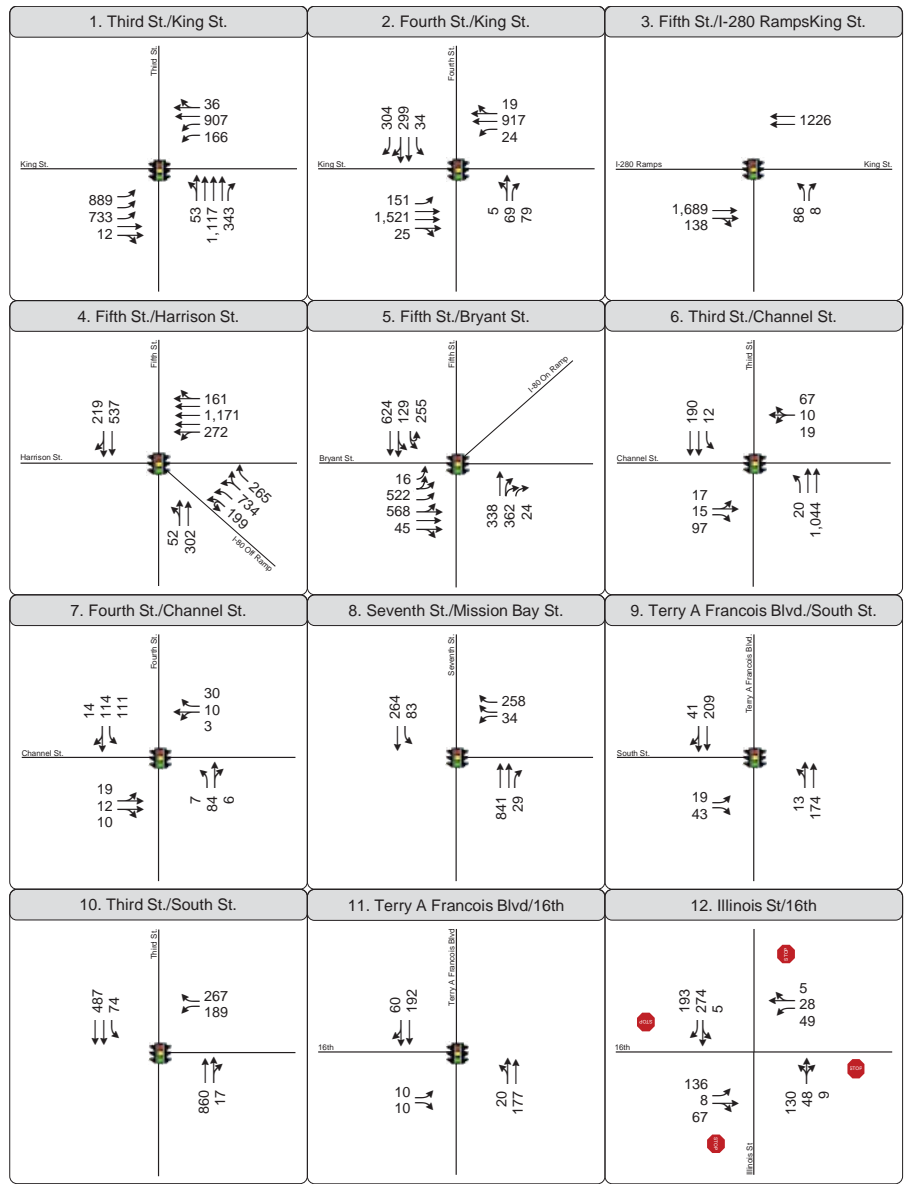
PM Peak (Saturday)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 5b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - No Event

EXISTING 2015 PLUS PROJECT – CONVENTION EVENT
WEEKDAY PM PEAK



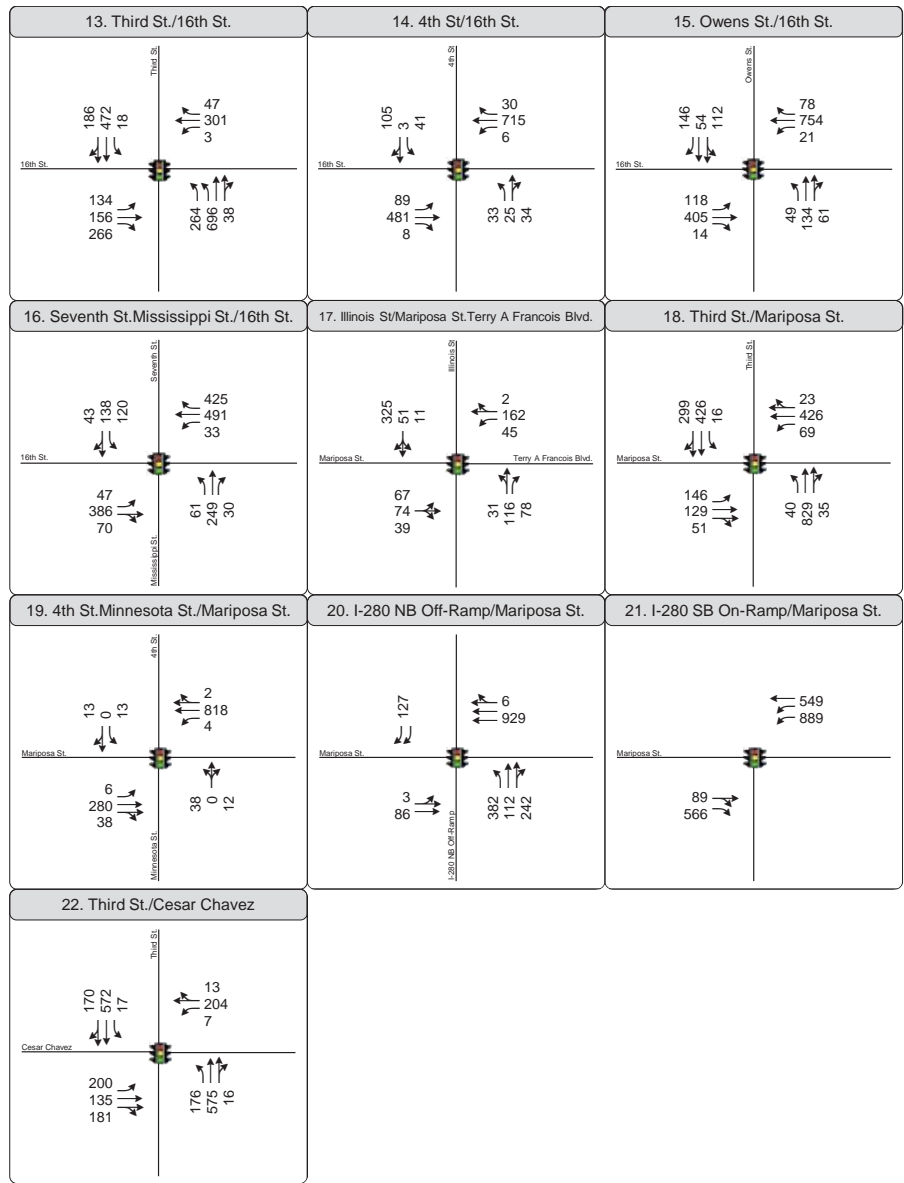
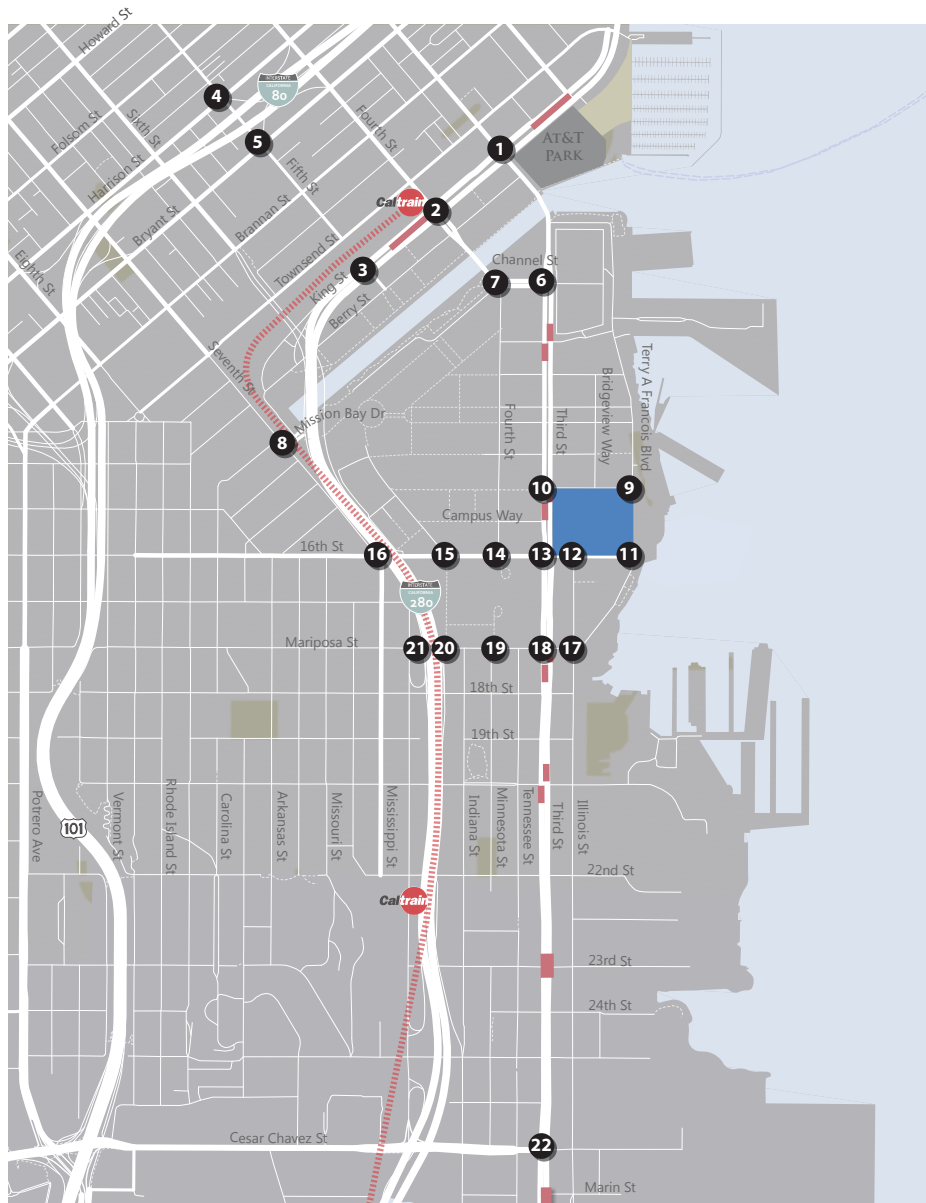
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



PM Peak Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 6a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - Weekday PM Peak with Convention





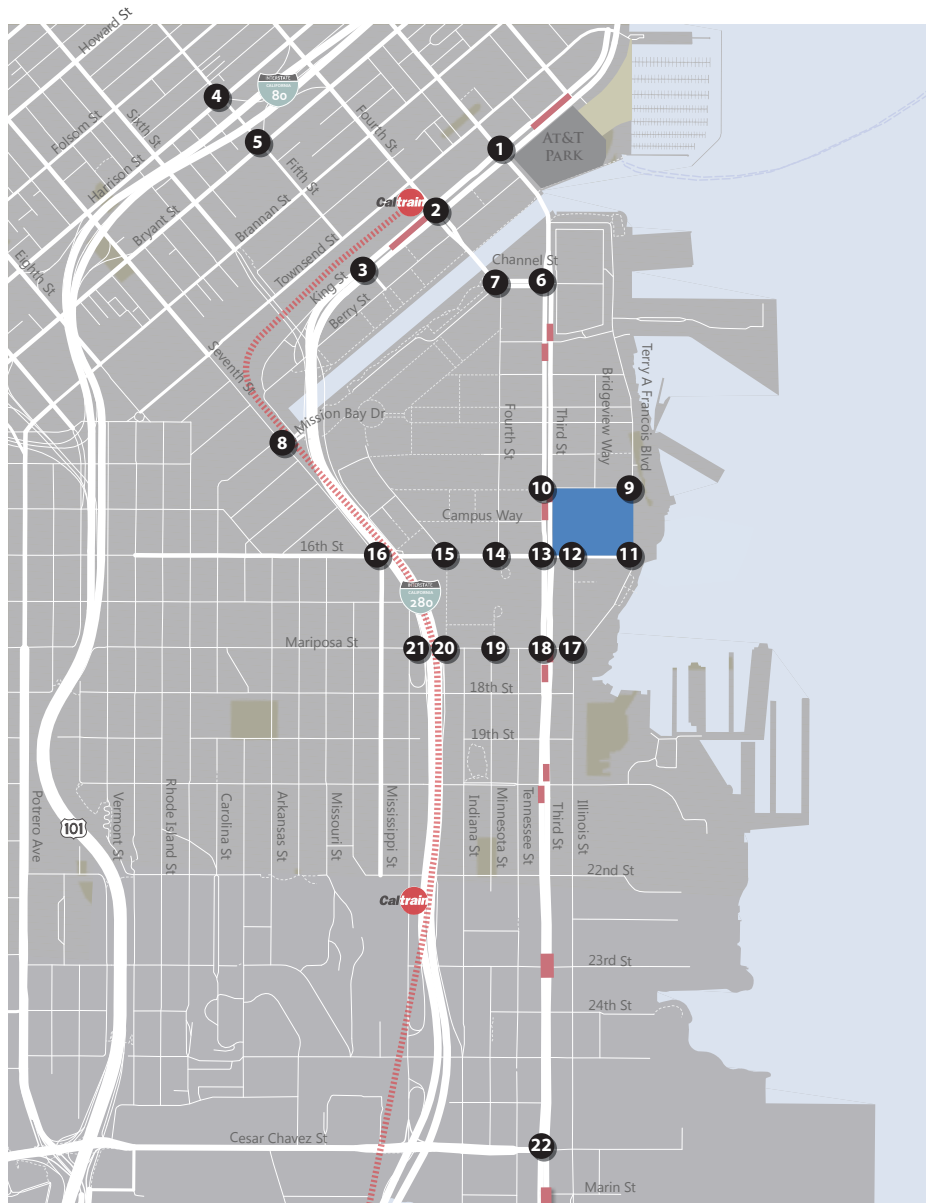
Study Intersection
 Project Site
 Muni Stop
 Turn Lane

PM Peak Peak Hour Traffic Volume Traffic Signal
 Stop Sign

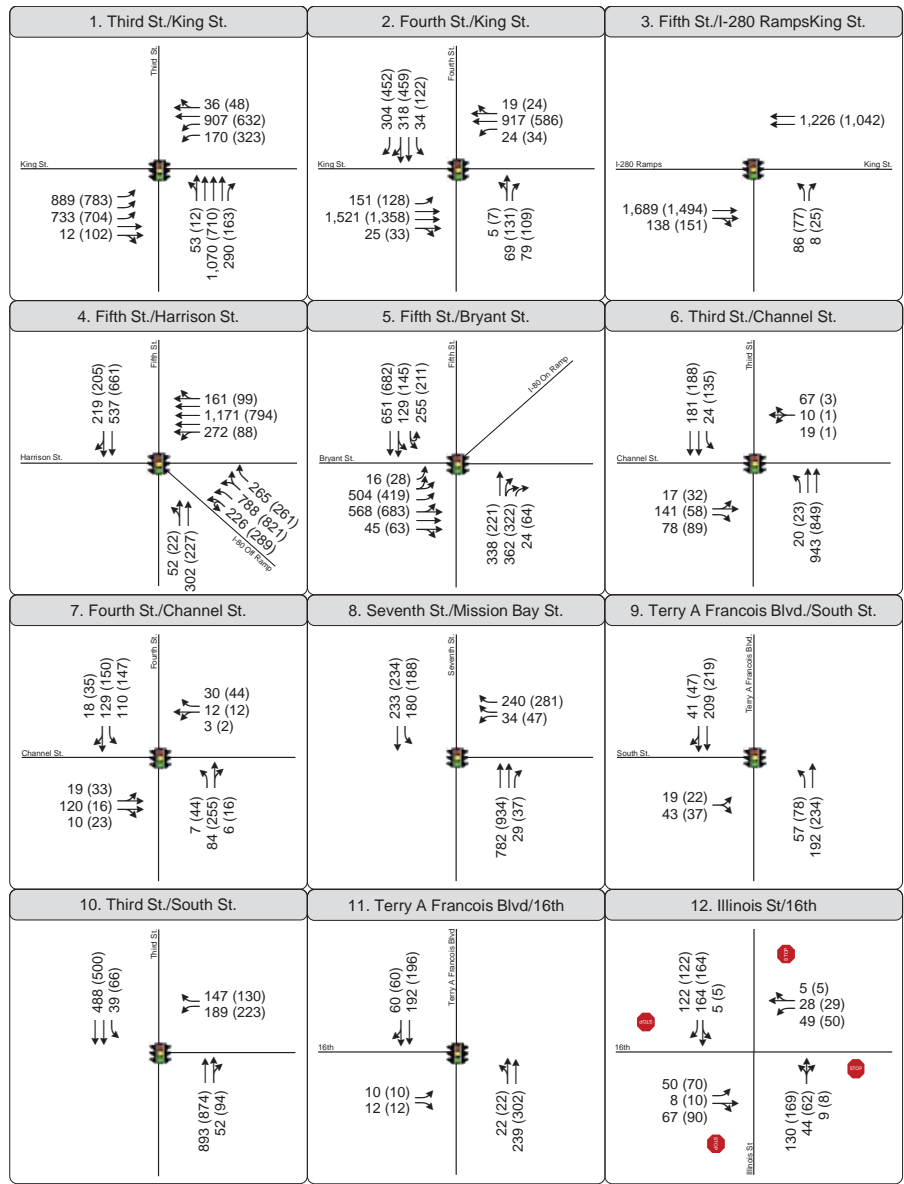
Figure 6b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - Weekday PM Peak with Convention



EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WEEKDAY PM PEAK



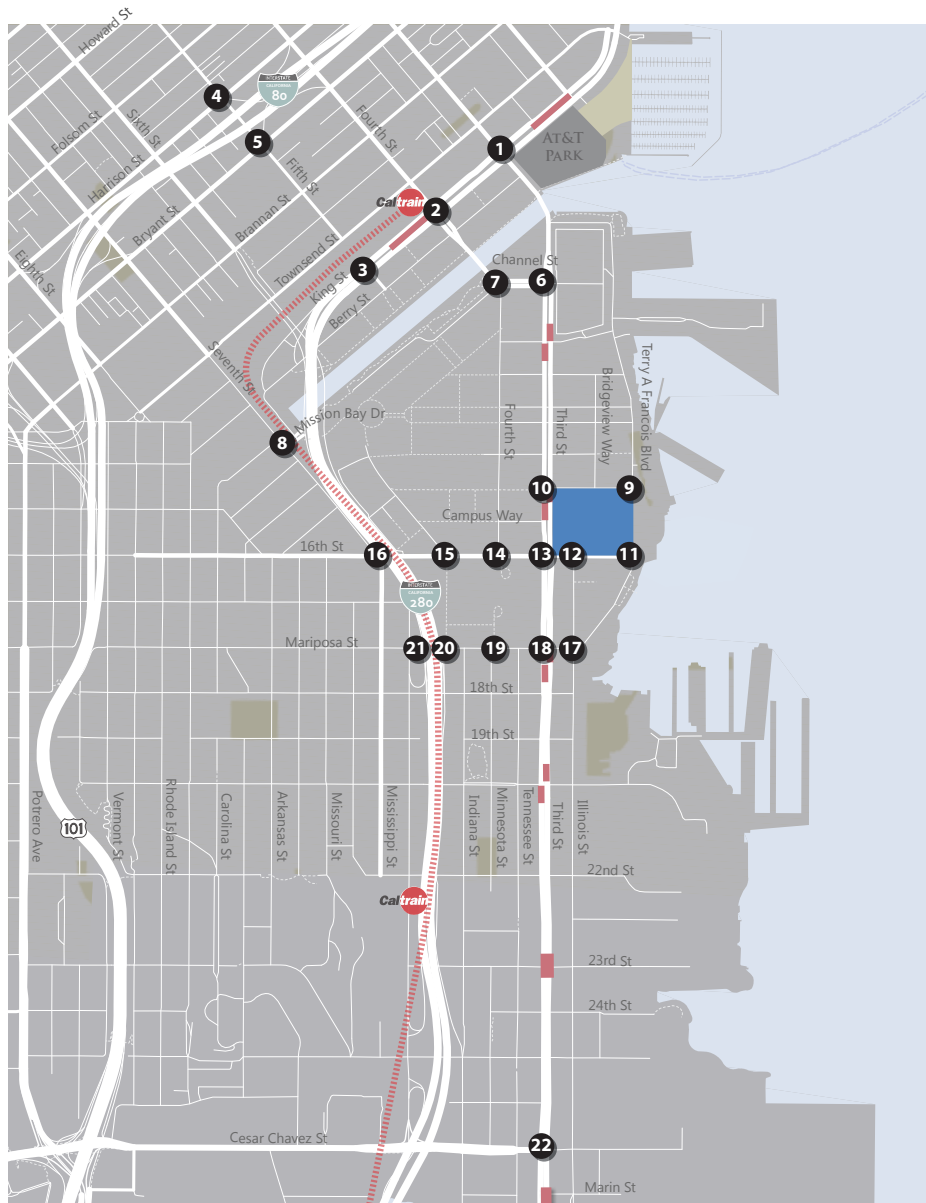
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



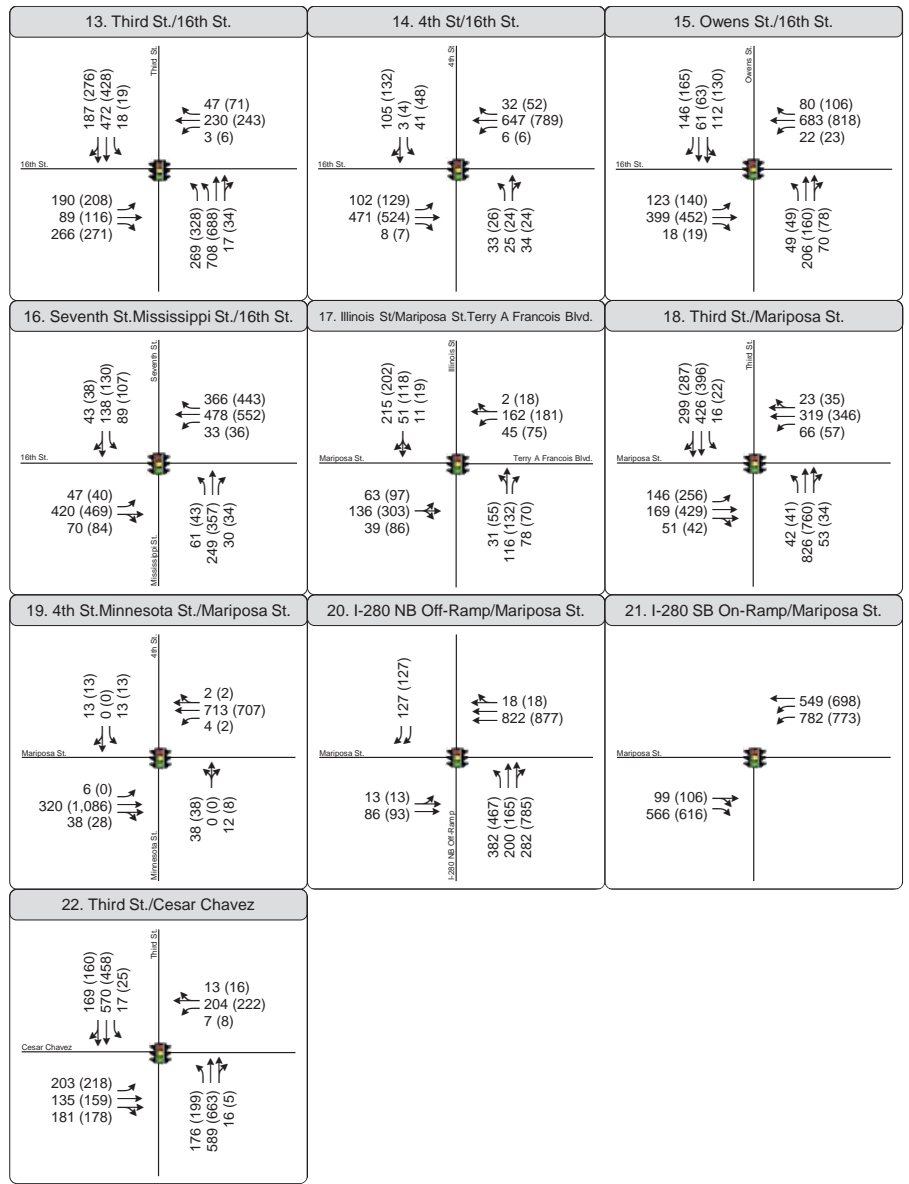
Weekday PM Peak (PM Peak + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 7a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game





Study Intersection
 Project Site
 Muni Stop
 Turn Lane

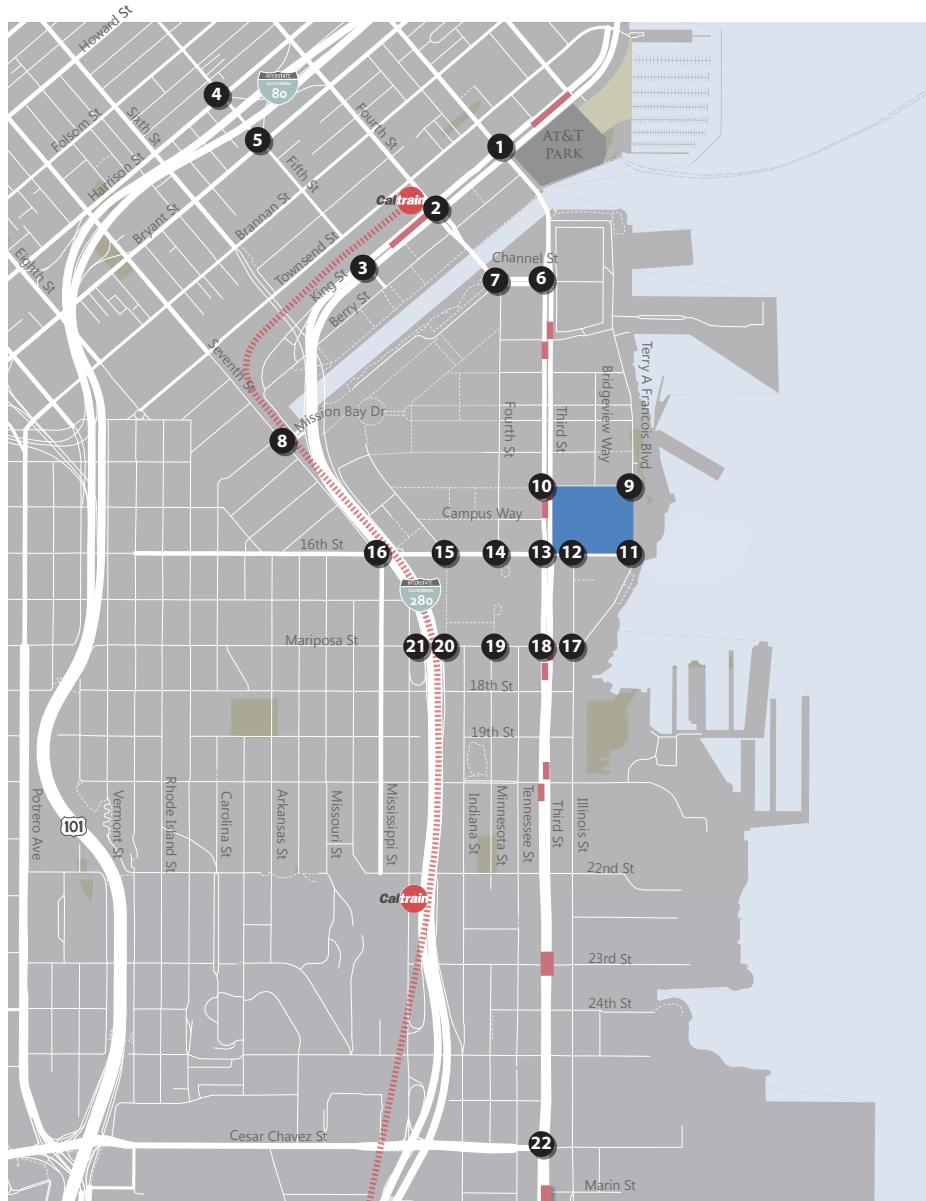


Weekday PM Peak (PM Peak + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

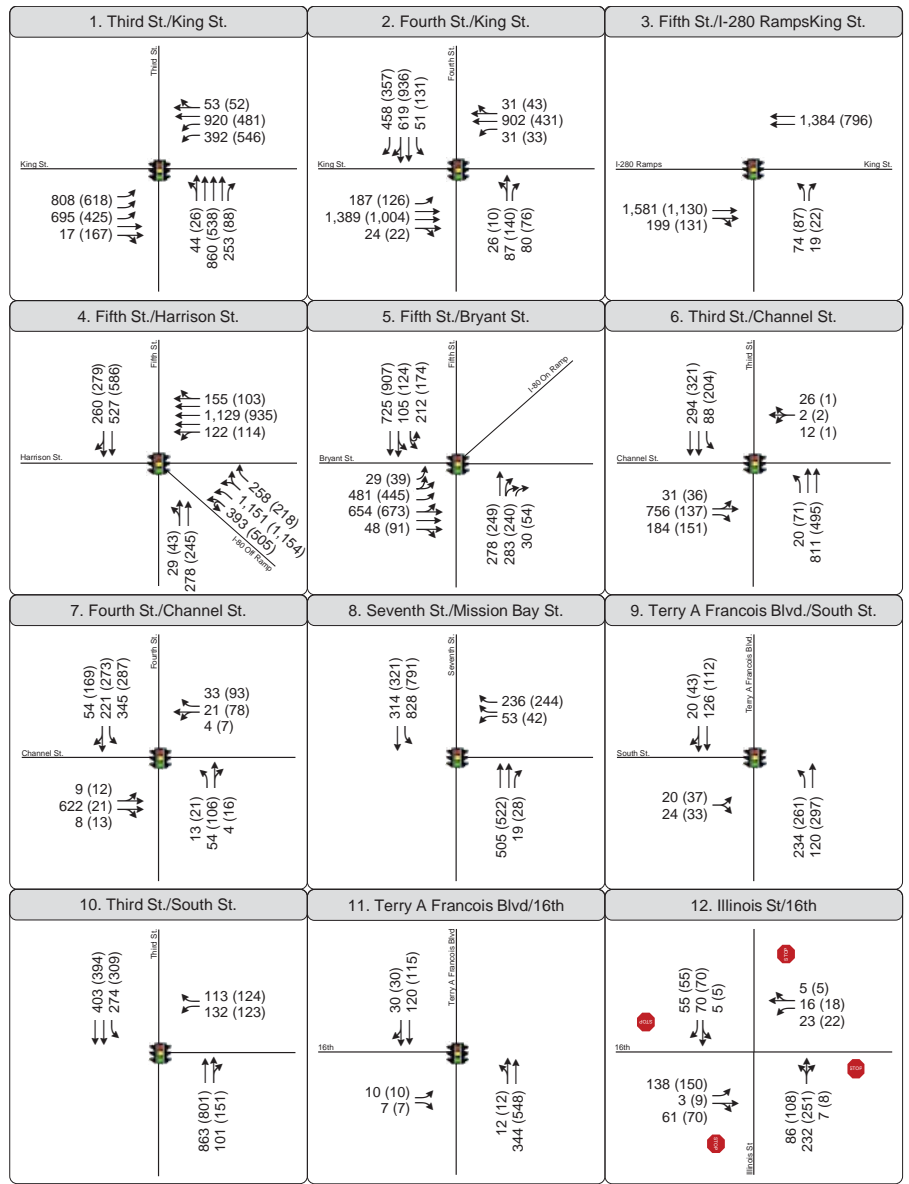
Figure 7b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game



EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WEEKDAY EVENING

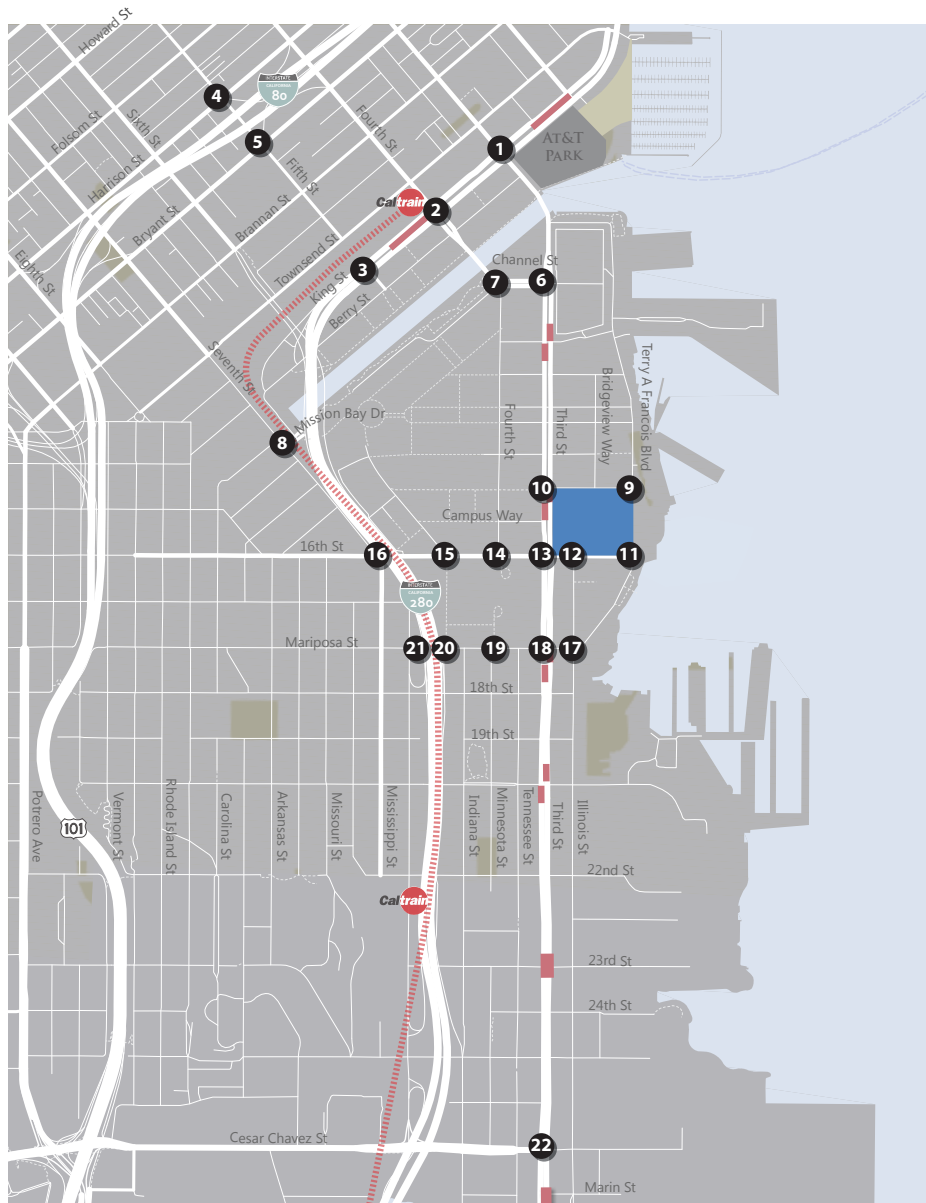


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

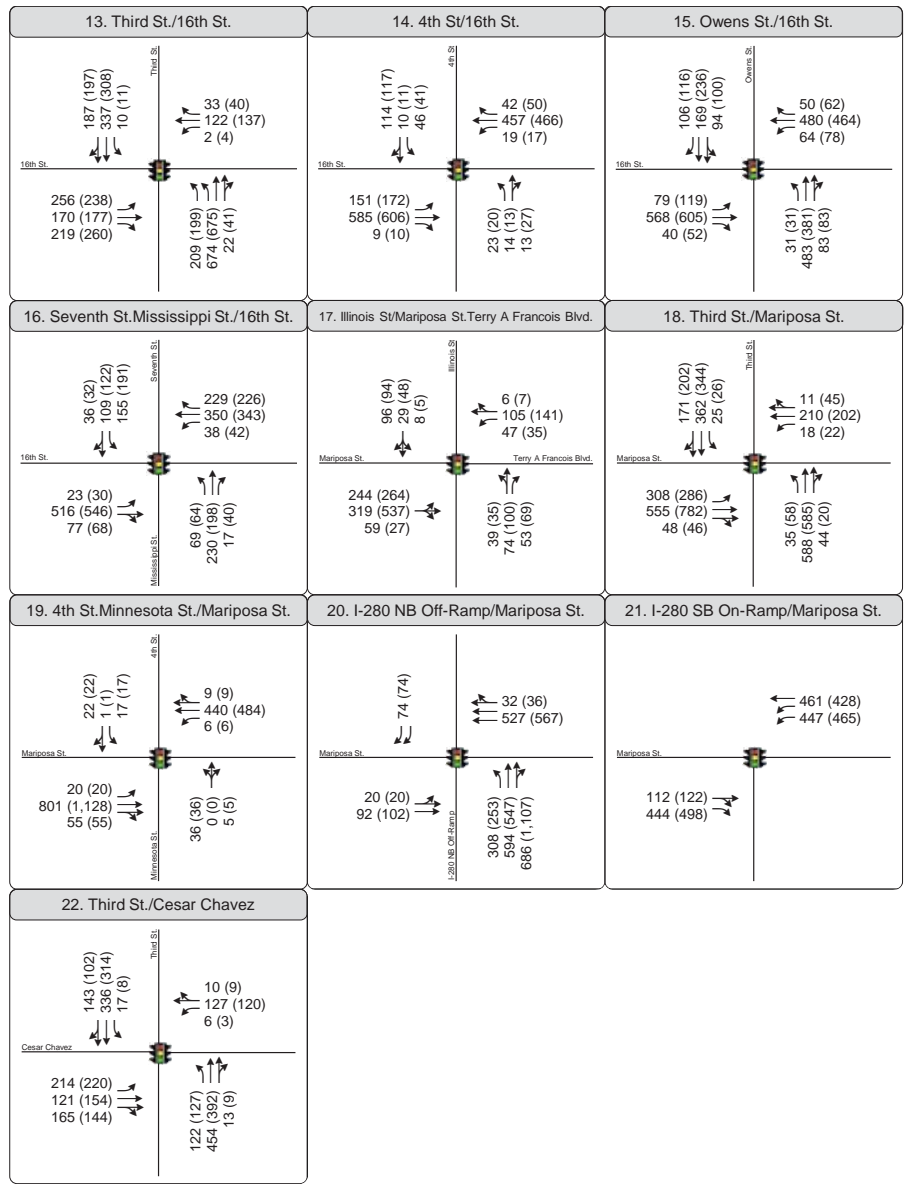


Weekday Evening (Weekday Evening + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 8a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game



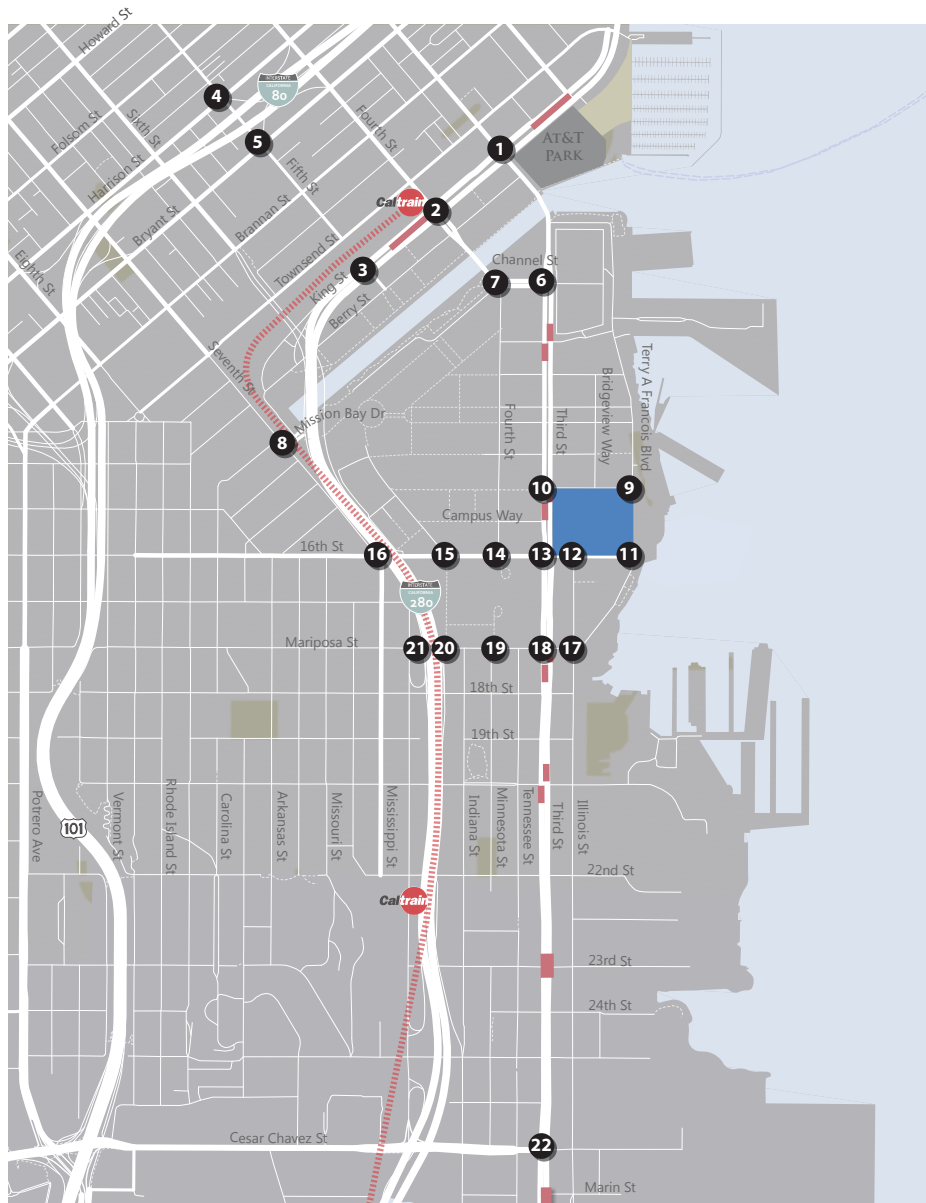
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



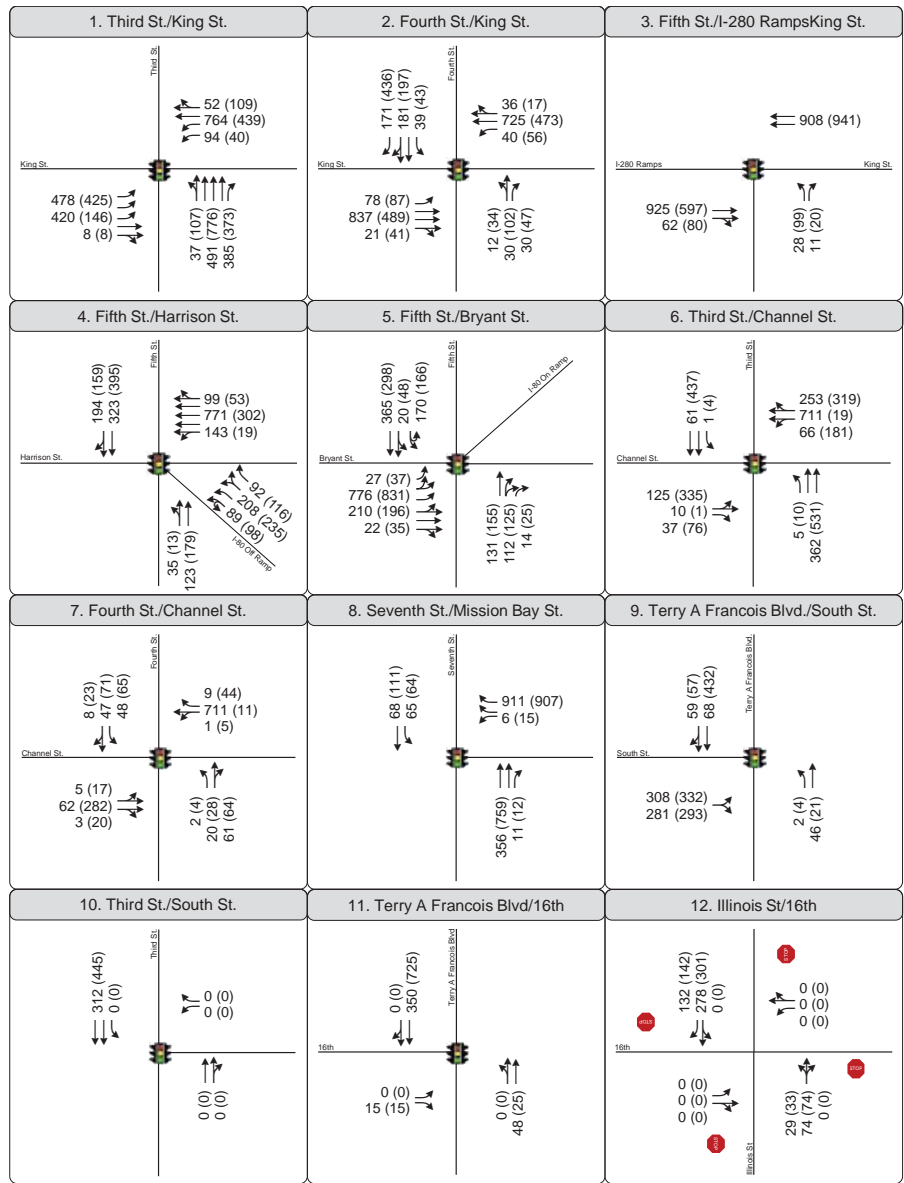
Weekday Evening (Weekday Evening + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 8b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WEEKDAY LATE EVENING



X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



Weekday Late Evening (Weekday Late Evening + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 9a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game



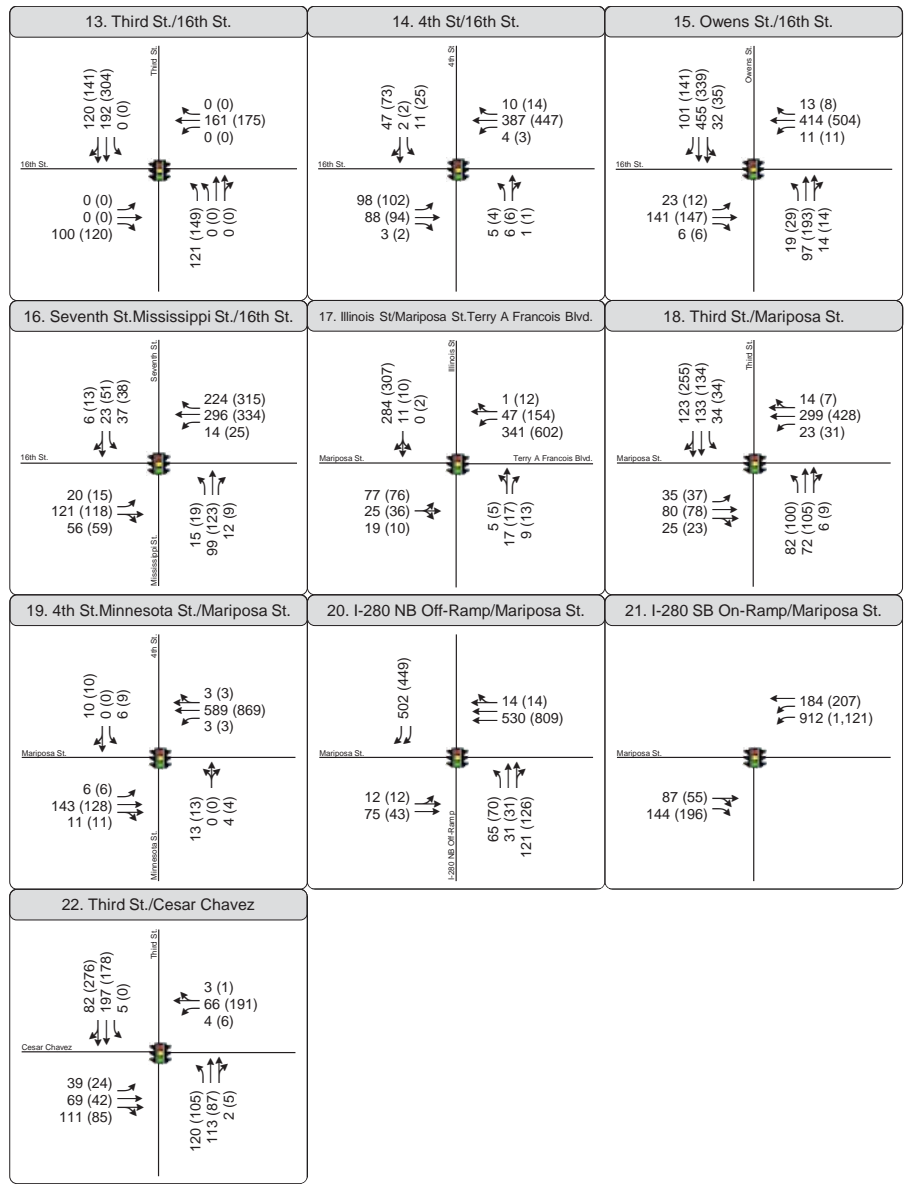
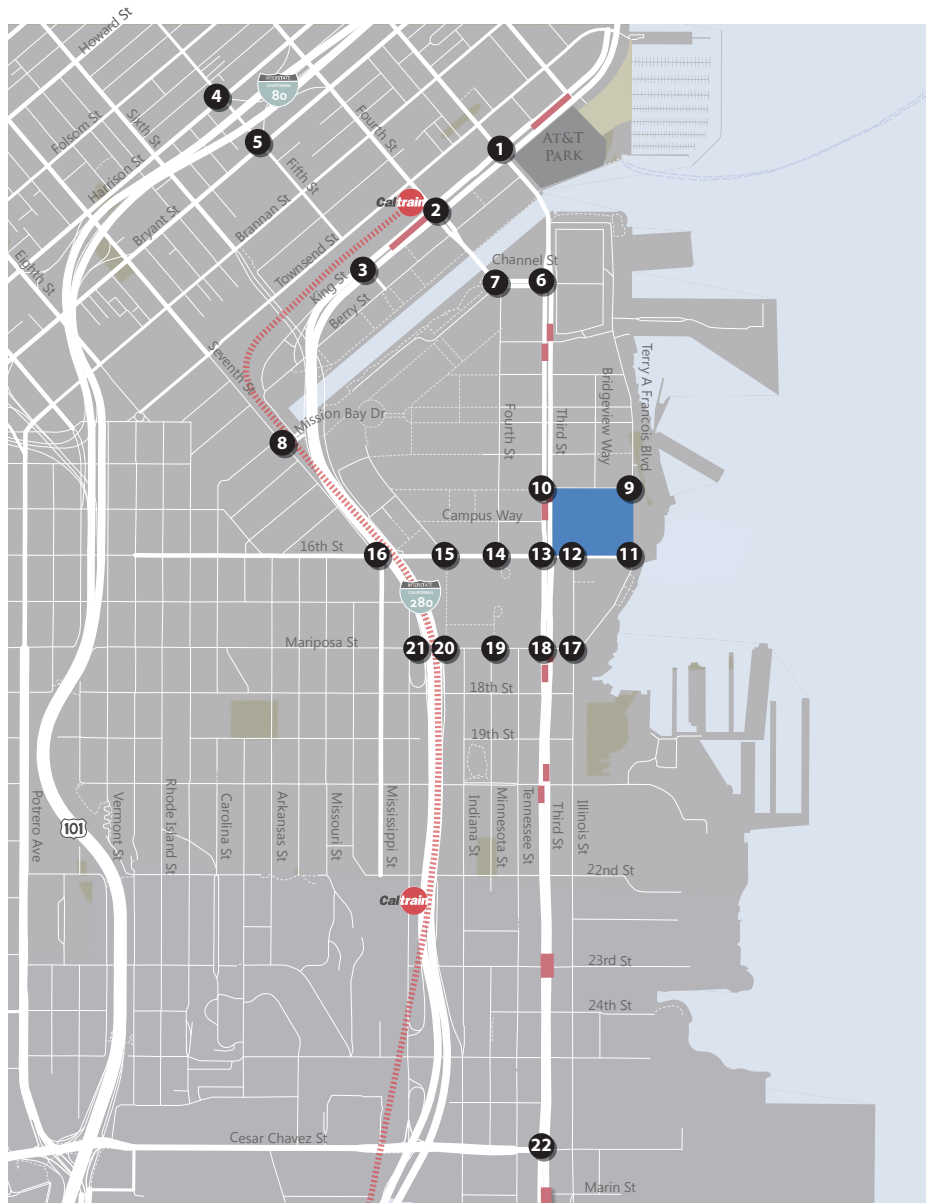
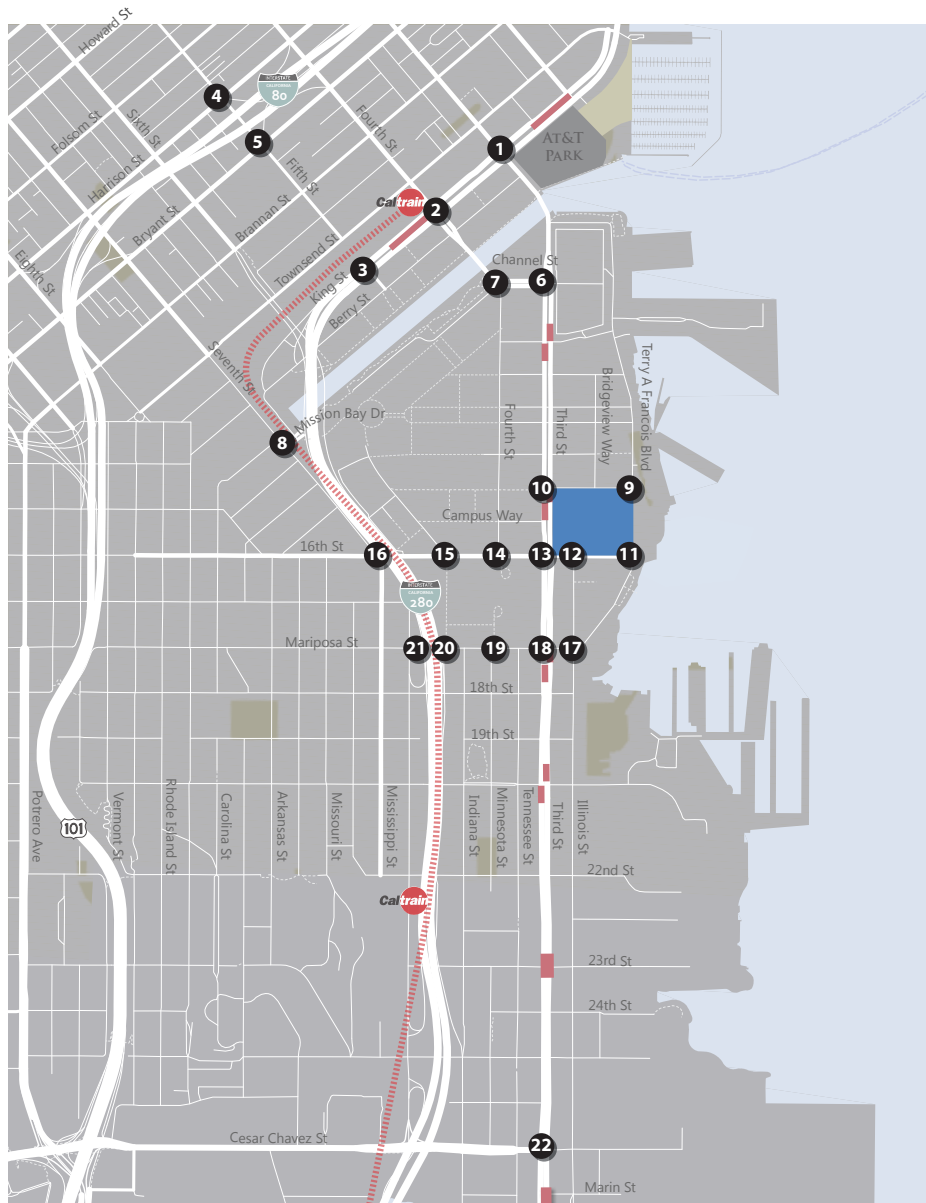
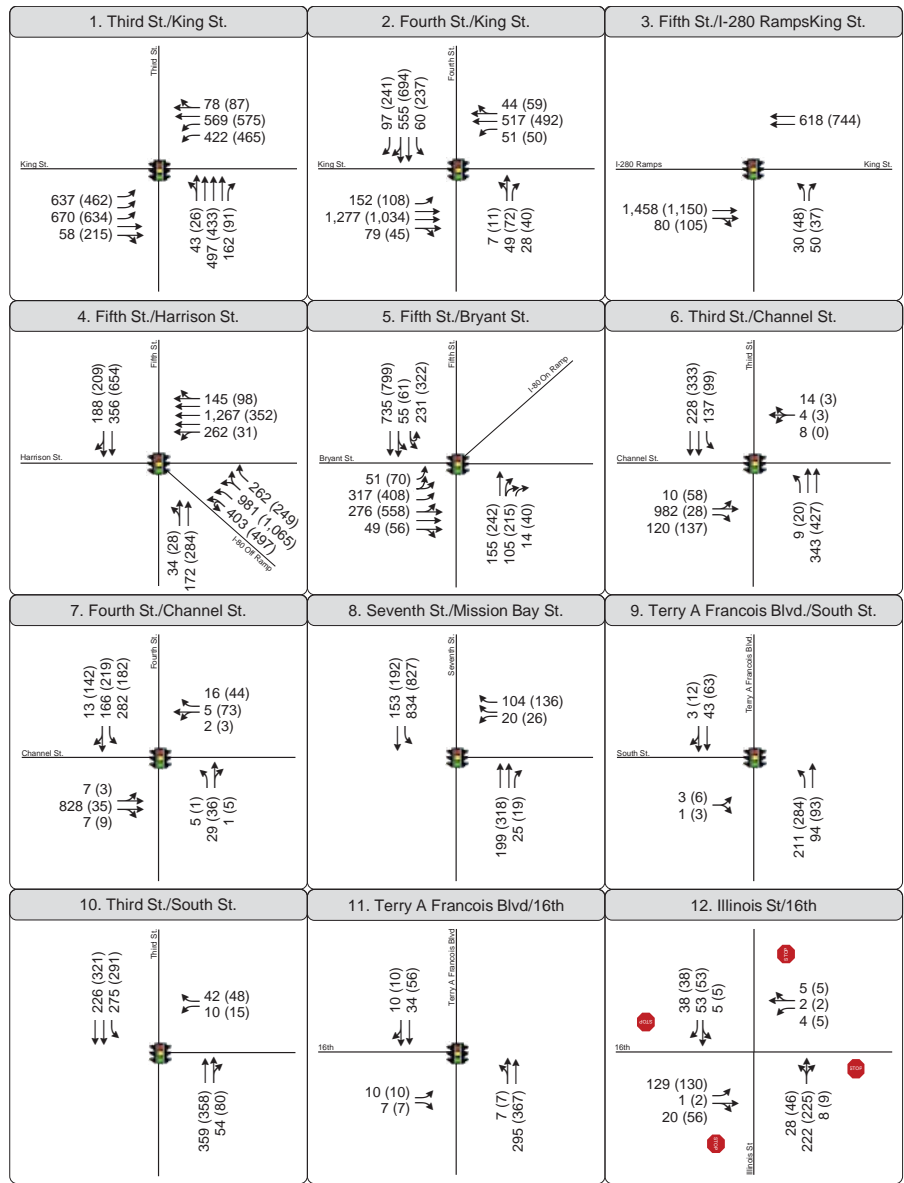


Figure 9b
Peak Hour Traffic Volumes and Lane Configurations
Existing Plus Project (2015) Conditions - with Basketball Game

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
SATURDAY EVENING



X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



Saturday Evening
(Saturday Evening
+ Giants Game)

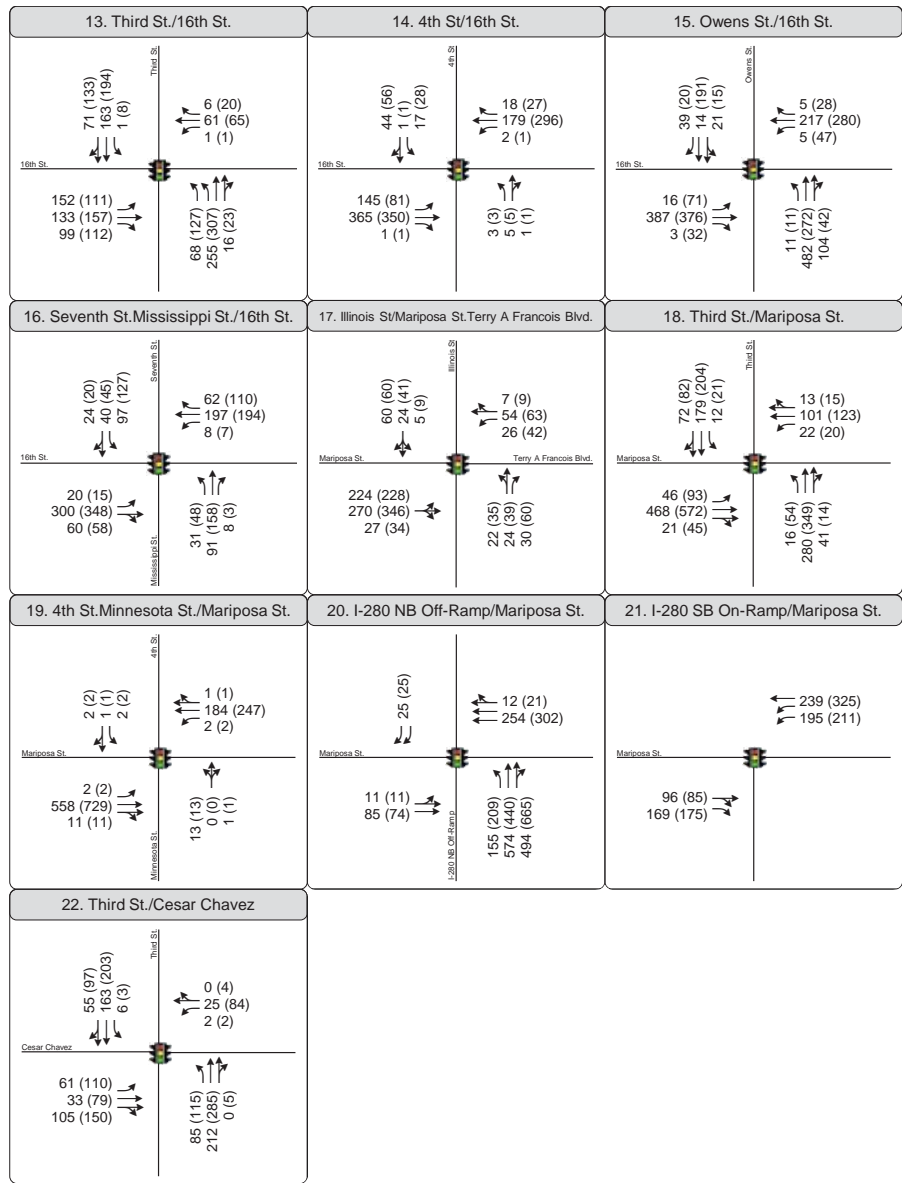
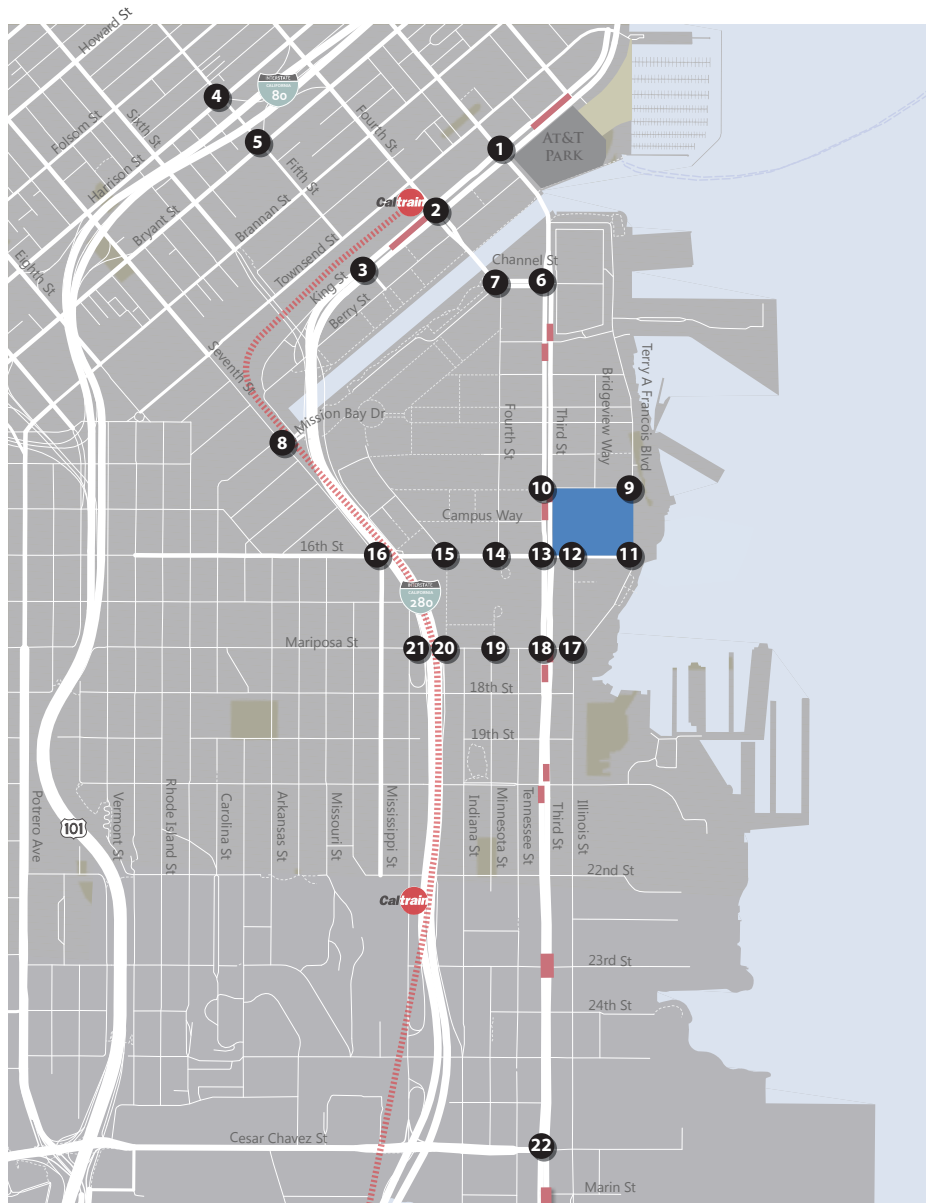
Peak Hour Traffic Volume

Traffic Signal

Stop Sign

Figure 10a
Peak Hour Traffic Volumes and Lane Configurations
Existing Plus Project (2015) Conditions - with Basketball Game





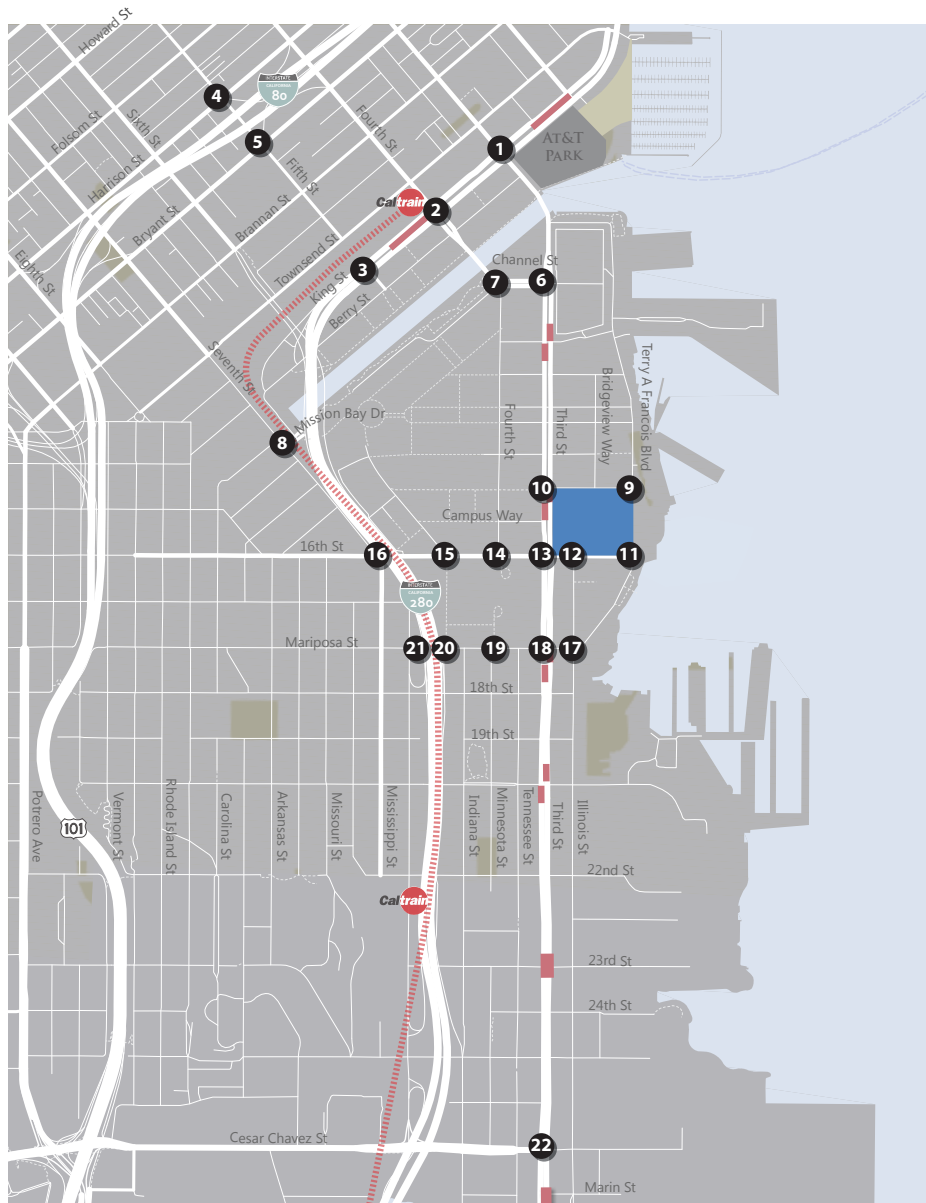
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

Saturday Evening (Saturday Evening + Giants Game)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

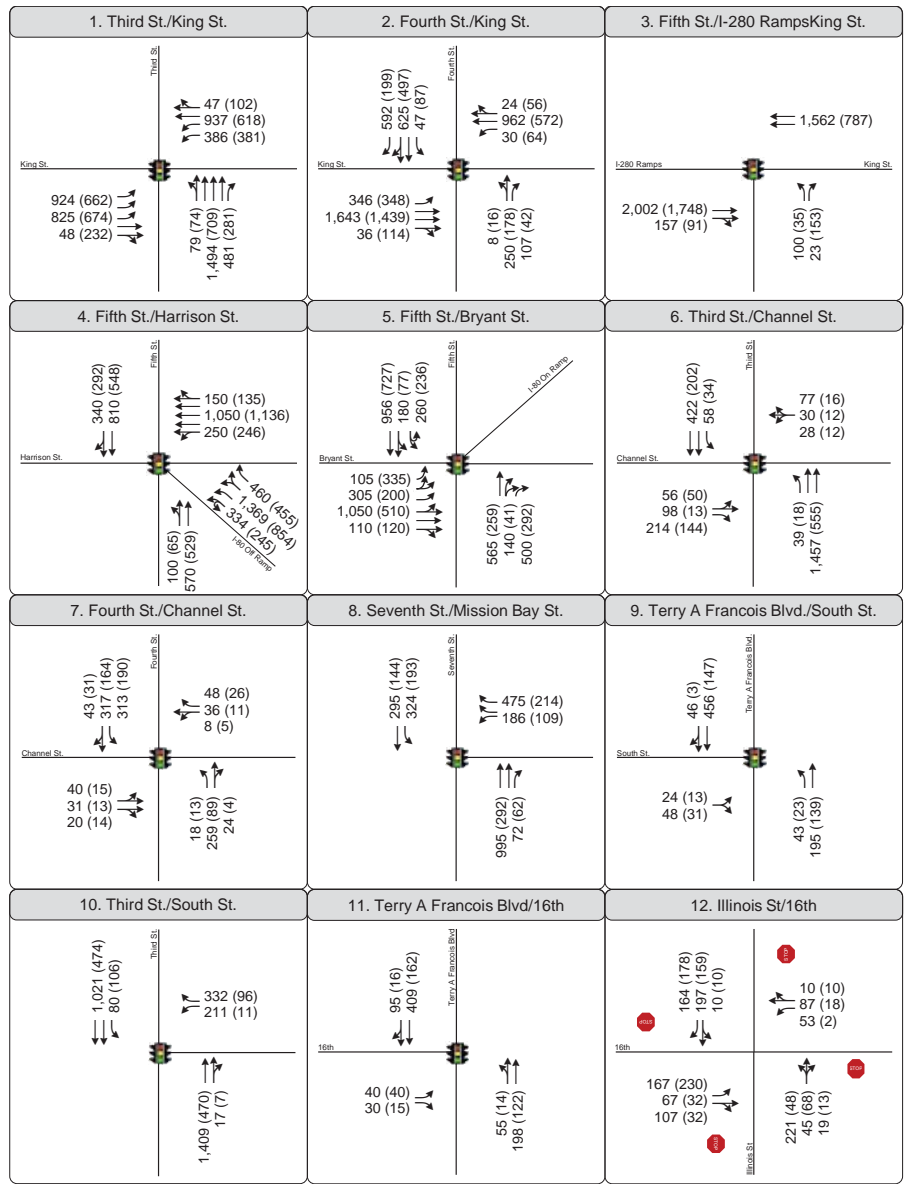
Figure 10b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game



2040 CUMULATIVE WITH PROJECT – NO EVENT
WEEKDAY PM PEAK / SATURDAY EVENING

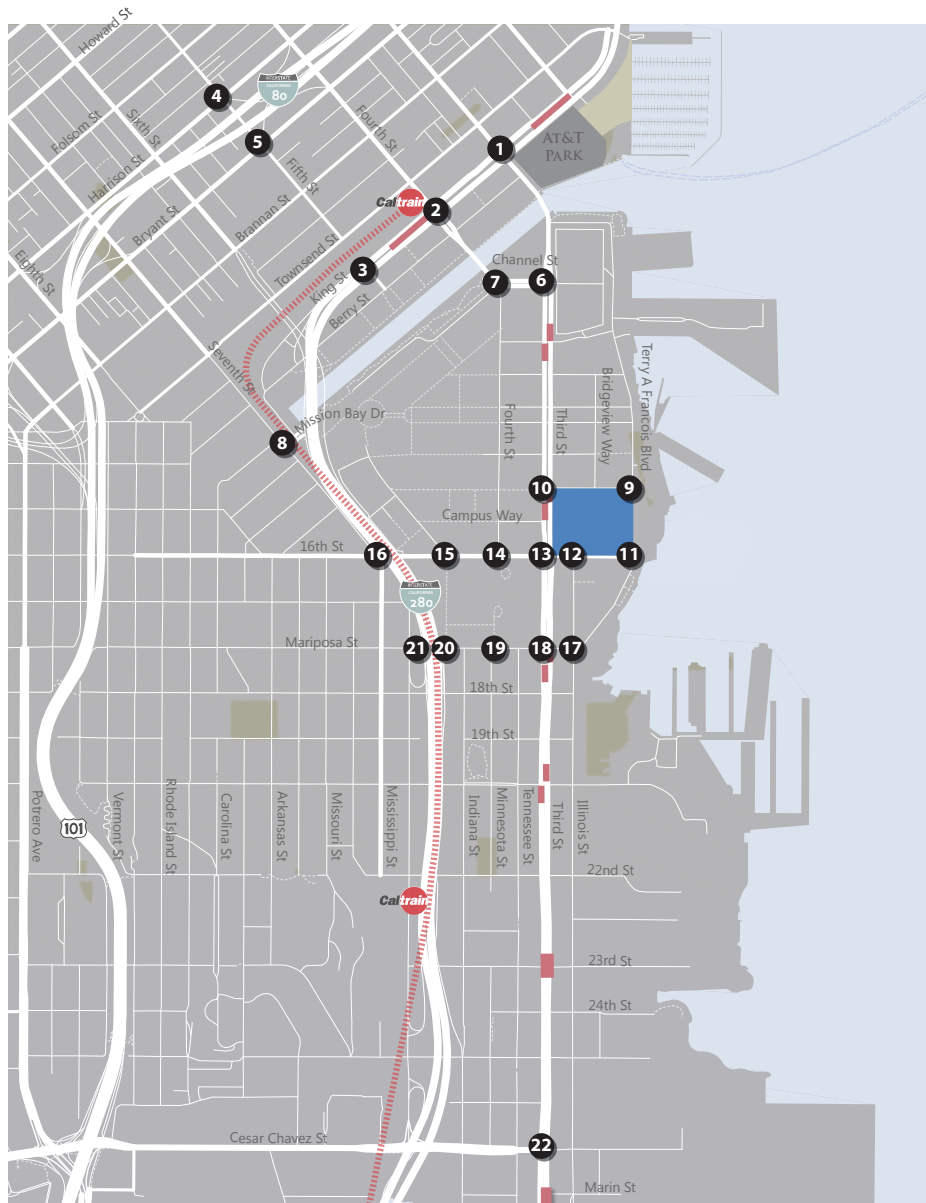


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

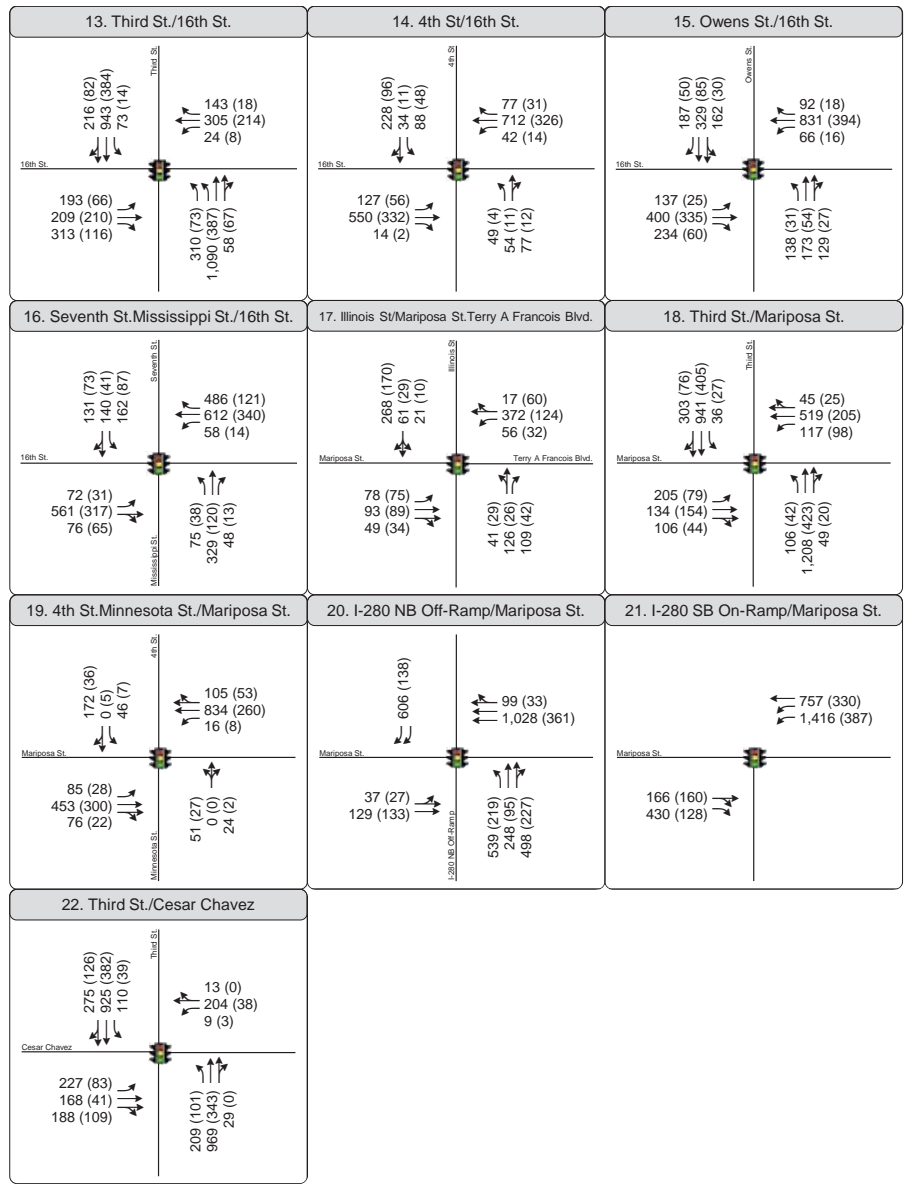


PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 13a
Peak Hour Traffic Volumes and Lane Configurations
Cumulative Plus Project (2040) Conditions - No Event



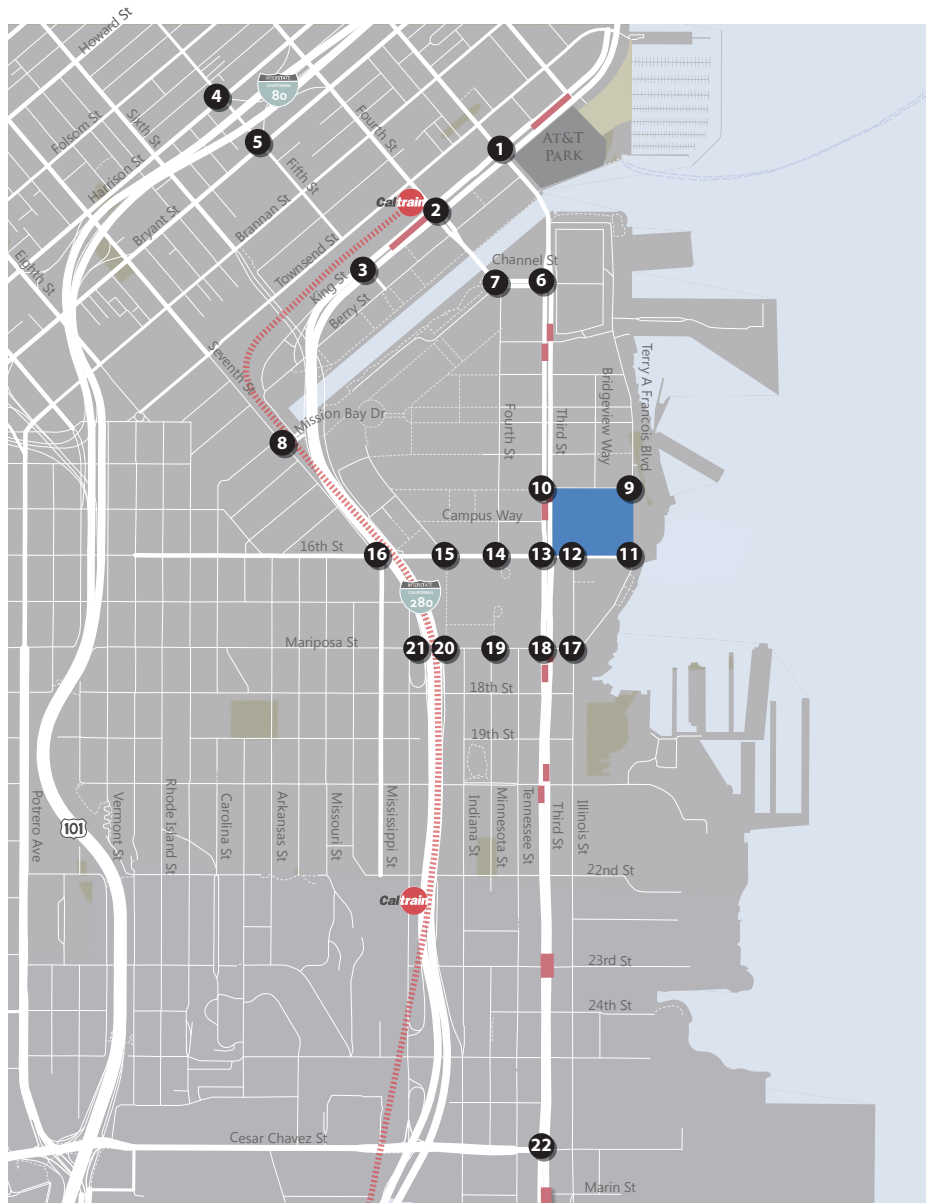
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



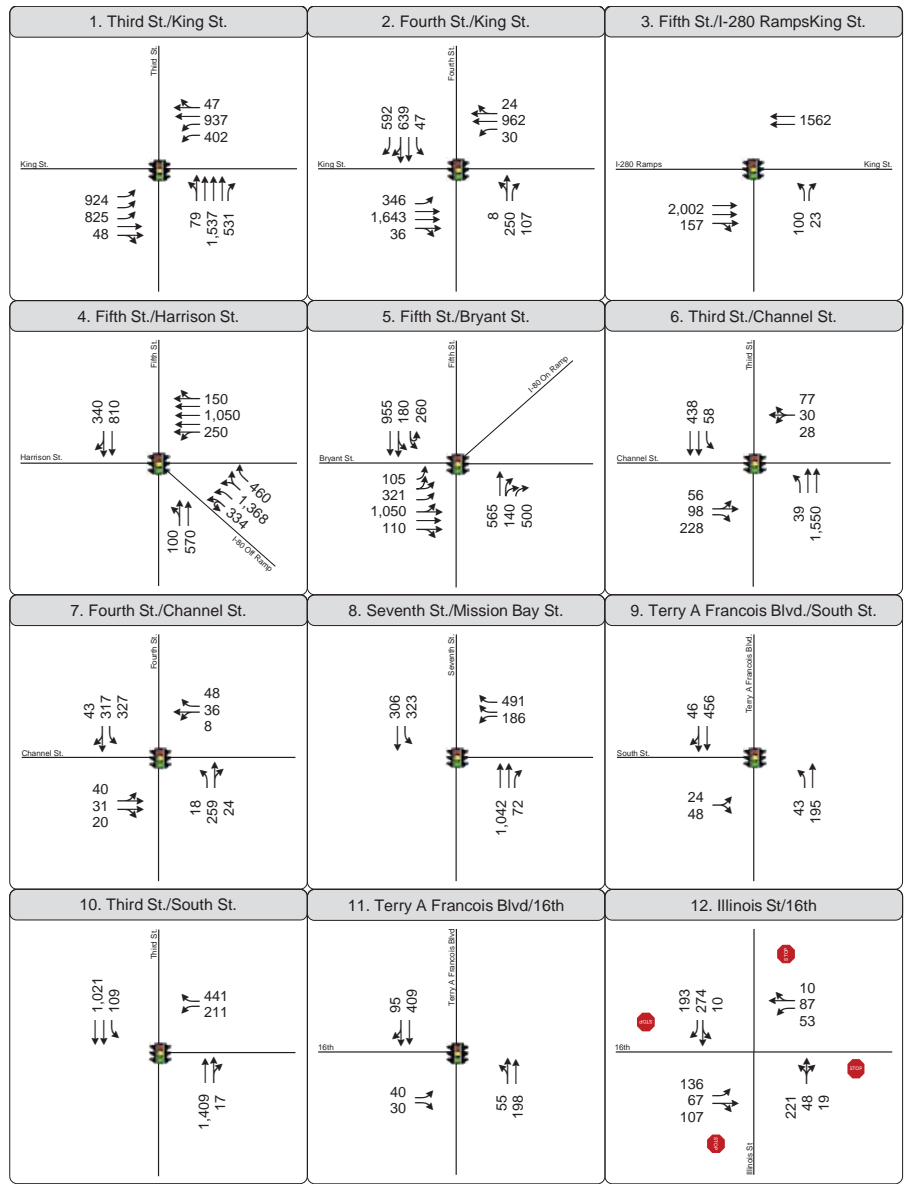
PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 13b
 Peak Hour Traffic Volumes and Lane Configurations
 Cumulative Plus Project (2040) Conditions - No Event

2040 CUMULATIVE WITH PROJECT - CONVENTION EVENT
WEEKDAY PM PEAK

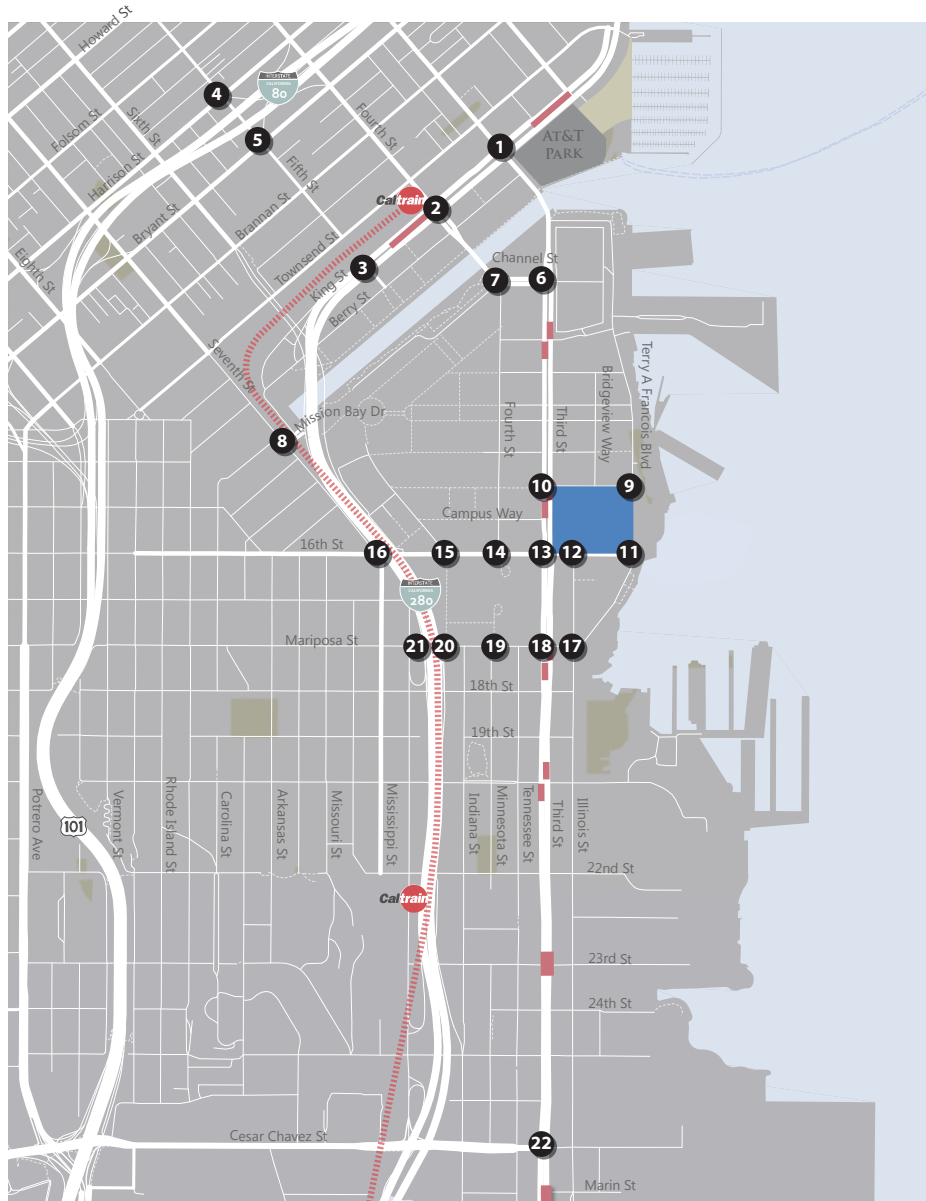


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

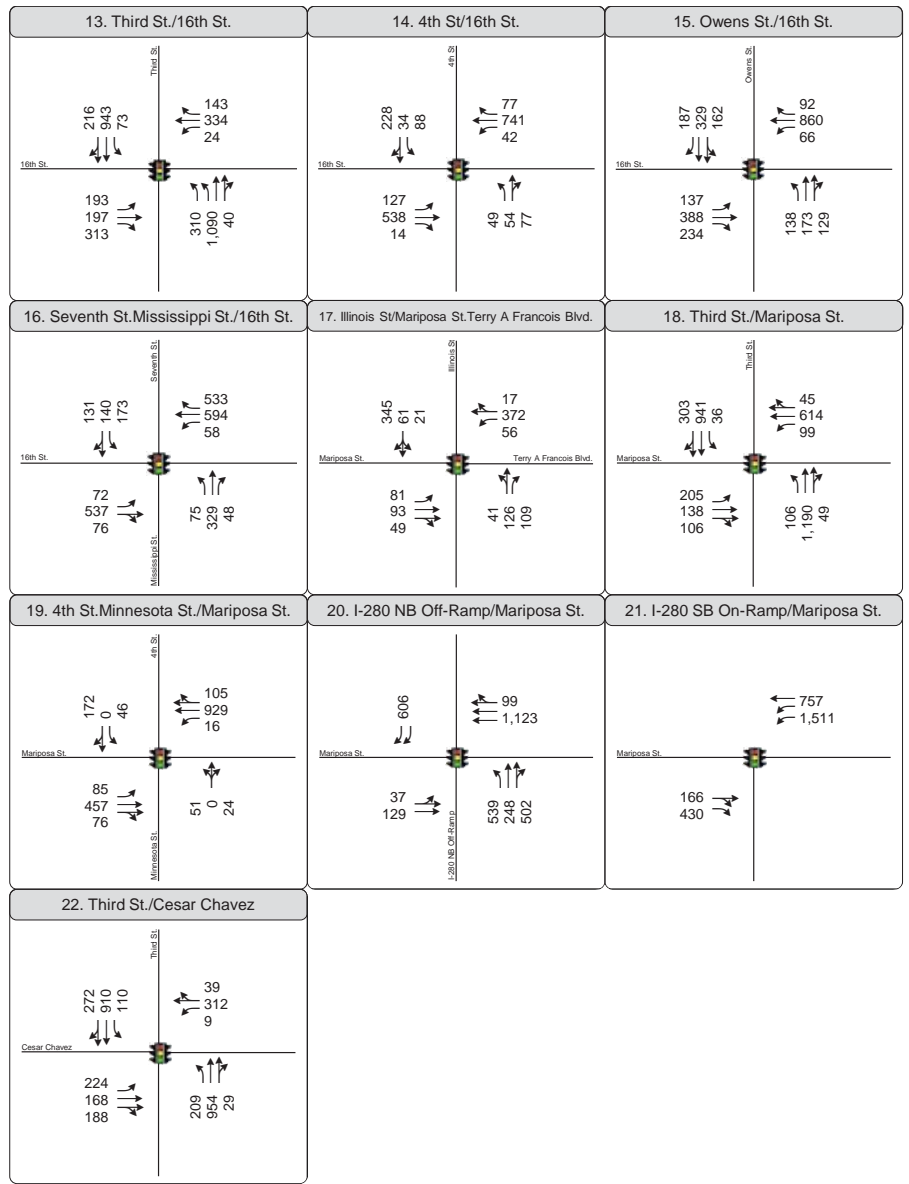


PM Peak Peak Hour Traffic Volume Traffic Signal Stop Sign

Figure 14a
Peak Hour Traffic Volumes and Lane Configurations
Cumulative Plus Project (2040) Conditions - with Convention



X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

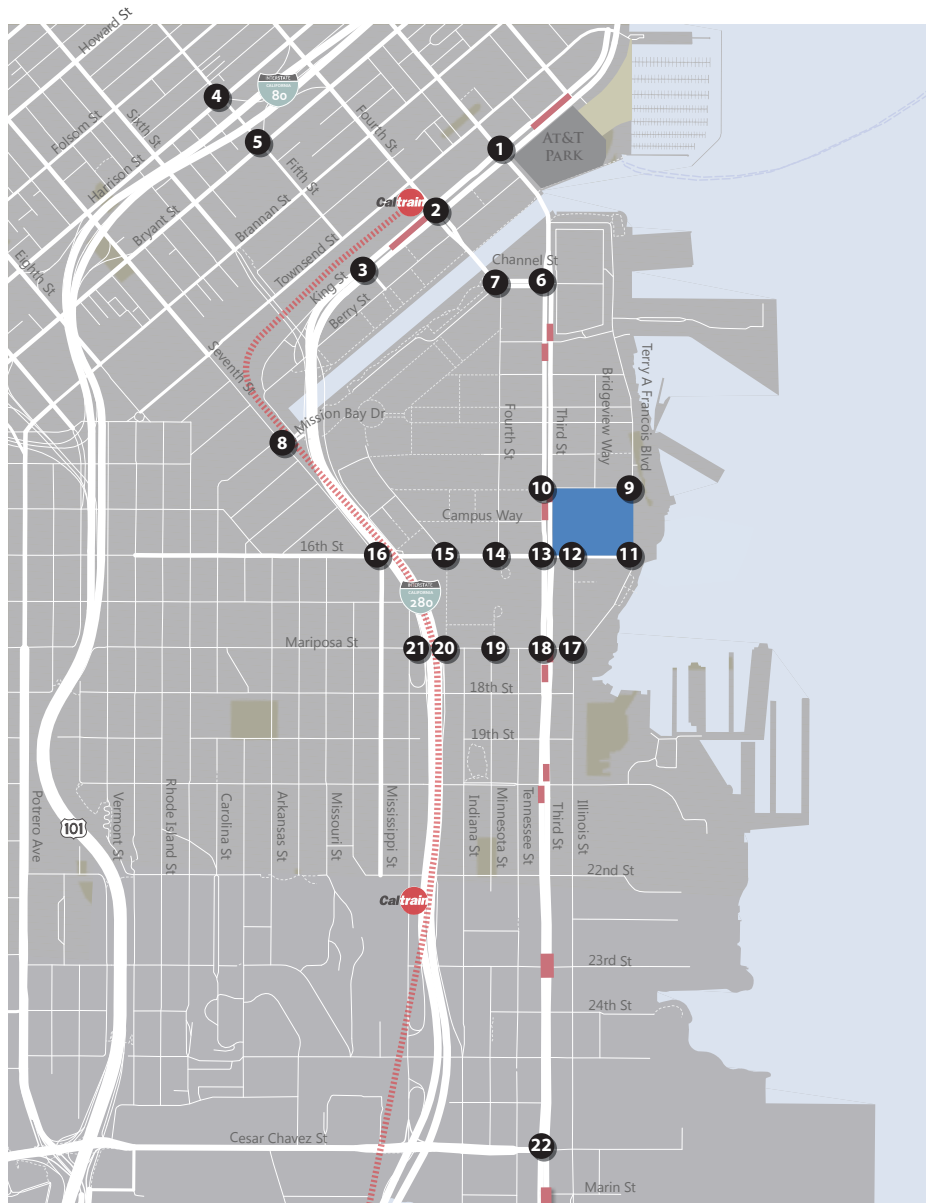


PM Peak Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

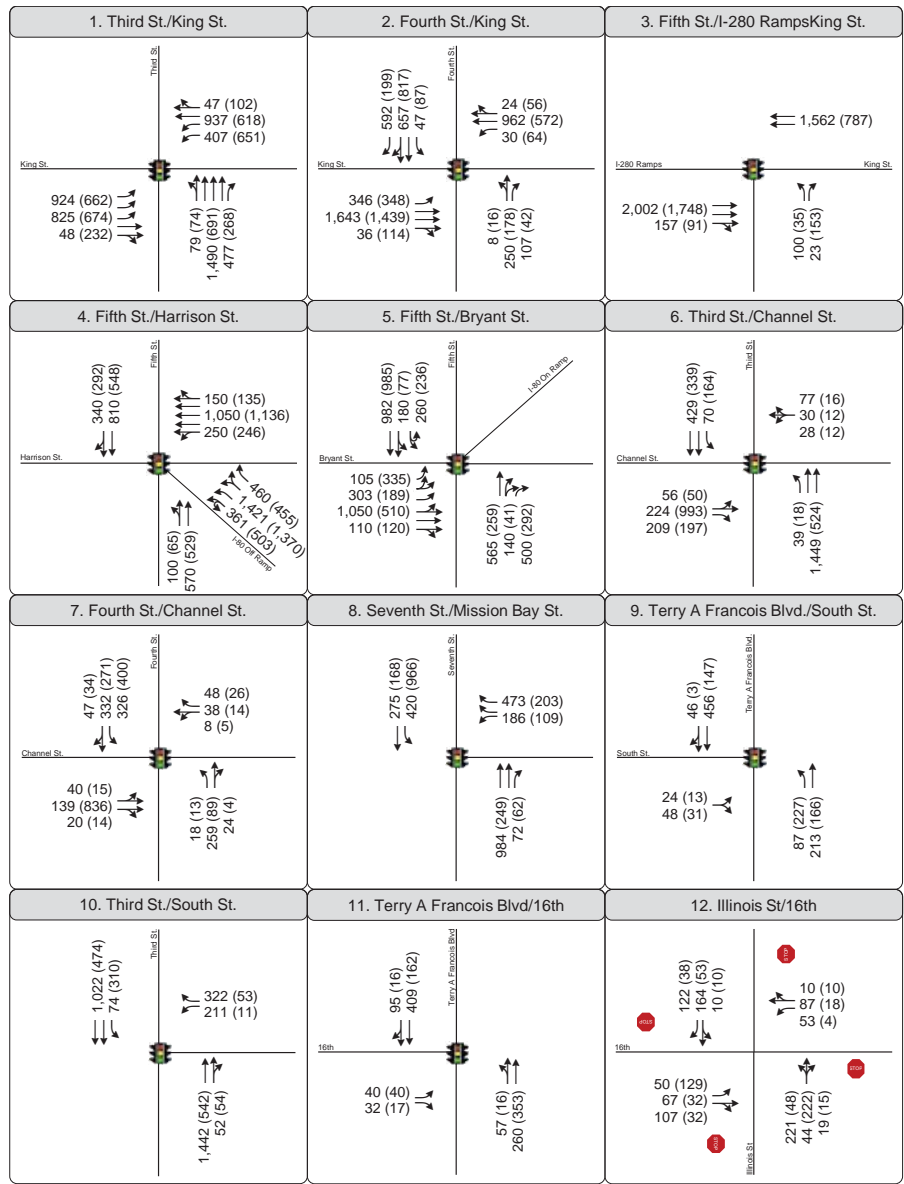
Figure 14b
 Peak Hour Traffic Volumes and Lane Configurations
 Cumulative Plus Project (2040) Conditions - with Convention



2040 CUMULATIVE WITH PROJECT – BASKETBALL GAME
WEEKDAY PM PEAK / SATURDAY EVENING

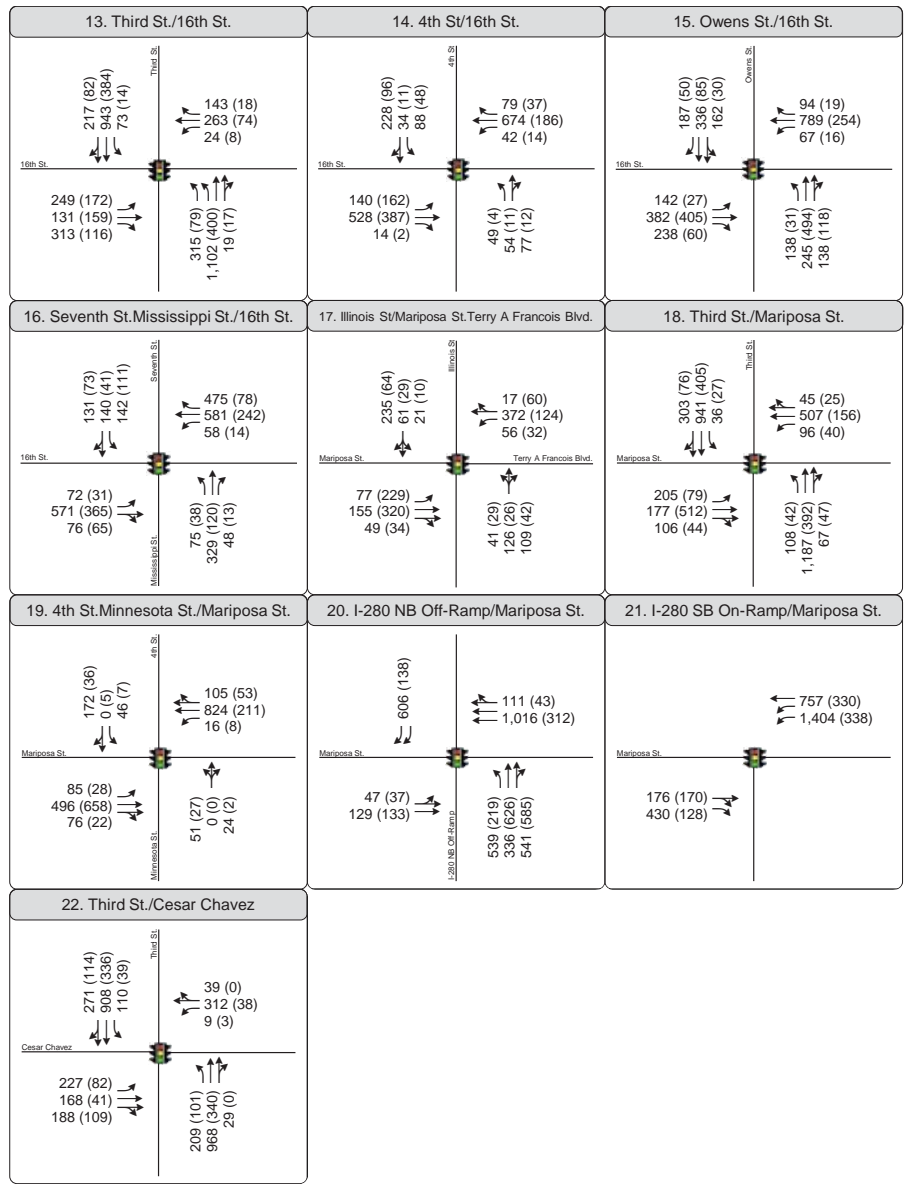
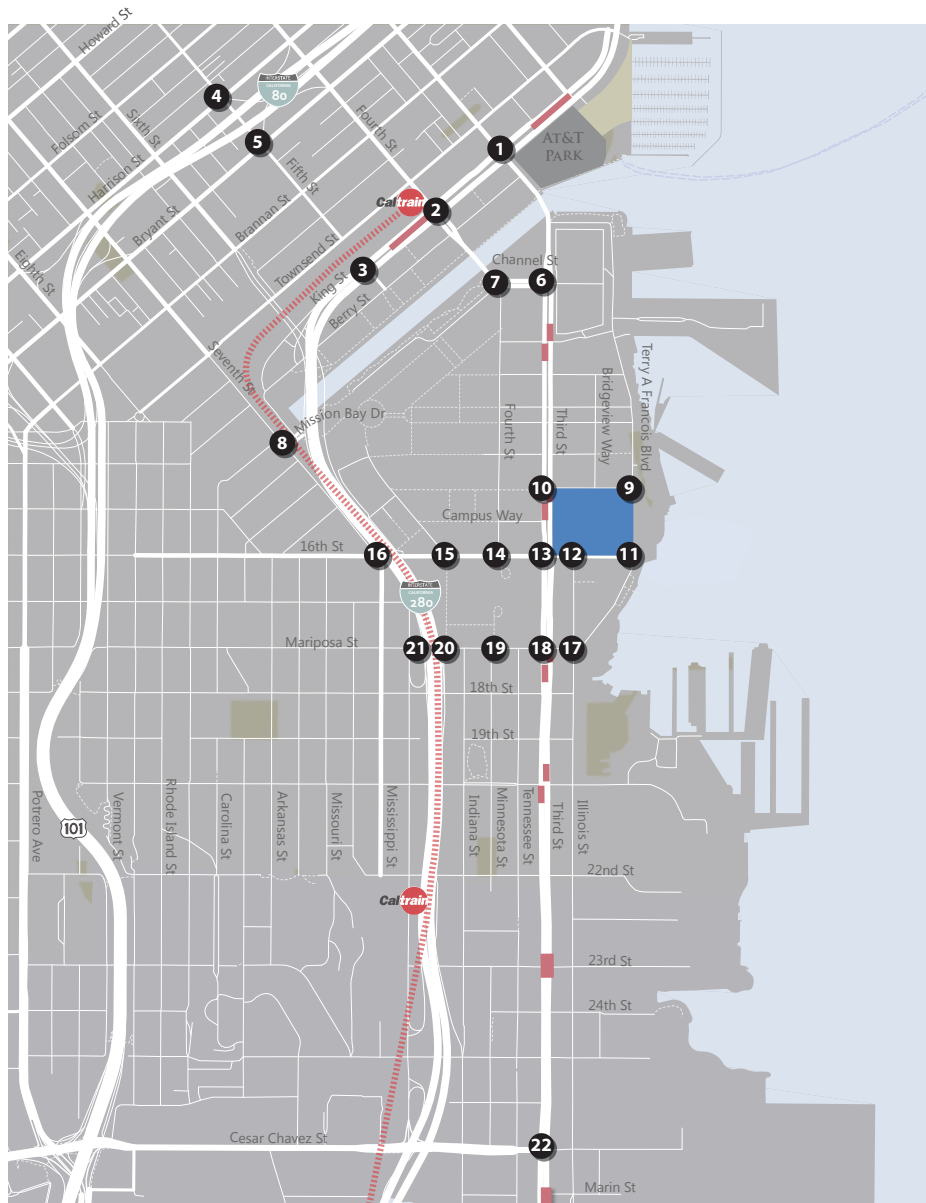


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

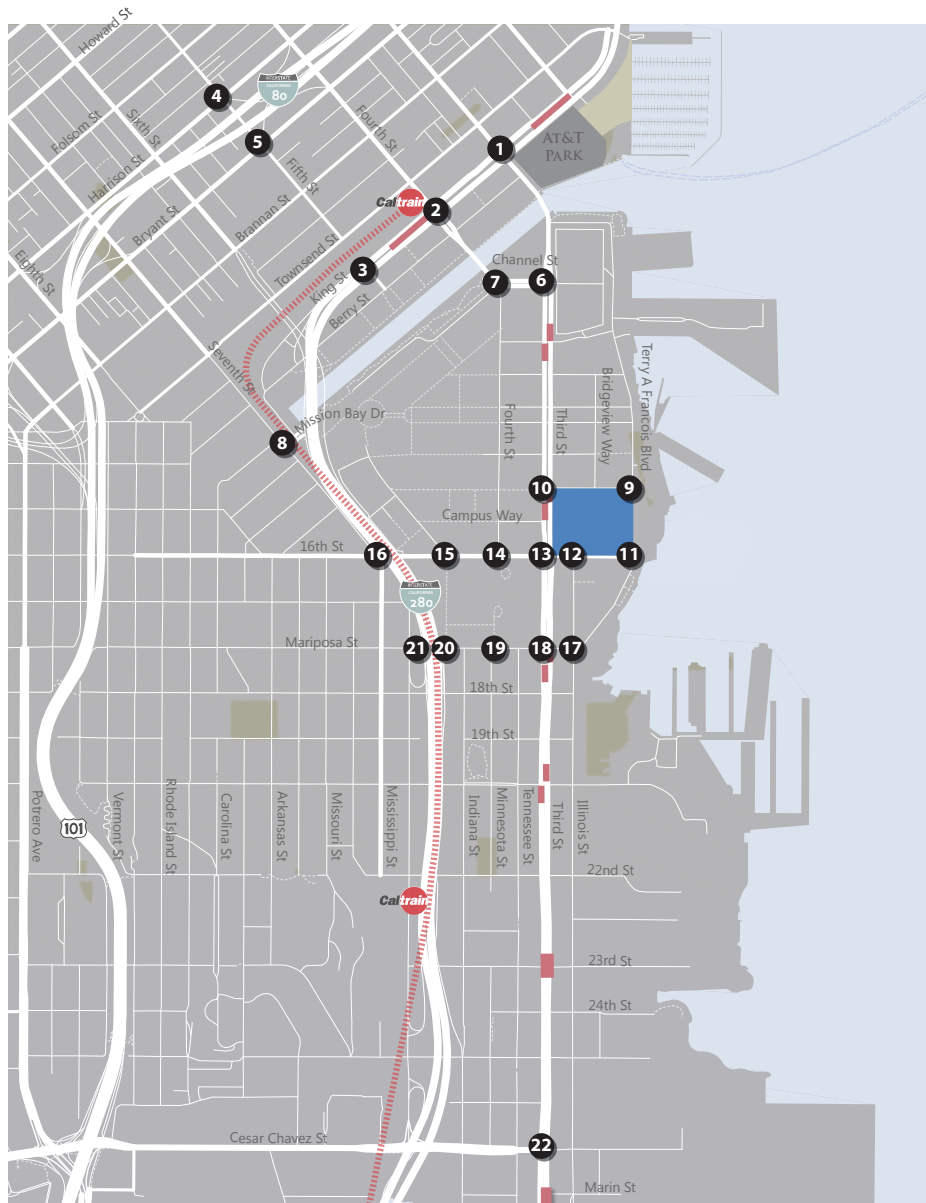
Figure 15a
 Peak Hour Traffic Volumes and Lane Configurations
 Cumulative Plus Project (2040) Conditions - with Basketball Game



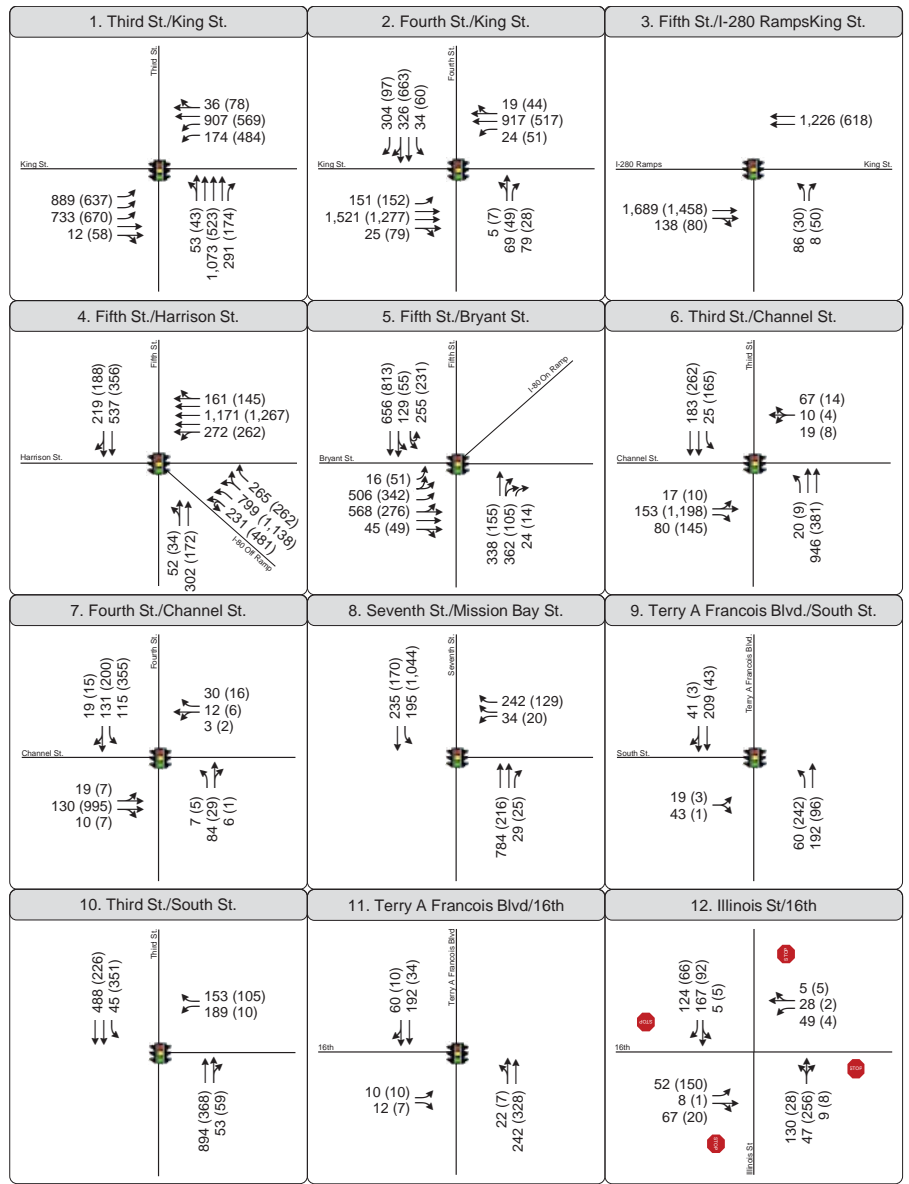
PM Peak (Saturday Peak) Peak Hour Traffic Volume Traffic Signal Stop Sign

Figure 15b
 Peak Hour Traffic Volumes and Lane Configurations
 Cumulative Plus Project (2040) Conditions - with Basketball Game

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO TSP - WEEKDAY PM PEAK / SATURDAY EVENING



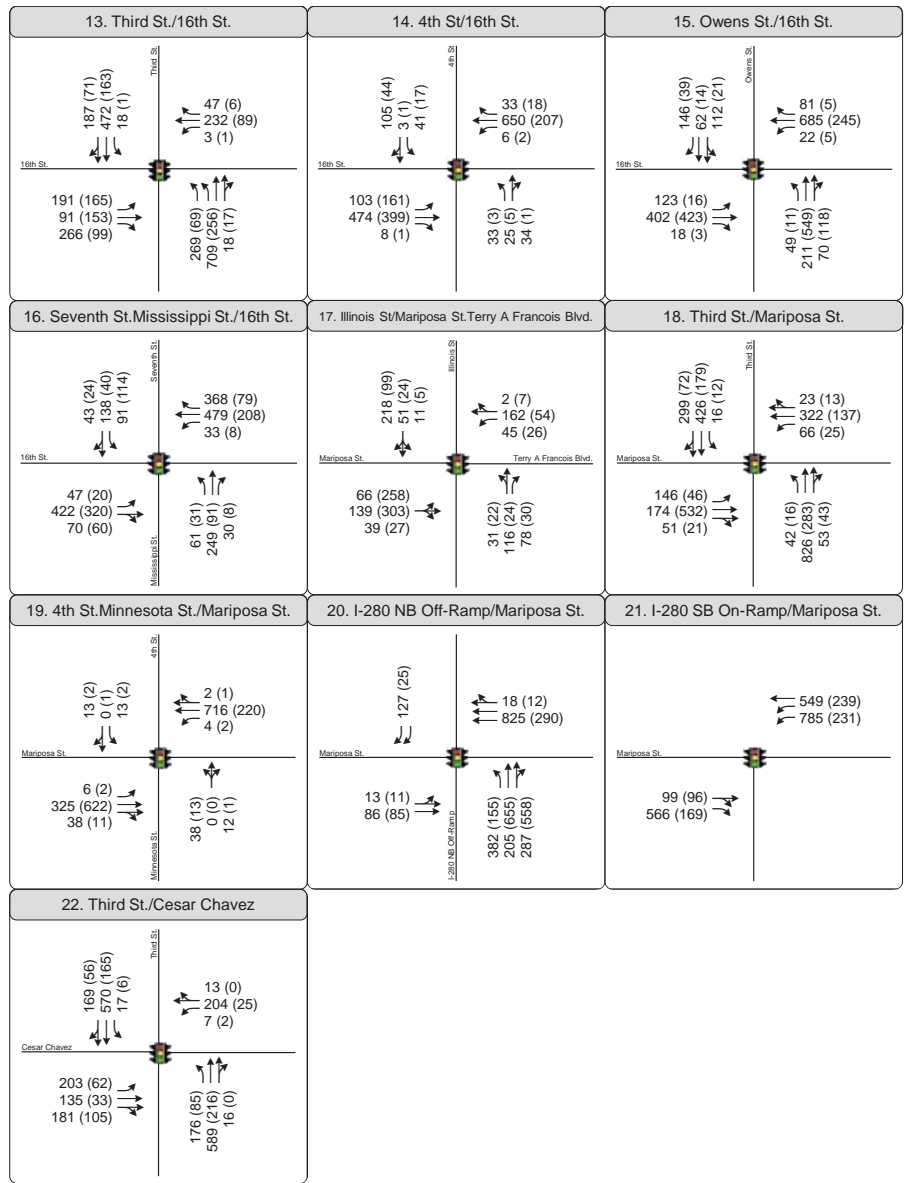
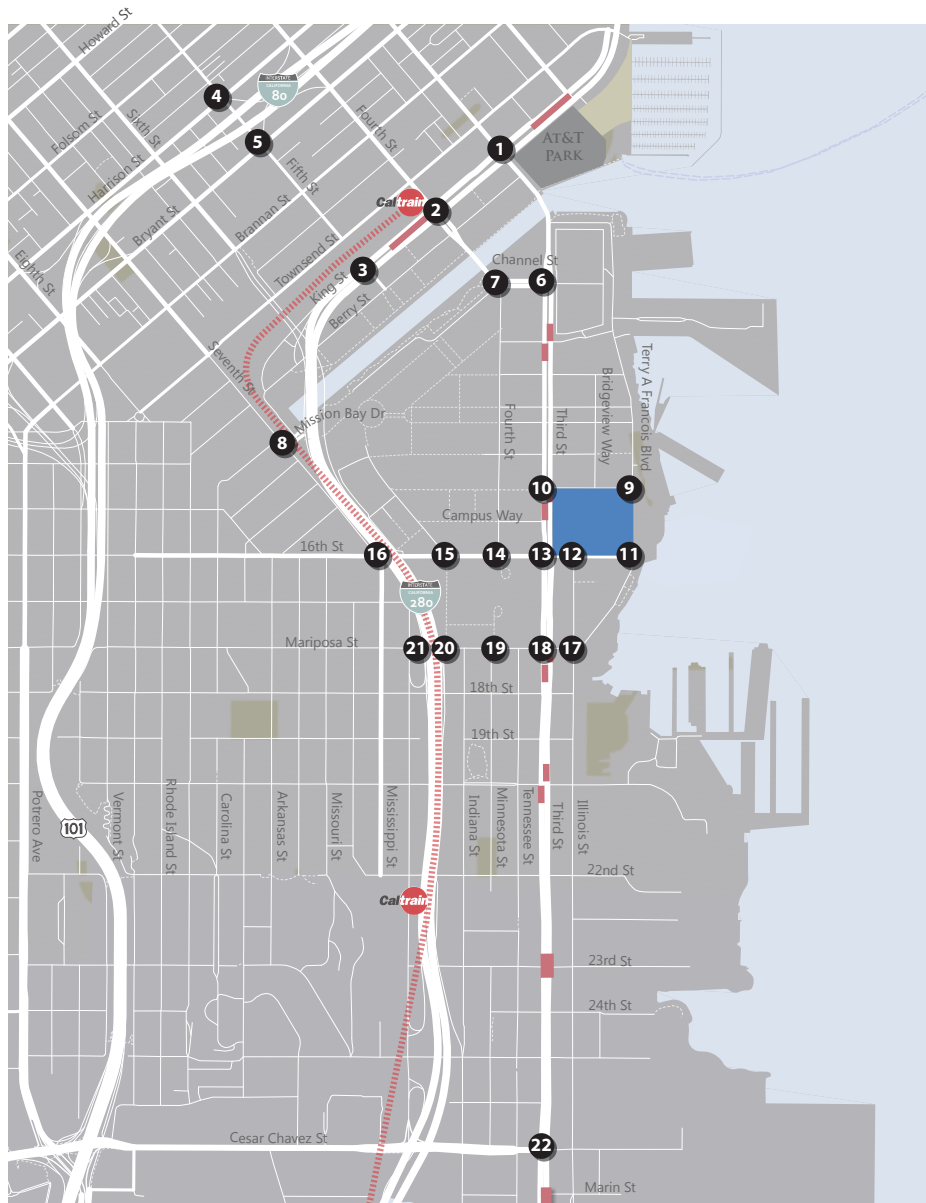
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



Weekday PM Peak (Saturday Evening)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 11a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game, No TSP





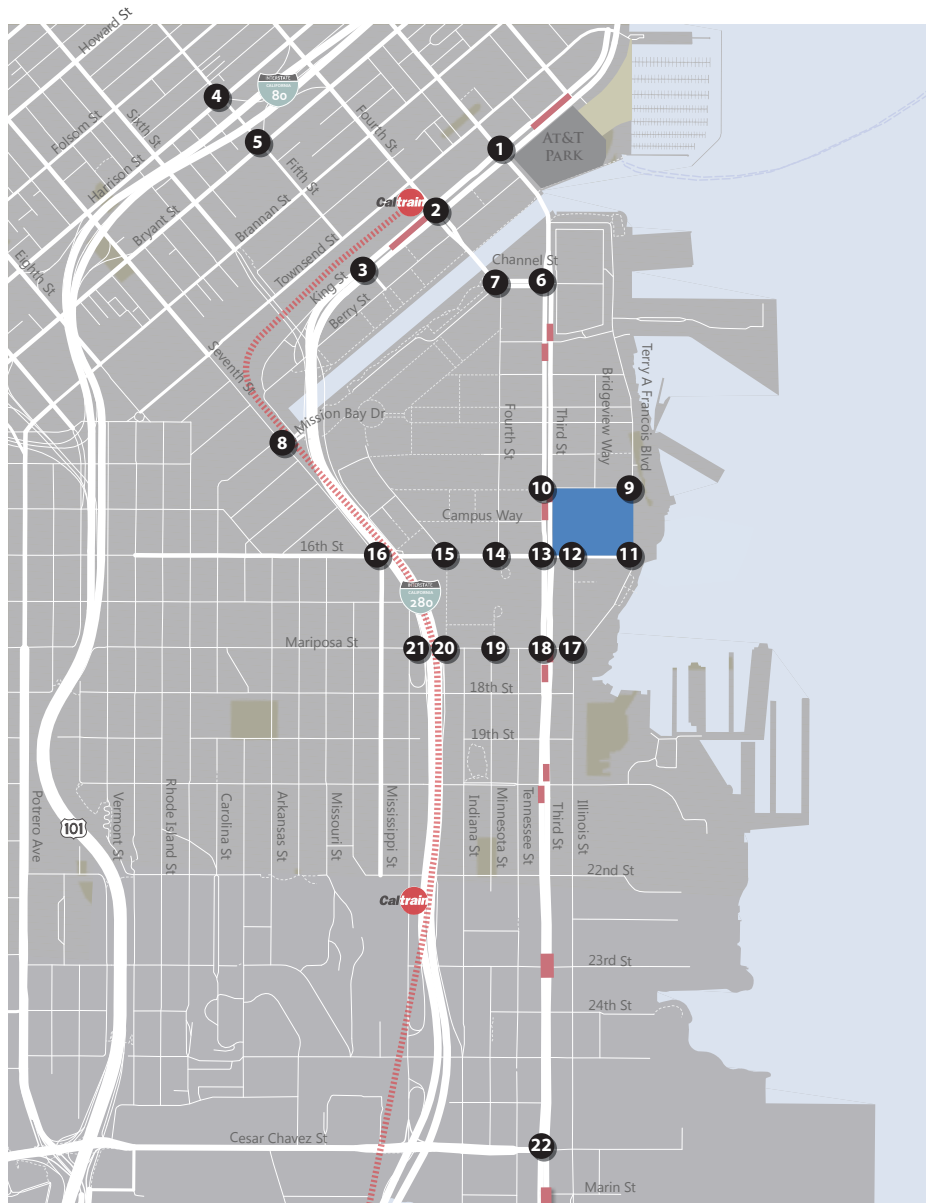
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane

Weekday PM Peak (Saturday Evening)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

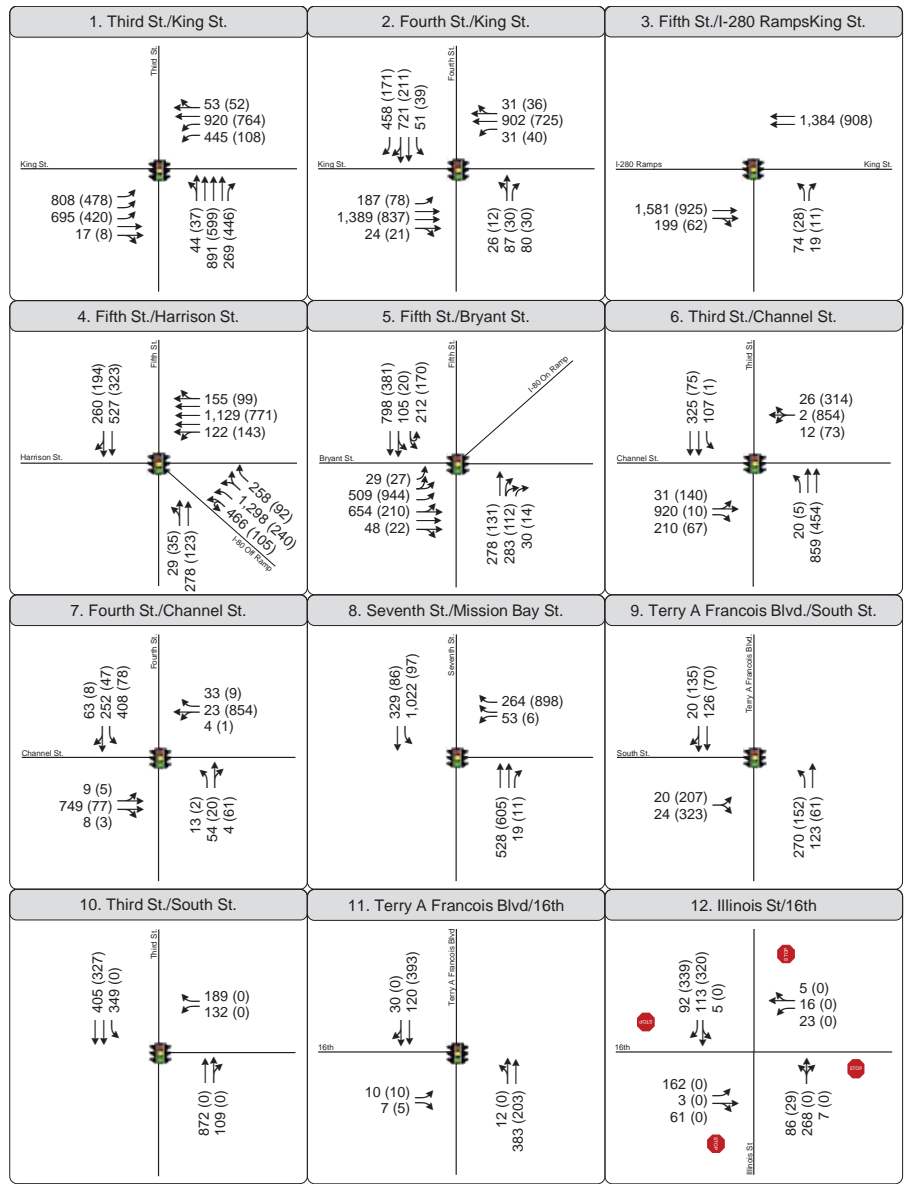
Figure 11b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game, No TSP



EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO TSP - WEEKDAY EVENING / WEEKDAY LATE EVENING



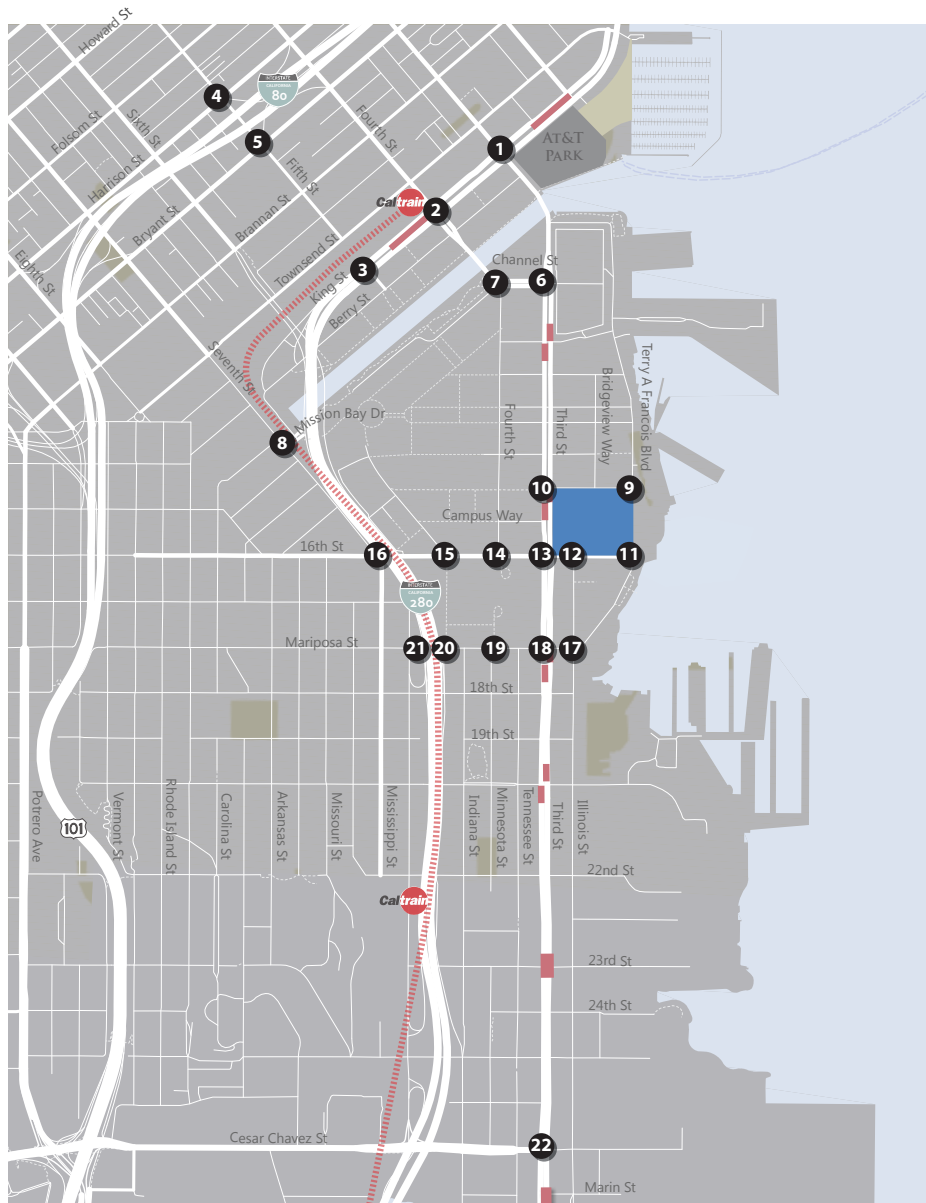
X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



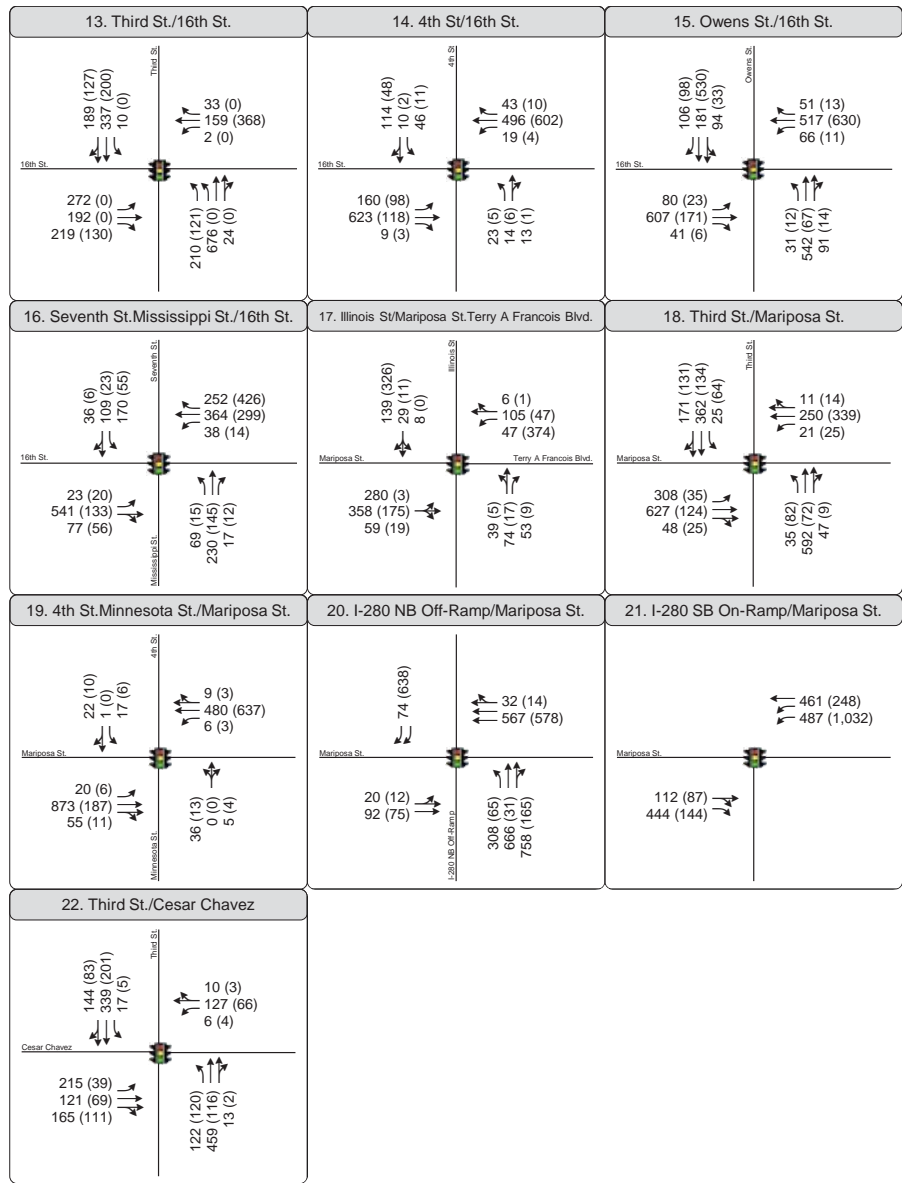
↗ Weekday Evening (Late Evening)
 ↗ Peak Hour Traffic Volume
 🚦 Traffic Signal
 🛑 Stop Sign

Figure 12a
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game, No TSP





X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



Weekday Evening (Late Evening)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 12b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Project (2015) Conditions - with Basketball Game, No TSP

APPENDIX TR-4
INTERSECTION LEVEL OF SERVICE ANALYSIS

EXISTING 2015 (NO PROJECT)
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	↑↑		←←←	↑↑			←←←	↑			
Volume (vph)	889	733	12	137	907	36	53	1043	272	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5478	941			
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5478	941			
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)	916	756	12	141	935	37	55	1075	280	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	190	0	0	0
Lane Group Flow (vph)	916	767	0	141	971	0	0	1130	90	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.9		13.2	37.4			35.5	35.5			
Effective Green, g (s)	18.2	40.9		13.2	37.4			35.5	35.5			
Actuated g/C Ratio	0.17	0.37		0.12	0.34			0.32	0.32			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1136		358	1027			1767	303			
v/s Ratio Prot	c0.20	0.25		0.05	c0.32							
v/s Ratio Perm								0.21	0.10			
v/c Ratio	1.24	0.67		0.39	0.95			0.64	0.30			
Uniform Delay, d1	45.9	29.0		44.7	35.3			31.8	27.9			
Progression Factor	1.37	1.61		1.53	1.02			0.89	2.83			
Incremental Delay, d2	114.1	2.1		0.2	6.6			0.7	0.5			
Delay (s)	177.1	48.8		68.8	42.7			29.1	79.5			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		118.6			46.0			39.1			0.0	
Approach LOS		F			D			D			A	

Intersection Summary

HCM 2000 Control Delay	72.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



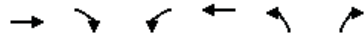
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	↑↑↑		←	↑↑			←	↑	←	↑↑	←
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	268	304
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.83	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4385		1296	2553			1585	858	1044	2330	581
Flt Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1540	4385		1296	2553			1543	858	778	2330	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	273	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	47	116
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	356	64
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1829		70	833			535	297	277	830	207
v/s Ratio Prot	0.10	c0.36		0.02	c0.37						c0.15	
v/s Ratio Perm								0.05	0.03	0.04		0.11
v/c Ratio	0.77	0.86		0.34	1.14			0.14	0.09	0.13	0.43	0.31
Uniform Delay, d1	46.2	29.2		50.1	37.0			24.6	24.2	23.9	26.9	25.6
Progression Factor	0.58	1.17		0.88	0.91			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.5		1.1	71.0			0.1	0.1	0.2	0.4	0.9
Delay (s)	28.4	34.8		45.4	104.7			24.8	24.4	24.1	27.3	26.5
Level of Service	C	C		D	F			C	C	C	C	C
Approach Delay (s)		34.2			103.2			24.6			26.8	
Approach LOS		C			F			C			C	

Intersection Summary

HCM 2000 Control Delay	51.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.53	1.00	1.00
Incremental Delay, d2	69.5			1.0	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	

Intersection Summary

HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Volume (vph)	272	1171	161	52	302	537	219	193	722	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4086	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4086	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	210	776	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1015	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1225	293
v/s Ratio Prot						c0.33			0.25	
v/s Ratio Perm		0.30			0.20					c0.26
v/c Ratio		0.92			0.65	1.05			0.83	0.87
Uniform Delay, d1		29.4			26.7	31.0			29.3	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	47.9			6.5	28.4
Delay (s)		50.1			2.1	78.9			35.9	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	78.9			40.4	
Approach LOS		D			A	E			D	

Intersection Summary

HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



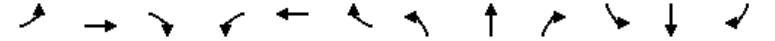
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↕		↕	↕↔
Volume (vph)	16	472	568	45	338	362	24	255	129	618
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1914		2130		1163		1327	2541
Fit Permitted		0.95	1.00		1.00		1.00		0.15	0.63
Satd. Flow (perm)		1313	1914		2130		1163		207	1616
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	508	611	48	363	389	26	274	139	665
RTOR Reduction (vph)	0	0	8	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	464	712	0	755	0	6	0	306	772
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0		23.0		42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5		23.0		43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27		0.26		0.48	0.48
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		328	531		579		297		305	950
v/s Ratio Prot		0.35	c0.37		c0.35				c0.18	0.15
v/s Ratio Perm							0.01		0.30	0.24
v/c Ratio		1.41	1.34		1.42dr		0.02		1.00	0.81
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	19.8
Progression Factor		1.00	1.00		1.00		1.00		1.10	1.16
Incremental Delay, d2		203.7	165.8		149.0		0.1		28.0	2.2
Delay (s)		237.5	198.3		181.8		25.2		62.3	25.1
Level of Service		F	F		F		C		E	C
Approach Delay (s)			213.6		177.1					35.7
Approach LOS			F		F					D

Intersection Summary			
HCM 2000 Control Delay	141.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↔		↔	↕↔		↕	↕↔	↕↔
Volume (vph)	17	15	66	19	10	67	20	898	18	12	161	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1569	1353		1426		1272	2531		1540	3037	
Fit Permitted		0.87	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1405	1353		1373		1272	2531		1540	3037	
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)	18	16	69	20	11	71	21	945	19	13	169	14
RTOR Reduction (vph)	0	0	47	0	48	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	34	22	0	54	0	21	963	0	13	177	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		14.8	37.5		14.5	37.5	
Effective Green, g (s)		32.1	32.1		32.1		14.8	37.5		14.5	37.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.15	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		451	434		440		188	949		223	1138	
v/s Ratio Prot							0.02	c0.38		0.01	c0.06	
v/s Ratio Perm		0.02	0.02		c0.04							
v/c Ratio		0.08	0.05		0.12		0.11	1.01		0.06	0.16	
Uniform Delay, d1		23.6	23.4		24.0		36.9	31.2		36.9	20.7	
Progression Factor		1.00	1.00		1.00		1.63	0.50		1.00	1.00	
Incremental Delay, d2		0.3	0.2		0.6		0.8	27.9		0.5	0.3	
Delay (s)		23.9	23.7		24.6		61.1	43.7		37.4	21.0	
Level of Service		C	C		C		E	D		D	C	
Approach Delay (s)		23.8			24.6			44.0			22.1	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	12	10	3	10	30	7	84	6	80	114	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2553			1434	1227	1155	1432		1377	1393	
Fit Permitted		0.95			1.00	1.00	0.80	1.00		0.95	1.00	
Satd. Flow (perm)		2493			1449	1227	973	1432		1377	1393	
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)	20	13	11	3	11	32	8	90	6	86	123	15
RTOR Reduction (vph)	0	10	0	0	0	17	0	4	0	0	5	0
Lane Group Flow (vph)	0	34	0	0	14	15	8	92	0	86	133	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.3			2.3	18.6	5.0	5.0		16.3	26.3	
Effective Green, g (s)		2.3			2.3	18.6	5.0	5.0		16.3	26.3	
Actuated g/C Ratio		0.06			0.06	0.48	0.13	0.13		0.42	0.68	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		148			86	750	126	185		581	949	
v/s Ratio Prot						0.01		c0.06		0.06	c0.10	
v/s Ratio Perm	c0.01				0.01	0.00	0.01					
v/c Ratio	0.23				0.16	0.02	0.06	0.50		0.15	0.14	
Uniform Delay, d1	17.3				17.2	5.2	14.7	15.6		6.9	2.2	
Progression Factor	1.00				1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8				0.9	0.0	0.2	2.1		0.1	0.1	
Delay (s)	18.1				18.1	5.2	15.0	17.7		7.0	2.2	
Level of Service	B				B	A	B	B		A	A	
Approach Delay (s)	18.1				9.2			17.5			4.1	
Approach LOS	B				A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (vph)	34	208	743	29	71	219
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	226	808	32	77	238
RTOR Reduction (vph)	0	202	0	5	0	0
Lane Group Flow (vph)	37	24	808	27	77	238
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.6	8.6	47.5	42.5	9.1	61.6
Effective Green, g (s)	8.6	8.6	47.5	42.5	9.1	61.6
Actuated g/C Ratio	0.11	0.11	0.59	0.53	0.11	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	121	186	909	502	128	917
v/s Ratio Prot	c0.03		c0.53	0.01	c0.07	0.20
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.31	0.13	0.89	0.05	0.60	0.26
Uniform Delay, d1	33.0	32.4	14.1	9.1	33.8	2.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	10.6	0.0	7.7	0.2
Delay (s)	34.5	32.7	24.6	9.2	41.6	2.8
Level of Service	C	C	C	A	D	A
Approach Delay (s)	33.0		24.1			12.3
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	19	43	13	164	149	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	21	48	14	182	166	46
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	408	206	261			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	408	206	261			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	94	99			
cM capacity (veh/h)	522	741	1251			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	21	48	75	121	110	101
Volume Left	21	0	14	0	0	0
Volume Right	0	48	0	0	0	46
cSH	522	741	1251	1700	1700	1700
Volume to Capacity	0.04	0.06	0.01	0.07	0.06	0.06
Queue Length 95th (ft)	3	5	1	0	0	0
Control Delay (s)	12.2	10.2	1.6	0.0	0.0	0.0
Lane LOS	B	B	A			
Approach Delay (s)	10.8		0.6		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay	1.8					
Intersection Capacity Utilization	32.6%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	189	71	860	17	2	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3408		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3408		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	79	956	19	2	541
RTOR Reduction (vph)	0	56	1	0	0	0
Lane Group Flow (vph)	210	23	974	0	2	541
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	54.0		2.0	61.1
Effective Green, g (s)	28.7	28.7	54.0		2.0	61.1
Actuated g/C Ratio	0.29	0.29	0.54		0.02	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1840		34	2090
v/s Ratio Prot			c0.29		0.00	c0.16
v/s Ratio Perm	c0.13	0.02				
v/c Ratio	0.46	0.05	0.53		0.06	0.26
Uniform Delay, d1	29.3	25.8	14.8		48.1	9.0
Progression Factor	1.00	1.00	2.21		1.19	0.78
Incremental Delay, d2	0.7	0.1	0.8		0.7	0.1
Delay (s)	30.1	25.9	33.5		58.0	7.1
Level of Service	C	C	C		E	A
Approach Delay (s)	28.9		33.5			7.3
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↑	
Volume (veh/h)	0	0	0	177	192	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	208	226	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	356	139	251			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356	139	251			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	604	866	1287			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	69	139	151	75
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1287	1700	1700	1700
Volume to Capacity	0.00	0.00	0.08	0.09	0.04
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0	0.0		
Approach LOS	A				

Intersection Summary					
Average Delay	0.0				
Intersection Capacity Utilization	20.4%		ICU Level of Service		A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	P			↑	Y	
Volume (veh/h)	8	67	49	28	130	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	9	77	56	32	149	5
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			136		293	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			136		293	148
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		76	99
cM capacity (veh/h)			1393		620	832

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	86	89	154
Volume Left	0	56	149
Volume Right	77	0	5
cSH	1700	1393	625
Volume to Capacity	0.05	0.04	0.25
Queue Length 95th (ft)	0	3	24
Control Delay (s)	0.0	5.0	12.6
Lane LOS		A	B
Approach Delay (s)	0.0	5.0	12.6
Approach LOS		B	

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	31.3%	ICU Level of Service	
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	134	52	266	3	108	47	264	696	5	18	472	186
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1257	1365	1126	1282	1365	1099	2515	2590		1296	2464	
Fit Permitted	0.68	1.00	1.00	0.72	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	901	1365	1126	971	1365	1099	2515	2590		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	147	57	292	3	119	52	290	765	5	20	519	204
RTOR Reduction (vph)	0	0	191	0	0	34	0	1	0	0	42	0
Lane Group Flow (vph)	147	57	101	3	119	18	290	769	0	20	681	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	310	470	388	334	470	379	352	979		155	882	
v/s Ratio Prot		0.04			0.09		0.12	c0.30		0.02	c0.28	
v/s Ratio Perm	c0.16		0.09	0.00		0.02						
v/c Ratio	0.47	0.12	0.26	0.01	0.25	0.05	0.82	0.79		0.13	0.77	
Uniform Delay, d1	25.6	22.4	23.6	21.5	23.5	21.8	41.8	27.5		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.65	0.76		1.02	1.00	
Incremental Delay, d2	5.1	0.5	1.6	0.0	1.3	0.2	9.8	3.0		1.7	6.3	
Delay (s)	30.8	22.9	25.2	21.6	24.8	22.0	37.1	23.9		41.9	34.8	
Level of Service	C	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		26.6			23.9			27.5			35.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	89	377	8	6	522	30	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	410	9	7	567	33	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	18	0	28	0	0	85	0
Lane Group Flow (vph)	97	410	5	7	567	15	36	36	0	45	32	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)			10		10				10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.06	0.24		0.00	c0.33		0.01	0.03		0.02	0.02	
v/s Ratio Perm			0.00				0.01	0.03				
v/c Ratio	0.48	0.44	0.01	0.14	0.74	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.5	11.8	9.0	41.1	19.6	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.5	0.0	1.3	3.7	0.0	0.2	0.1		0.3	0.1	
Delay (s)	37.3	13.3	9.0	42.4	23.3	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	C	B	C	C		C	C	
Approach Delay (s)		17.8			23.0			25.3			25.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	118	301	14	21	561	78	49	134	61	112	54	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1050	1540	2934			2978	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.69	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1050	1041	2934			2120	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	123	314	15	22	584	81	51	140	64	117	56	152
RTOR Reduction (vph)	0	0	5	0	0	22	0	54	0	0	0	130
Lane Group Flow (vph)	123	314	10	22	584	59	51	150	0	0	173	22
Confl. Peds. (#/hr)						17						3
Confl. Bikes (#/hr)						36						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	7.0	56.8	56.8	2.7	51.5	51.5	13.3	13.3			12.3	12.3
Effective Green, g (s)	7.0	56.8	56.8	2.7	51.5	51.5	13.3	13.3			12.3	12.3
Actuated g/C Ratio	0.08	0.66	0.66	0.03	0.60	0.60	0.16	0.16			0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	99	804	912	48	729	630	161	454			303	153
v/s Ratio Prot	c0.10	0.26		0.01	c0.48			0.05				
v/s Ratio Perm			0.01			0.06	0.05				c0.08	0.02
v/c Ratio	1.24	0.39	0.01	0.46	0.80	0.09	0.32	0.33			0.57	0.14
Uniform Delay, d1	39.4	6.6	4.9	40.8	13.2	7.3	32.2	32.3			34.3	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	169.2	1.4	0.0	6.8	6.3	0.1	1.1	0.4			2.6	0.4
Delay (s)	208.6	8.0	5.0	47.6	19.5	7.3	33.3	32.7			36.9	32.6
Level of Service	F	A	A	D	B	A	C	C			D	C
Approach Delay (s)		62.5			19.0			32.8			34.9	
Approach LOS		E			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	47	328	70	33	396	327	61	249	30	75	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	925		1335	1126	867	1070	957	923	1070	1069	
Fit Permitted	0.14	1.00		0.32	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	193	925		444	1126	867	1070	957	923	1070	1069	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	349	74	35	421	348	65	265	32	80	147	46
RTOR Reduction (vph)	0	9	0	0	0	184	0	0	23	0	14	0
Lane Group Flow (vph)	50	414	0	35	421	164	65	265	9	80	179	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	34.1	34.1		34.1	34.1	41.1	13.1	25.1	25.1	7.0	19.0	
Effective Green, g (s)	34.1	34.1		34.1	34.1	41.1	13.1	25.1	25.1	7.0	19.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39	0.46	0.15	0.28	0.28	0.08	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	104	356		194	433	451	158	271	261	84	229	
v/s Ratio Prot	0.01	c0.45		0.00	c0.37	0.03	0.06	c0.28		0.07	c0.17	
v/s Ratio Perm	0.17			0.06		0.16			0.01			
v/c Ratio	0.48	1.16		0.18	0.97	0.36	0.41	0.98	0.03	0.95	0.78	
Uniform Delay, d1	20.5	27.2		25.0	26.7	15.3	34.2	31.4	22.9	40.6	32.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.5	100.2		0.4	35.8	0.5	1.7	48.0	0.1	81.8	15.8	
Delay (s)	23.9	127.4		25.5	62.6	15.8	35.9	79.4	23.0	122.4	48.5	
Level of Service	C	F		C	E	B	D	E	C	F	D	
Approach Delay (s)		116.5			40.7			66.6			70.2	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	19	74	39	45	162	2	31	116	78	11	51	51
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	21	82	43	50	180	2	34	129	87	12	57	57
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	147	50	182	163	87	126						
Volume Left (vph)	21	50	0	34	0	12						
Volume Right (vph)	43	0	2	0	87	57						
Hadj (s)	-0.11	0.53	0.03	0.14	-0.67	-0.22						
Departure Headway (s)	5.8	6.3	5.8	5.9	5.1	5.8						
Degree Utilization, x	0.24	0.09	0.29	0.27	0.12	0.20						
Capacity (veh/h)	579	539	589	578	661	580						
Control Delay (s)	10.6	8.7	9.9	9.9	7.6	10.2						
Approach Delay (s)	10.6	9.7		9.1		10.2						
Approach LOS	B	A		A		B						

Intersection Summary						
Delay		9.7				
Level of Service		A				
Intersection Capacity Utilization	44.3%		ICU Level of Service	A		
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	146	81	51	19	202	23	40	796	35	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	3177		1676	3353		1260	2500		1260	2331	
Fit Permitted	0.60	1.00		0.66	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1059	3177		1170	3353		1260	2500		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	86	54	20	215	24	43	847	37	17	453	318
RTOR Reduction (vph)	0	35	0	0	8	0	0	3	0	0	127	0
Lane Group Flow (vph)	155	105	0	20	231	0	43	881	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	367	1102		405	1163		149	872		187	883	
v/s Ratio Prot		0.03			0.07		0.03	c0.35		0.01	c0.28	
v/s Ratio Perm	c0.15			0.02								
v/c Ratio	0.42	0.10		0.05	0.20		0.29	1.01		0.09	0.73	
Uniform Delay, d1	25.0	22.0		21.7	22.9		40.2	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.79		1.55	0.71	
Incremental Delay, d2	3.5	0.2		0.2	0.4		3.6	28.7		0.7	3.8	
Delay (s)	28.5	22.2		21.9	23.3		40.0	54.6		57.5	22.8	
Level of Service	C	C		C	C		D	D		E	C	
Approach Delay (s)		25.5			23.2			53.9			23.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	6	232	38	4	553	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3349		1711	3420			1678		1711	1531	
Flt Permitted	0.38	1.00		0.57	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	677	3349		1031	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	252	41	4	601	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	22	0	0	1	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	271	0	4	602	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	270	1339		412	1368			635		563	663	
v/s Ratio Prot		0.08			c0.18						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.03	0.20		0.01	0.44			0.05		0.02	0.01	
Uniform Delay, d1	10.9	11.8		10.8	13.1			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		0.0	1.0			0.2		0.1	0.0	
Delay (s)	11.1	12.1		10.9	14.1			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.1			14.1			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015

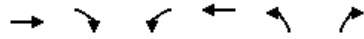


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	3	86	0	0	705	6	382	112	194	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frbp, ped/bikes		1.00			1.00		1.00	1.00				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			1.00		1.00	0.90				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3416			5125		1711	3096				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3248			5125		1711	3096				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	88	0	0	719	6	390	114	198	0	0	130
RTOR Reduction (vph)	0	0	0	0	1	0	0	103	0	0	0	121
Lane Group Flow (vph)	0	91	0	0	724	0	390	209	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1414			1700		824	1491				183
v/s Ratio Prot		c0.00			c0.14		c0.23	0.07				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.43		0.47	0.14				0.05
Uniform Delay, d1		18.3			28.6		19.1	15.8				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.8		1.9	0.2				0.5
Delay (s)		18.4			29.4		21.1	16.0				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.4			29.4			18.8				48.4
Approach LOS		B			C			B				D

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

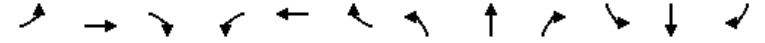
4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔	0	0
Volume (vph)	89	566	665	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1502	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1502	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	584	686	566	0	0
RTOR Reduction (vph)	44	44	0	0	0	0
Lane Group Flow (vph)	299	289	686	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	40.0	40.0	20.0	70.0		
Effective Green, g (s)	40.0	40.0	20.0	70.0		
Actuated g/C Ratio	0.57	0.57	0.29	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	858	814	948	1801		
v/s Ratio Prot	0.20		c0.21	0.31		
v/s Ratio Perm		c0.20				
v/c Ratio	0.35	0.35	0.72	0.31		
Uniform Delay, d1	8.0	8.1	22.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.3	2.8	0.1		
Delay (s)	8.3	8.3	25.3	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	8.3			13.9	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			11.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			51.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	193	135	181	7	204	13	176	549	16	17	532	160
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2412		1215	2287	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2412		1215	2287	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	201	141	189	7	212	14	183	572	17	18	554	167
RTOR Reduction (vph)	0	125	0	0	2	0	0	2	0	0	29	0
Lane Group Flow (vph)	201	205	0	7	224	0	183	587	0	18	692	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.8	33.8		21.9	21.9		17.3	45.6		4.3	32.6	
Effective Green, g (s)	33.8	33.8		21.9	21.9		17.3	45.6		4.3	32.6	
Actuated g/C Ratio	0.34	0.34		0.22	0.22		0.17	0.46		0.04	0.33	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	657		144	275		210	1099		52	745	
v/s Ratio Prot	c0.07	0.11			0.18		c0.15	0.24		0.01	c0.30	
v/s Ratio Perm	c0.27			0.01								
v/c Ratio	1.00	0.31		0.05	0.81		0.87	0.53		0.35	0.93	
Uniform Delay, d1	33.2	24.5		30.8	37.1		40.3	19.6		46.5	32.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.84	
Incremental Delay, d2	63.5	0.3		0.1	16.6		30.2	1.9		3.1	16.2	
Delay (s)	96.7	24.8		31.0	53.7		70.5	21.4		50.8	43.6	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		52.0			53.0			33.1			43.8	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			43.0									D
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			96.7%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



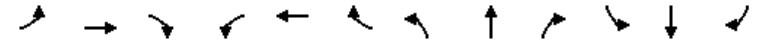
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←↑	←	←←←	←↑	←		←←←	←			
Volume (vph)	783	704	102	290	632	48	12	683	145	0	0	0
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.93		1.00	0.96			1.00	0.47			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.98		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	3656	2370		2515	2469			4649	547			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	3656	2370		2515	2469			4649	547			
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)	807	726	105	299	652	49	12	704	149	0	0	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	114	0	0	0
Lane Group Flow (vph)	807	821	0	299	701	0	0	716	35	0	0	0
Confl. Peds. (#/hr)			1700			1700	1700		1700			
Confl. Bikes (#/hr)		10				10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	20.8	43.9		19.6	44.2			26.1	26.1			
Effective Green, g (s)	20.8	43.9		19.6	44.2			26.1	26.1			
Actuated g/C Ratio	0.19	0.40		0.18	0.40			0.24	0.24			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	691	945		448	992			1103	129			
v/s Ratio Prot	c0.22	c0.35		0.12	c0.28							
v/s Ratio Perm								0.15	0.06			
v/c Ratio	1.17	0.87		0.67	0.71			0.65	0.27			
Uniform Delay, d1	44.6	30.4		42.2	27.5			37.8	34.2			
Progression Factor	1.21	1.39		1.51	1.20			0.83	2.32			
Incremental Delay, d2	81.2	4.0		1.1	0.7			1.2	1.0			
Delay (s)	135.1	46.3		64.7	33.7			32.5	80.4			
Level of Service	F	D		E	C			C	F			
Approach Delay (s)		90.1			43.0			40.8			0.0	
Approach LOS		F			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015

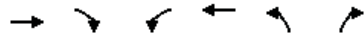


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←↑	←	←←←	←↑	←		←	←	←	←	←
Volume (vph)	128	1358	33	34	586	24	7	131	109	122	409	452
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	*0.80		1.00	*0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.64	1.00	0.84	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00	0.71	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.95	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3234		1296	2516			1601	858	1088	2349	581
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1296	3234		1296	2516			1548	858	764	2349	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1386	34	35	598	24	7	134	111	124	417	461
RTOR Reduction (vph)	0	2	0	0	3	0	0	0	72	0	43	175
Lane Group Flow (vph)	131	1418	0	35	619	0	0	141	39	124	563	97
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.39		0.08	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	169	1264		104	821			537	297	272	837	207
v/s Ratio Prot	0.10	c0.44		0.03	c0.25						c0.24	
v/s Ratio Perm								0.09	0.04	0.16		0.17
v/c Ratio	0.78	1.12		0.34	0.75			0.26	0.13	0.46	0.67	0.47
Uniform Delay, d1	46.2	33.5		47.8	33.1			25.8	24.5	27.2	30.0	27.3
Progression Factor	0.63	0.91		0.97	0.94			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	56.0		1.3	2.8			0.3	0.2	1.2	2.1	1.7
Delay (s)	31.2	86.5		47.6	33.9			26.0	24.7	28.4	32.1	29.0
Level of Service	C	F		D	C			C	C	C	C	C
Approach Delay (s)		81.8			34.6			25.5			30.8	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	54.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	134.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1494	151	3	1042	77	25
Ideal Flow (vphpl)	1700	1700	1400	1400	1700	1700
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2709			2269	1377	1214
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2709			2157	1377	1214
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1556	157	3	1085	80	26
RTOR Reduction (vph)	7	0	0	0	0	14
Lane Group Flow (vph)	1706	0	0	1088	80	12
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1529			1217	458	403
v/s Ratio Prot	c0.63				c0.06	
v/s Ratio Perm				0.50		0.01
v/c Ratio	1.12			0.89	0.17	0.03
Uniform Delay, d1	23.9			21.1	26.0	24.7
Progression Factor	1.00			0.82	1.00	1.00
Incremental Delay, d2	61.7			7.4	0.8	0.1
Delay (s)	85.6			24.7	26.8	24.9
Level of Service	F			C	C	C
Approach Delay (s)	85.6			24.7	26.3	
Approach LOS	F			C	C	

Intersection Summary

HCM 2000 Control Delay	60.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑	↑↑		↑↑	↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	88	794	99	22	227	661	205	256	755	261
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.97			0.99	0.87
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5795			2871	2501			4091	978
Fit Permitted		1.00			0.74	1.00			0.95	1.00
Satd. Flow (perm)		5795			2124	2501			4091	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	96	854	106	24	244	711	220	278	812	281
RTOR Reduction (vph)	0	22	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	1034	0	0	268	924	0	0	1118	253
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1867			660	778			1227	293
v/s Ratio Prot						c0.37			c0.27	
v/s Ratio Perm		0.18			0.13					0.26
v/c Ratio		0.55			0.41	1.19			0.91	0.86
Uniform Delay, d1		25.2			24.4	31.0			30.3	29.8
Progression Factor		1.66			0.15	1.00			1.00	1.00
Incremental Delay, d2		0.6			0.2	97.2			11.7	27.0
Delay (s)		42.3			3.9	128.2			42.0	56.8
Level of Service		D			A	F			D	E
Approach Delay (s)		42.3			3.9	128.2			44.7	
Approach LOS		D			A	F			D	

Intersection Summary

HCM 2000 Control Delay	62.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



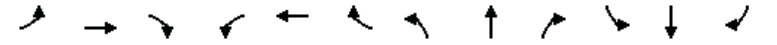
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↕		↕	↕↔
Volume (vph)	28	387	683	63	221	322	64	211	145	649
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.81		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.91		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1313	1910		2041		1163		1327	2548
Fit Permitted		0.95	1.00		1.00		1.00		0.23	0.84
Satd. Flow (perm)		1313	1910		2041		1163		326	2161
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	30	416	734	68	238	346	69	227	156	698
RTOR Reduction (vph)	0	0	9	0	1	0	46	0	0	0
Lane Group Flow (vph)	0	404	835	0	590	0	16	0	319	762
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10				
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0			23.0	42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5			23.0	43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27			0.26	0.48	0.48
Clearance Time (s)		4.5	4.5		4.0			4.0	4.0	4.0
Lane Grp Cap (vph)		328	530		555			297	341	1115
v/s Ratio Prot		0.31	c0.44		c0.29				c0.17	0.13
v/s Ratio Perm							0.01		0.28	0.20
v/c Ratio		1.23	1.57		1.32dr		0.05		0.94	0.68
Uniform Delay, d1		33.8	32.5		32.8		25.3		27.6	17.9
Progression Factor		1.00	1.00		1.00		1.00		1.05	1.14
Incremental Delay, d2		128.0	267.6		56.2		0.3		5.7	0.3
Delay (s)		161.8	300.1		89.0		25.6		34.8	20.7
Level of Service		F	F		F		C		C	C
Approach Delay (s)			255.3		82.9					24.9
Approach LOS			F		F					C

Intersection Summary			
HCM 2000 Control Delay		134.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio		1.05	F
Actuated Cycle Length (s)		90.0	Sum of lost time (s)
Intersection Capacity Utilization		99.3%	ICU Level of Service
Analysis Period (min)		15	F

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↔		↕↔	↕↔		↕	↕↔	↕↔
Volume (vph)	32	58	72	1	1	3	23	804	56	135	160	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	0.99		1.00	0.98	
Fit Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1584	1353		1450		1272	2499		1540	2993	
Fit Permitted		0.91	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1473	1353		1431		1272	2499		1540	2993	
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)	34	61	76	1	1	3	24	846	59	142	168	31
RTOR Reduction (vph)	0	0	52	0	2	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	95	24	0	3	0	24	900	0	142	184	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		14.8	38.5		13.5	37.5	
Effective Green, g (s)		32.1	32.1		32.1		14.8	38.5		13.5	37.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.15	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		472	434		459		188	962		207	1122	
v/s Ratio Prot							0.02	c0.36		c0.09	0.06	
v/s Ratio Perm		c0.06	0.02		0.00							
v/c Ratio		0.20	0.06		0.01		0.13	0.94		0.69	0.16	
Uniform Delay, d1		24.6	23.5		23.1		37.0	29.6		41.2	20.8	
Progression Factor		1.00	1.00		1.00		1.57	0.38		1.00	1.00	
Incremental Delay, d2		1.0	0.2		0.0		1.1	14.0		17.0	0.3	
Delay (s)		25.6	23.7		23.1		59.0	25.2		58.2	21.1	
Level of Service		C	C		C		E	C		E	C	
Approach Delay (s)		24.8			23.1			26.1			36.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay		28.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio		0.61	C
Actuated Cycle Length (s)		100.0	Sum of lost time (s)
Intersection Capacity Utilization		97.5%	ICU Level of Service
Analysis Period (min)		15	F

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	33	16	23	2	7	44	44	255	16	130	128	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.99	1.00	1.00		1.00	0.96	
Flpb, ped/bikes		0.99			1.00	1.00	0.82	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2811			1604	1363	1265	1603		1540	1518	
Fit Permitted		0.90			0.91	1.00	0.65	1.00		0.95	1.00	
Satd. Flow (perm)		2596			1473	1363	869	1603		1540	1518	
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)	35	17	25	2	8	47	47	274	17	140	138	27
RTOR Reduction (vph)	0	23	0	0	0	31	0	3	0	0	7	0
Lane Group Flow (vph)	0	54	0	0	10	16	47	288	0	140	158	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		3.8			3.8	14.7	14.6	14.6		10.9	30.5	
Effective Green, g (s)		3.8			3.8	14.7	14.6	14.6		10.9	30.5	
Actuated g/C Ratio		0.09			0.09	0.33	0.33	0.33		0.25	0.69	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		222			126	606	286	528		378	1045	
v/s Ratio Prot						0.01		c0.18		c0.09	0.10	
v/s Ratio Perm		c0.02			0.01	0.01	0.05					
v/c Ratio		0.24			0.08	0.03	0.16	0.55		0.37	0.15	
Uniform Delay, d1		18.9			18.6	10.0	10.5	12.1		13.9	2.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			0.3	0.0	0.3	1.2		0.6	0.1	
Delay (s)		19.5			18.9	10.0	10.8	13.3		14.5	2.5	
Level of Service		B			B	A	B	B		B	A	
Approach Delay (s)		19.5			11.6			13.0			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	47	249	895	37	85	214
Ideal Flow (vphpl)	1900	1900	1400	1400	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2365	1791	990	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2365	1791	990	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	271	973	40	92	233
RTOR Reduction (vph)	0	242	0	6	0	0
Lane Group Flow (vph)	51	29	973	34	92	233
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.6	8.6	47.6	42.6	10.1	62.7
Effective Green, g (s)	8.6	8.6	47.6	42.6	10.1	62.7
Actuated g/C Ratio	0.11	0.11	0.59	0.52	0.12	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	162	250	1048	579	140	920
v/s Ratio Prot	c0.03		c0.54	0.01	c0.08	0.20
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.31	0.11	0.93	0.06	0.66	0.25
Uniform Delay, d1	33.6	32.9	15.3	9.5	33.9	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2	13.6	0.0	10.6	0.1
Delay (s)	34.7	33.1	29.0	9.5	44.6	2.8
Level of Service	C	C	C	A	D	A
Approach Delay (s)	33.4		28.2			14.6
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	37	16	224	159	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	26	44	19	264	187	55
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	484	221	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	221	292			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	94	98			
cM capacity (veh/h)	466	724	1218			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	26	44	107	176	125	118
Volume Left	26	0	19	0	0	0
Volume Right	0	44	0	0	0	55
cSH	466	724	1218	1700	1700	1700
Volume to Capacity	0.06	0.06	0.02	0.10	0.07	0.07
Queue Length 95th (ft)	4	5	1	0	0	0
Control Delay (s)	13.2	10.3	1.5	0.0	0.0	0.0
Lane LOS	B	B	A			
Approach Delay (s)	11.4		0.6		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			36.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	223	54	874	44	14	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3389		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3389		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	248	60	971	49	16	553
RTOR Reduction (vph)	0	43	3	0	0	0
Lane Group Flow (vph)	248	17	1017	0	16	553
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	52.0		4.0	61.1
Effective Green, g (s)	28.7	28.7	52.0		4.0	61.1
Actuated g/C Ratio	0.29	0.29	0.52		0.04	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1762		68	2090
v/s Ratio Prot			c0.30		0.01	c0.16
v/s Ratio Perm	c0.16	0.01				
v/c Ratio	0.55	0.04	0.58		0.24	0.26
Uniform Delay, d1	30.1	25.7	16.5		46.5	9.0
Progression Factor	1.00	1.00	1.90		1.06	0.90
Incremental Delay, d2	1.3	0.0	1.0		1.8	0.1
Delay (s)	31.5	25.8	32.3		51.0	8.1
Level of Service	C	C	C		D	A
Approach Delay (s)	30.4		32.3			9.4
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	240	196	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	282	231	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	398	141	256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	141	256			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	568	863	1281			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	94	188	154	77
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1281	1700	1700	1700
Volume to Capacity	0.00	0.00	0.11	0.09	0.05
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			20.5%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	10	90	50	29	169	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	12	107	60	35	201	4
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			169		319	165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			169		319	165
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		66	100
cM capacity (veh/h)			1355		596	813

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	119	94	205
Volume Left	0	60	201
Volume Right	107	0	4
cSH	1700	1355	599
Volume to Capacity	0.07	0.04	0.34
Queue Length 95th (ft)	0	3	38
Control Delay (s)	0.0	5.1	14.1
Lane LOS		A	B
Approach Delay (s)	0.0	5.1	14.1
Approach LOS			B

Intersection Summary			
Average Delay			8.0
Intersection Capacity Utilization		31.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	176	64	271	6	121	71	316	671	17	19	428	274
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.94	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1258	1365	1126	1282	1365	1099	2515	2580		1296	2415	
Fit Permitted	0.67	1.00	1.00	0.71	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	890	1365	1126	960	1365	1099	2515	2580		1296	2415	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	193	70	298	7	133	78	347	737	19	21	470	301
RTOR Reduction (vph)	0	0	195	0	0	51	0	2	0	0	103	0
Lane Group Flow (vph)	193	70	103	7	133	27	347	754	0	21	668	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	307	470	388	331	470	379	352	975		155	864	
v/s Ratio Prot		0.05			0.10		c0.14	0.29		0.02	c0.28	
v/s Ratio Perm	c0.22		0.09	0.01		0.02						
v/c Ratio	0.63	0.15	0.26	0.02	0.28	0.07	0.99	0.77		0.14	0.77	
Uniform Delay, d1	27.4	22.6	23.6	21.6	23.8	22.0	42.9	27.3		39.4	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.74		1.11	1.17	
Incremental Delay, d2	9.4	0.7	1.7	0.1	1.5	0.4	27.8	2.6		1.7	6.4	
Delay (s)	36.8	23.3	25.3	21.7	25.3	22.4	62.5	22.9		45.5	39.6	
Level of Service	D	C	C	C	C	C	E	C		D	D	
Approach Delay (s)		29.0			24.1			35.3			39.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	102	439	7	6	658	47	26	24	24	48	4	132
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1243	1621	1578		1493	1358	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1243	1101	1578		1136	1358	
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)	110	472	8	6	708	51	28	26	26	52	4	142
RTOR Reduction (vph)	0	0	4	0	0	28	0	19	0	0	106	0
Lane Group Flow (vph)	110	472	4	6	708	23	28	33	0	52	40	0
Confl. Peds. (#/hr)	50				50				39			8
Confl. Bikes (#/hr)					10				4			14
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.6	45.8	45.8	2.7	37.9	37.9	21.3	21.3		21.3	21.3	
Effective Green, g (s)	10.6	45.8	45.8	2.7	37.9	37.9	21.3	21.3		21.3	21.3	
Actuated g/C Ratio	0.12	0.54	0.54	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	921	783	51	762	555	276	396		285	341	
v/s Ratio Prot	c0.07	0.28		0.00	c0.42			0.02			0.03	
v/s Ratio Perm			0.00			0.02	0.03					
v/c Ratio	0.54	0.51	0.01	0.12	0.93	0.04	0.10	0.08		0.18	0.12	
Uniform Delay, d1	34.8	12.4	9.0	39.9	22.2	13.2	24.4	24.3		24.9	24.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	2.0	0.0	1.0	17.5	0.0	0.2	0.1		0.3	0.2	
Delay (s)	37.8	14.4	9.0	40.9	39.6	13.2	24.6	24.4		25.2	24.6	
Level of Service	D	B	A	D	D	B	C	C		C	C	
Approach Delay (s)		18.7			37.9			24.4			24.8	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	126	358	14	21	696	99	49	134	60	130	54	165
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1050	1540	2937			2974	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00			0.68	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1050	1024	2937			2107	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	131	373	15	22	725	103	51	140	62	135	56	172
RTOR Reduction (vph)	0	0	5	0	0	22	0	52	0	0	0	146
Lane Group Flow (vph)	131	373	10	22	725	81	51	150	0	0	191	26
Confl. Peds. (#/hr)						17						3
Confl. Bikes (#/hr)						36						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	7.0	57.6	57.6	1.9	51.5	51.5	14.3	14.3			13.3	13.3
Effective Green, g (s)	7.0	57.6	57.6	1.9	51.5	51.5	14.3	14.3			13.3	13.3
Actuated g/C Ratio	0.08	0.66	0.66	0.02	0.59	0.59	0.16	0.16			0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	97	806	914	33	720	622	168	483			322	164
v/s Ratio Prot	c0.11	0.31		0.01	c0.60			0.05				
v/s Ratio Perm			0.01			0.08	0.05				c0.09	0.02
v/c Ratio	1.35	0.46	0.01	0.67	1.01	0.13	0.30	0.31			0.89dl	0.16
Uniform Delay, d1	39.9	7.1	4.9	42.1	17.6	7.8	31.9	31.9			34.2	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	211.1	0.4	0.0	40.8	35.3	0.1	1.0	0.4			2.9	0.5
Delay (s)	251.0	7.5	5.0	83.0	52.9	7.9	32.9	32.3			37.2	32.4
Level of Service	F	A	A	F	D	A	C	C			D	C
Approach Delay (s)		68.9			48.2			32.4				34.9
Approach LOS		E			D			C				C

Intersection Summary			
HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	86.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	40	377	84	36	470	404	43	357	34	87	130	38
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.90		1.00	*0.90	*0.80	*0.80	*0.80	*0.80	*1.00	*0.80	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.89	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	1039		1335	1267	853	1070	957	924	1337	1073	
Fit Permitted	0.16	1.00		0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	220	1039		416	1267	853	1070	957	924	1337	1073	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	401	89	38	500	430	46	380	36	93	138	40
RTOR Reduction (vph)	0	7	0	0	0	132	0	0	25	0	9	0
Lane Group Flow (vph)	43	483	0	38	500	298	46	380	11	93	169	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	46.1	46.1		46.1	46.1	53.1	7.8	35.2	35.2	7.0	34.4	
Effective Green, g (s)	46.1	46.1		46.1	46.1	53.1	7.8	35.2	35.2	7.0	34.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42	0.48	0.07	0.32	0.32	0.06	0.31	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	114	433		192	528	448	75	304	294	84	333	
v/s Ratio Prot	0.01	c0.46		0.00	0.39	c0.04	0.04	c0.40		c0.07	0.16	
v/s Ratio Perm	0.15			0.08		0.31			0.01			
v/c Ratio	0.38	1.12		0.20	0.95	0.67	0.61	1.25	0.04	1.11	0.51	
Uniform Delay, d1	23.5	32.2		30.9	31.1	22.0	49.9	37.7	26.0	51.8	31.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	78.5		0.5	26.2	3.7	14.0	136.8	0.1	130.2	1.2	
Delay (s)	25.5	110.8		31.4	57.3	25.7	63.9	174.5	26.1	182.0	32.4	
Level of Service	C	F		C	E	C	E	F	C	F	C	
Approach Delay (s)		103.9			42.2			152.0			83.7	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	84.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



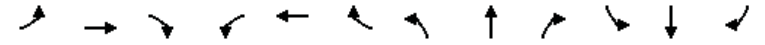
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop	Stop		Stop	
Volume (vph)	35	241	86	75	181	18	55	132	70	19	118	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	39	268	96	83	201	20	61	147	78	21	131	42

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	402	83	221	208	78	194
Volume Left (vph)	39	83	0	61	0	21
Volume Right (vph)	96	0	20	0	78	42
Hadj (s)	-0.09	0.53	-0.03	0.18	-0.67	-0.07
Departure Headway (s)	6.8	7.6	7.0	7.5	6.6	7.5
Degree Utilization, x	0.75	0.18	0.43	0.43	0.14	0.40
Capacity (veh/h)	518	440	469	440	494	426
Control Delay (s)	27.6	11.0	14.1	14.9	9.6	15.5
Approach Delay (s)	27.6	13.2		13.5		15.5
Approach LOS	D	B		B		C

Intersection Summary						
Delay			18.5			
Level of Service			C			
Intersection Capacity Utilization		67.2%		ICU Level of Service		C
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	256	306	42	10	229	35	39	713	34	22	396	287
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1300	1300	1300	1300	1300	1300
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1495	2992		1509	2981		1170	2320		1170	2161	
Flt Permitted	0.57	1.00		0.49	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	897	2992		779	2981		1170	2320		1170	2161	

Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	272	326	45	11	244	37	41	759	36	23	421	305
RTOR Reduction (vph)	0	11	0	0	12	0	0	3	0	0	130	0
Lane Group Flow (vph)	272	360	0	11	269	0	41	792	0	23	596	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	311	1038		270	1034		139	809		174	819	
v/s Ratio Prot		0.12			0.09		0.04	c0.34		0.02	c0.28	
v/s Ratio Perm	c0.30			0.01								
v/c Ratio	0.87	0.35		0.04	0.26		0.29	0.98		0.13	0.73	
Uniform Delay, d1	30.6	24.2		21.6	23.4		40.2	32.2		36.9	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.80		1.45	0.72	
Incremental Delay, d2	27.2	0.9		0.3	0.6		3.5	21.1		1.1	4.1	
Delay (s)	57.8	25.2		21.9	24.1		40.1	46.8		54.9	23.3	
Level of Service	E	C		C	C		D	D		D	C	
Approach Delay (s)		39.0			24.0			46.5			24.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↔
Volume (vph)	0	963	28	2	588	2	38	0	8	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		0.99	1.00			0.99		0.98	1.00	
Frt		1.00		1.00	1.00			0.98		1.00	0.85	
Fit Protected		1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)		3402		1702	3419			1653		1682	1477	
Fit Permitted		1.00		0.17	1.00			0.83		0.72	1.00	
Satd. Flow (perm)		3402		296	3419			1421		1283	1477	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1047	30	2	639	2	41	0	9	14	0	14
RTOR Reduction (vph)	0	3	0	0	1	0	0	22	0	0	9	0
Lane Group Flow (vph)	0	1074	0	2	640	0	0	28	0	14	5	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)		27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)		1530		133	1538			544		491	566	
v/s Ratio Prot		c0.32			0.19						0.00	
v/s Ratio Perm				0.01				c0.02		0.01		
v/c Ratio		0.70		0.02	0.42			0.05		0.03	0.01	
Uniform Delay, d1		13.3		9.1	11.2			11.6		11.5	11.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.7		0.2	0.8			0.2		0.1	0.0	
Delay (s)		16.0		9.3	12.0			11.8		11.6	11.5	
Level of Service		B		A	B			B		B	B	
Approach Delay (s)		16.0			12.0			11.8			11.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015

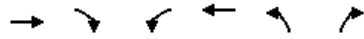


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	3	93	0	0	760	6	467	112	662	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frpb, ped/bikes		1.00			1.00		1.00	0.98				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			1.00		1.00	0.87				0.85
Fit Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3416			5125		1711	2925				2694
Fit Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3235			5125		1711	2925				2694
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	3	97	0	0	792	6	486	117	690	0	0	132
RTOR Reduction (vph)	0	0	0	0	1	0	0	368	0	0	0	126
Lane Group Flow (vph)	0	100	0	0	797	0	486	439	0	0	0	6
Confl. Peds. (#/hr)	20					20	1		10			
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		38.5			29.5		42.0	42.0				4.0
Effective Green, g (s)		38.5			29.5		42.0	42.0				4.0
Actuated g/C Ratio		0.43			0.33		0.47	0.47				0.04
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1391			1679		798	1365				119
v/s Ratio Prot		c0.00			c0.16		c0.28	0.15				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.47		0.61	0.32				0.05
Uniform Delay, d1		15.2			24.1		17.9	15.1				41.2
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.0		3.4	0.6				0.8
Delay (s)		15.3			25.0		21.3	15.7				42.0
Level of Service		B			C		C	B				D
Approach Delay (s)		15.3			25.0			17.8				42.0
Approach LOS		B			C			B				D

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	96	616	656	698	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.98	0.97	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1494	1417	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1494	1417	3319	1801		
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	98	629	669	712	0	0
RTOR Reduction (vph)	39	39	0	0	0	0
Lane Group Flow (vph)	329	320	669	712	0	0
Confl. Peds. (#/hr)		4	5			
Confl. Bikes (#/hr)		24				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	32.8	32.8	17.2	60.0		
Effective Green, g (s)	32.8	32.8	17.2	60.0		
Actuated g/C Ratio	0.55	0.55	0.29	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	816	774	951	1801		
v/s Ratio Prot	0.22		c0.20	c0.40		
v/s Ratio Perm		0.23				
v/c Ratio	0.40	0.41	0.70	0.40		
Uniform Delay, d1	7.9	8.0	19.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.4	2.4	0.1		
Delay (s)	8.2	8.3	21.5	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	8.3			10.5	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			9.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	208	159	178	8	222	16	199	623	5	25	420	151
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1191	1972		1141	1254		1215	2426		1215	2267	
Fit Permitted	0.34	1.00		0.54	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	431	1972		650	1254		1215	2426		1215	2267	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	217	166	185	8	231	17	207	649	5	26	438	157
RTOR Reduction (vph)	0	114	0	0	3	0	0	1	0	0	38	0
Lane Group Flow (vph)	217	237	0	8	245	0	207	653	0	26	557	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	38.3	38.3		23.1	23.1		16.1	41.6		3.8	29.3	
Effective Green, g (s)	38.3	38.3		23.1	23.1		16.1	41.6		3.8	29.3	
Actuated g/C Ratio	0.38	0.38		0.23	0.23		0.16	0.42		0.04	0.29	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	755		150	289		195	1009		46	664	
v/s Ratio Prot	c0.09	0.12			0.20		c0.17	0.27		0.02	c0.25	
v/s Ratio Perm	c0.26			0.01								
v/c Ratio	0.90	0.31		0.05	0.85		1.06	0.65		0.57	0.84	
Uniform Delay, d1	27.6	21.6		29.9	36.8		42.0	23.3		47.3	33.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.91	
Incremental Delay, d2	33.5	0.2		0.1	20.0		81.7	3.2		10.9	9.0	
Delay (s)	61.0	21.9		30.1	56.7		123.6	26.6		58.3	39.0	
Level of Service	E	C		C	E		F	C		E	D	
Approach Delay (s)		36.8			55.9			49.9			39.8	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			44.6									D
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			97.1%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←↑	←	←←←	←↑	←		←←←	←			
Volume (vph)	808	695	17	159	920	53	44	831	236	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3046		2987	2999			5475	941			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3046		2987	2999			5475	941			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	878	755	18	173	1000	58	48	903	257	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	184	0	0	0
Lane Group Flow (vph)	878	772	0	173	1057	0	0	951	73	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	48.5		11.3	41.6			31.3	31.3			
Effective Green, g (s)	18.2	48.5		11.3	41.6			31.3	31.3			
Actuated g/C Ratio	0.17	0.44		0.10	0.38			0.28	0.28			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1343		306	1134			1557	267			
v/s Ratio Prot	c0.20	0.25		0.06	c0.35							
v/s Ratio Perm								0.17	0.08			
v/c Ratio	1.18	0.57		0.57	0.93			0.61	0.27			
Uniform Delay, d1	45.9	23.0		47.0	32.9			34.1	30.5			
Progression Factor	0.63	0.55		0.98	0.46			1.43	5.39			
Incremental Delay, d2	92.7	1.2		1.1	7.0			0.6	0.5			
Delay (s)	121.4	13.9		47.3	22.2			49.5	165.1			
Level of Service	F	B		D	C			D	F			
Approach Delay (s)		71.1			25.7			74.1			0.0	
Approach LOS		E			C			E			A	

Intersection Summary

HCM 2000 Control Delay	58.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



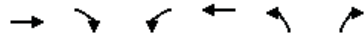
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←↑	←	←	←↑	←		←	←	←	←	←
Volume (vph)	187	1389	24	31	902	31	26	87	80	51	279	458
Ideal Flow (vphpl)	1700	1700	1700	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.63	1.00	0.77	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.95	1.00	0.70	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.93	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1377	3923		1296	2527			1524	856	1077	2107	581
Fit Permitted	0.95	1.00		0.95	1.00			0.65	1.00	0.68	1.00	1.00
Satd. Flow (perm)	1377	3923		1296	2527			1000	856	768	2107	581
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	1526	26	34	991	34	29	96	88	56	307	503
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	66	0	152	191
Lane Group Flow (vph)	205	1551	0	34	1023	0	0	125	22	56	401	66
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	23.1	53.8		8.9	38.0			27.4	27.4	28.4	28.4	28.4
Effective Green, g (s)	23.1	53.8		8.9	38.0			27.4	27.4	28.4	28.4	28.4
Actuated g/C Ratio	0.21	0.49		0.08	0.35			0.25	0.25	0.26	0.26	0.26
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	289	1918		104	872			249	213	198	543	150
v/s Ratio Prot	0.15	c0.40		0.03	c0.40						c0.19	
v/s Ratio Perm								0.13	0.03	0.07		0.11
v/c Ratio	0.71	0.81		0.33	1.17			0.50	0.10	0.28	0.74	0.44
Uniform Delay, d1	40.3	23.7		47.7	36.0			35.4	31.8	32.7	37.4	34.2
Progression Factor	0.63	0.79		0.59	0.63			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4		0.8	83.3			1.6	0.2	0.8	5.2	2.1
Delay (s)	26.2	19.0		28.7	105.9			37.0	32.0	33.4	42.6	36.2
Level of Service	C	B		C	F			D	C	C	D	D
Approach Delay (s)		19.9			103.4			35.0			40.1	
Approach LOS		B			F			C			D	

Intersection Summary

HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	118.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1581	199	2	1384	74	19
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2937			2998	1540	1357
Fit Permitted	1.00			0.93	0.95	1.00
Satd. Flow (perm)	2937			2789	1540	1357
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1664	209	2	1457	78	20
RTOR Reduction (vph)	9	0	0	0	0	11
Lane Group Flow (vph)	1864	0	0	1459	78	9
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA	Perm	NA	Prot	Perm	
Protected Phases	2		6	8		
Permitted Phases		6			8	
Actuated Green, G (s)	62.1		62.1	36.6	36.6	
Effective Green, g (s)	62.1		62.1	36.6	36.6	
Actuated g/C Ratio	0.56		0.56	0.33	0.33	
Clearance Time (s)	4.9		4.9	6.4	6.4	
Lane Grp Cap (vph)	1658		1574	512	451	
v/s Ratio Prot	c0.63			c0.05		
v/s Ratio Perm			0.52	0.01		
v/c Ratio	1.12		0.93	0.15	0.02	
Uniform Delay, d1	23.9		21.9	25.8	24.7	
Progression Factor	1.00		0.72	1.00	1.00	
Incremental Delay, d2	64.5		3.3	0.6	0.1	
Delay (s)	88.5		19.1	26.4	24.7	
Level of Service	F		B	C	C	
Approach Delay (s)	88.5		19.1	26.1		
Approach LOS	F		B	C		

Intersection Summary

HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Volume (vph)	122	1129	155	29	278	527	260	144	654	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.95			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5773			2869	2440			4080	1122
Fit Permitted		1.00			0.75	1.00			0.95	1.00
Satd. Flow (perm)		5773			2150	2440			4080	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	139	1283	176	33	316	599	295	164	743	293
RTOR Reduction (vph)	0	29	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1569	0	0	349	893	0	0	936	264
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA	Perm	NA	NA	NA	Prot	Prot	Prot	
Protected Phases	6		4	4			7	7	7	
Permitted Phases	6		4							
Actuated Green, G (s)		20.5			22.0	22.0			15.0	15.0
Effective Green, g (s)		22.5			25.0	25.0			18.0	18.0
Actuated g/C Ratio		0.30			0.33	0.33			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1731			716	813			979	269
v/s Ratio Prot						c0.37			0.23	c0.24
v/s Ratio Perm		0.27			0.16					
v/c Ratio		0.91			0.49	1.10			0.96	0.98
Uniform Delay, d1		25.2			19.9	25.0			28.1	28.3
Progression Factor		1.00			1.00	1.00			1.00	1.00
Incremental Delay, d2		7.2			0.5	61.8			18.8	49.5
Delay (s)		32.4			20.4	86.8			47.0	77.8
Level of Service		C			C	F			D	E
Approach Delay (s)		32.4			20.4	86.8			53.7	
Approach LOS		C			C	F			D	

Intersection Summary

HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



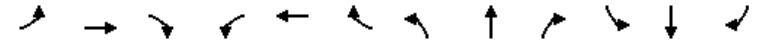
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	29	453	654	48	278	283	30	212	105	476
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0	4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor	1.00	0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes	1.00	1.00	0.99		0.85		0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00
Frt	1.00	1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected	0.95	0.95	1.00		1.00		1.00		0.95	0.99
Satd. Flow (prot)	810	1313	1911		2182		1161		1327	2539
Fit Permitted	0.95	0.95	1.00		1.00		1.00		0.20	0.72
Satd. Flow (perm)	810	1313	1911		2182		1161		279	1849
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	477	688	51	293	298	32	223	111	501
RTOR Reduction (vph)	0	0	9	0	1	0	23	0	0	0
Lane Group Flow (vph)	31	429	778	0	593	0	6	0	244	591
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)	18.5	18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)	21.0	18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio	0.27	0.24	0.27		0.23		0.21	0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	220	315	521		495		241	287	892	
v/s Ratio Prot	0.04	0.33	c0.41		c0.27			c0.14	0.11	
v/s Ratio Perm						0.01		0.22	0.17	
v/c Ratio	0.14	1.36	1.49		1.28dr		0.03	0.85	0.66	
Uniform Delay, d1	21.2	29.2	28.0		29.8		24.3	25.7	17.9	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3	182.1	232.2		107.5		0.2	25.8	3.9	
Delay (s)	22.5	211.3	260.2		137.3		24.5	51.5	21.7	
Level of Service	C	F	F		F		C	D	C	
Approach Delay (s)			237.5		132.0				30.4	
Approach LOS			F		F				C	

Intersection Summary			
HCM 2000 Control Delay	149.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↕	↕	↔	↕	↕
Volume (vph)	31	17	99	12	2	26	20	765	1	4	156	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.98	
Fit Protected		0.97	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1557	1353		1428		1272	2544		1540	3004	
Fit Permitted		0.83	1.00		0.93		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1339	1353		1352		1272	2544		1540	3004	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	38	21	122	15	2	32	25	944	1	5	193	30
RTOR Reduction (vph)	0	0	83	0	22	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	59	39	0	27	0	25	945	0	5	211	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		14.8	37.5		14.5	37.5	
Effective Green, g (s)		32.1	32.1		32.1		14.8	37.5		14.5	37.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.15	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		429	434		433		188	954		223	1126	
v/s Ratio Prot							0.02	c0.37		0.00	c0.07	
v/s Ratio Perm		c0.04	0.03		0.02							
v/c Ratio		0.14	0.09		0.06		0.13	0.99		0.02	0.19	
Uniform Delay, d1		24.1	23.7		23.5		37.0	31.1		36.7	21.0	
Progression Factor		1.00	1.00		1.00		1.65	0.50		1.00	1.00	
Incremental Delay, d2		0.7	0.4		0.3		1.0	21.8		0.2	0.4	
Delay (s)		24.8	24.2		23.8		62.0	37.3		36.9	21.4	
Level of Service		C	C		C		E	D		D	C	
Approach Delay (s)		24.4			23.8			37.9			21.7	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	9	5	8	4	9	33	13	54	4	138	119	23
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2362			1427	1230	1160	1430		1377	1366	
Fit Permitted		0.95			1.00	1.00	0.93	1.00		0.95	1.00	
Satd. Flow (perm)		2302			1449	1230	1136	1430		1377	1366	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	9	5	8	4	9	34	14	56	4	144	124	24
RTOR Reduction (vph)	0	8	0	0	0	17	0	4	0	0	7	0
Lane Group Flow (vph)	0	14	0	0	13	17	14	56	0	144	141	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		1.0			1.0	19.0	4.3	4.3		18.0	27.3	
Effective Green, g (s)		1.0			1.0	19.0	4.3	4.3		18.0	27.3	
Actuated g/C Ratio		0.03			0.03	0.50	0.11	0.11		0.47	0.71	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		60			37	770	127	160		647	973	
v/s Ratio Prot						0.01		c0.04		c0.10	0.10	
v/s Ratio Perm		0.01			c0.01	0.00	0.01					
v/c Ratio		0.24			0.35	0.02	0.11	0.35		0.22	0.15	
Uniform Delay, d1		18.3			18.3	4.9	15.3	15.7		6.0	1.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.0			5.7	0.0	0.4	1.3		0.2	0.1	
Delay (s)		20.3			24.0	4.9	15.7	17.1		6.2	1.8	
Level of Service		C			C	A	B	B		A	A	
Approach Delay (s)		20.3			10.2			16.8			4.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	38.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	53	208	479	19	115	242
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	849	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	849	1134	1194
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	57	224	515	20	124	260
RTOR Reduction (vph)	0	197	0	6	0	0
Lane Group Flow (vph)	57	27	515	14	124	260
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.0	10.0	42.4	37.4	14.9	62.3
Effective Green, g (s)	10.0	10.0	42.4	37.4	14.9	62.3
Actuated g/C Ratio	0.12	0.12	0.52	0.45	0.18	0.76
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	137	211	790	437	205	903
v/s Ratio Prot	c0.05		c0.34	0.01	c0.11	0.22
v/s Ratio Perm		0.02		0.01		
v/c Ratio	0.42	0.13	0.65	0.03	0.60	0.29
Uniform Delay, d1	33.4	32.3	14.6	12.4	31.0	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.3	1.9	0.0	5.0	0.2
Delay (s)	35.5	32.5	16.5	12.5	36.0	3.3
Level of Service	D	C	B	B	D	A
Approach Delay (s)	33.1		16.4			13.8
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	82.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	24	2	85	96	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	24	28	2	100	113	24
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279	168	186			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279	168	186			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	100			
cM capacity (veh/h)	635	783	1332			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	24	28	36	67	75	61
Volume Left	24	0	2	0	0	0
Volume Right	0	28	0	0	0	24
cSH	635	783	1332	1700	1700	1700
Volume to Capacity	0.04	0.04	0.00	0.04	0.04	0.04
Queue Length 95th (ft)	3	3	0	0	0	0
Control Delay (s)	10.9	9.8	0.5	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.3		0.2		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay	1.9					
Intersection Capacity Utilization	30.1%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	132	39	792	34	6	394
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3394		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3394		1711	3421
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	148	44	890	38	7	443
RTOR Reduction (vph)	0	31	3	0	0	0
Lane Group Flow (vph)	148	13	925	0	7	443
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	54.0		2.0	61.1
Effective Green, g (s)	28.7	28.7	54.0		2.0	61.1
Actuated g/C Ratio	0.29	0.29	0.54		0.02	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1832		34	2090
v/s Ratio Prot			c0.27		0.00	c0.13
v/s Ratio Perm	c0.09	0.01				
v/c Ratio	0.33	0.03	0.51		0.21	0.21
Uniform Delay, d1	28.0	25.6	14.5		48.2	8.7
Progression Factor	1.00	1.00	2.17		1.13	0.79
Incremental Delay, d2	0.4	0.0	0.7		3.0	0.1
Delay (s)	28.5	25.7	32.3		57.6	6.9
Level of Service	C	C	C		E	A
Approach Delay (s)	27.8		32.3			7.7
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↑	
Volume (veh/h)	0	0	0	87	120	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	102	141	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	218	97	166			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	97	166			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	735	922	1382			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	34	68	94	47	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1382	1700	1700	1700	
Volume to Capacity	0.00	0.00	0.04	0.06	0.03	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	19.5%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	P			↑	Y	
Volume (veh/h)	3	61	23	16	86	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	75	28	20	106	2
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			129		218	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		218	141
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		85	100
cM capacity (veh/h)			1401		698	839
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	79	48	109			
Volume Left	0	28	106			
Volume Right	75	0	2			
cSH	1700	1401	701			
Volume to Capacity	0.05	0.02	0.16			
Queue Length 95th (ft)	0	2	14			
Control Delay (s)	0.0	4.6	11.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.6	11.1			
Approach LOS		B				
Intersection Summary						
Average Delay	6.0					
Intersection Capacity Utilization	30.7%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	136	49	219	2	67	33	202	657	5	10	337	178
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1255	1365	1126	1282	1365	1099	2515	2589		1296	2435	
Fit Permitted	0.71	1.00	1.00	0.72	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	934	1365	1126	972	1365	1099	2515	2589		1296	2435	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	156	56	252	2	77	38	232	755	6	11	387	205
RTOR Reduction (vph)	0	0	165	0	0	25	0	1	0	0	69	0
Lane Group Flow (vph)	156	56	87	2	77	13	232	760	0	11	523	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	322	470	388	335	470	379	352	978		155	871	
v/s Ratio Prot		0.04			0.06		0.09	c0.29		0.01	c0.21	
v/s Ratio Perm	c0.17		0.08	0.00		0.01						
v/c Ratio	0.48	0.12	0.22	0.01	0.16	0.03	0.66	0.78		0.07	0.60	
Uniform Delay, d1	25.8	22.4	23.2	21.5	22.7	21.7	40.7	27.4		39.1	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.80		1.00	0.88	
Incremental Delay, d2	5.1	0.5	1.3	0.0	0.7	0.2	6.2	4.0		0.9	3.0	
Delay (s)	30.9	22.9	24.6	21.5	23.5	21.9	43.0	26.0		39.9	26.0	
Level of Service	C	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		26.5			22.9			30.0			26.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	95	344	9	19	389	39	23	14	13	46	10	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1245	1621	1582		1491	1378	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00		0.74	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1245	1109	1582		1157	1378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	110	400	10	22	452	45	27	16	15	53	12	133
RTOR Reduction (vph)	0	0	5	0	0	25	0	11	0	0	99	0
Lane Group Flow (vph)	110	400	5	22	452	20	27	20	0	53	46	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.7	42.0	42.0	5.3	36.6	36.6	21.3	21.3		21.3	21.3	
Effective Green, g (s)	10.7	42.0	42.0	5.3	36.6	36.6	21.3	21.3		21.3	21.3	
Actuated g/C Ratio	0.13	0.50	0.50	0.06	0.44	0.44	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	857	728	102	746	545	282	403		294	351	
v/s Ratio Prot	c0.07	0.23		0.01	c0.26			0.01			0.03	
v/s Ratio Perm			0.00			0.02	0.02					
v/c Ratio	0.53	0.47	0.01	0.22	0.61	0.04	0.10	0.05		0.18	0.13	
Uniform Delay, d1	34.1	13.5	10.4	37.2	18.0	13.4	23.8	23.5		24.3	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	1.8	0.0	1.1	1.4	0.0	0.1	0.1		0.3	0.2	
Delay (s)	36.7	15.3	10.4	38.2	19.4	13.5	23.9	23.6		24.6	24.2	
Level of Service	D	B	B	D	B	B	C	C		C	C	
Approach Delay (s)		19.8			19.7			23.7			24.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	69	317	32	55	425	47	31	102	37	94	124	106
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1049	1540	2957			3014	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00			0.78	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1049	979	2957			2386	1072
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	345	35	60	462	51	34	111	40	102	135	115
RTOR Reduction (vph)	0	0	16	0	0	25	0	32	0	0	0	94
Lane Group Flow (vph)	75	345	19	60	462	26	34	119	0	0	237	21
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	7.2	40.4	40.4	5.4	37.6	37.6	14.7	14.7			13.7	13.7
Effective Green, g (s)	7.2	40.4	40.4	5.4	37.6	37.6	14.7	14.7			13.7	13.7
Actuated g/C Ratio	0.10	0.55	0.55	0.07	0.51	0.51	0.20	0.20			0.19	0.19
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	119	667	757	113	621	536	195	591			444	199
v/s Ratio Prot	c0.06	c0.28		0.04	c0.38			0.04				
v/s Ratio Perm			0.01			0.02	0.03				c0.10	0.02
v/c Ratio	0.63	0.52	0.03	0.53	0.74	0.05	0.17	0.20			0.53	0.11
Uniform Delay, d1	31.9	10.4	7.6	32.8	14.2	9.0	24.4	24.5			27.0	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.4	0.7	0.0	4.7	4.8	0.0	0.4	0.2			1.2	0.2
Delay (s)	42.3	11.1	7.6	37.6	19.0	9.0	24.8	24.7			28.3	25.1
Level of Service	D	B	A	D	B	A	C	C			C	C
Approach Delay (s)		16.0			20.0			24.7				27.2
Approach LOS		B			C			C				C

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	23	319	77	38	321	203	69	230	17	83	109	36
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1328	921		1335	1126	860	1070	957	921	1070	1064	
Fit Permitted	0.30	1.00		0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	423	921		470	1126	860	1070	957	921	1070	1064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	347	84	41	349	221	75	250	18	90	118	39
RTOR Reduction (vph)	0	8	0	0	0	103	0	0	13	0	12	0
Lane Group Flow (vph)	25	423	0	41	349	118	75	250	5	90	145	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	49.1	49.1		49.1	49.1	58.1	17.9	28.0	28.0	9.0	19.1	
Effective Green, g (s)	49.1	49.1		49.1	49.1	58.1	17.9	28.0	28.0	9.0	19.1	
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.54	0.17	0.26	0.26	0.08	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	210	417		231	510	500	176	247	237	88	187	
v/s Ratio Prot	0.00	c0.46		0.00	c0.31	0.02	0.07	c0.26		c0.08	0.14	
v/s Ratio Perm	0.05			0.08		0.12			0.01			
v/c Ratio	0.12	1.02		0.18	0.68	0.24	0.43	1.01	0.02	1.02	0.78	
Uniform Delay, d1	18.3	29.7		25.8	23.5	13.4	40.6	40.2	30.0	49.7	42.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	48.0		0.4	3.8	0.2	1.7	60.4	0.0	102.3	18.2	
Delay (s)	18.5	77.6		26.1	27.3	13.6	42.3	100.6	30.0	152.0	60.8	
Level of Service	B	E		C	C	B	D	F	C	F	E	
Approach Delay (s)		74.4			22.3			84.2			94.0	
Approach LOS		E			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop	Stop		Stop	
Volume (vph)	12	62	59	47	105	6	39	74	53	8	29	26
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	68	65	52	115	7	43	81	58	9	32	29
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	146	52	122	124	58	69						
Volume Left (vph)	13	52	0	43	0	9						
Volume Right (vph)	65	0	7	0	58	29						
Hadj (s)	-0.21	0.53	0.00	0.21	-0.67	-0.19						
Departure Headway (s)	5.2	5.9	5.3	5.6	4.8	5.4						
Degree Utilization, x	0.21	0.08	0.18	0.19	0.08	0.10						
Capacity (veh/h)	653	581	642	606	709	618						
Control Delay (s)	9.6	8.2	8.3	8.8	7.0	9.0						
Approach Delay (s)	9.6	8.3		8.2		9.0						
Approach LOS	A	A		A		A						

Intersection Summary						
Delay				8.7		
Level of Service				A		
Intersection Capacity Utilization		37.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Volume (vph)	308	90	48	7	152	11	32	546	19	25	362	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	3202		1677	3376		1260	2504		1260	2373	
Flt Permitted	0.64	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1118	3202		1156	3376		1260	2504		1260	2373	
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)	342	100	53	8	169	12	36	607	21	28	402	190
RTOR Reduction (vph)	0	37	0	0	5	0	0	2	0	0	56	0
Lane Group Flow (vph)	342	116	0	8	176	0	36	626	0	28	536	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	332	950		343	1002		212	999		187	899	
v/s Ratio Prot		0.04			0.05		0.03	c0.25		0.02	c0.23	
v/s Ratio Perm	c0.31			0.01								
v/c Ratio	1.03	0.12		0.02	0.18		0.17	0.63		0.15	0.60	
Uniform Delay, d1	35.1	25.6		24.9	26.1		35.5	24.1		37.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00		0.85	0.74		1.51	0.77	
Incremental Delay, d2	57.4	0.3		0.1	0.4		1.1	1.9		1.4	2.4	
Delay (s)	92.5	25.9		25.0	26.5		31.2	19.7		57.4	21.6	
Level of Service	F	C		C	C		C	B		E	C	
Approach Delay (s)		71.9			26.4			20.3			23.2	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	20	336	55	6	379	9	36	0	5	17	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3349		1711	3409			1698		1711	1541	
Flt Permitted	0.51	1.00		0.50	1.00			0.81		0.73	1.00	
Satd. Flow (perm)	910	3349		908	3409			1441		1312	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	365	60	7	412	10	39	0	5	18	1	24
RTOR Reduction (vph)	0	22	0	0	3	0	0	22	0	0	15	0
Lane Group Flow (vph)	22	403	0	7	419	0	0	22	0	18	10	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	409	1507		408	1534			552		502	590	
v/s Ratio Prot		0.12			c0.12						0.01	
v/s Ratio Perm	0.02			0.01			c0.02			0.01		
v/c Ratio	0.05	0.27		0.02	0.27			0.04		0.04	0.02	
Uniform Delay, d1	9.3	10.3		9.1	10.3			11.6		11.6	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.1	0.4			0.1		0.1	0.1	
Delay (s)	9.6	10.8		9.2	10.8			11.7		11.7	11.5	
Level of Service	A	B		A	B			B		B	B	
Approach Delay (s)		10.7			10.8			11.7			11.6	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



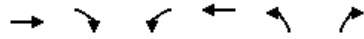
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	10	92	0	0	469	19	308	129	221	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.91				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3404			5102		1711	3097				2694
Flt Permitted		0.92			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3139			5102		1711	3097				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	12	107	0	0	545	22	358	150	257	0	0	86
RTOR Reduction (vph)	0	0	0	0	5	0	0	151	0	0	0	80
Lane Group Flow (vph)	0	119	0	0	562	0	358	256	0	0	0	6
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		40.5			29.5		35.0	35.0				6.0
Effective Green, g (s)		40.5			29.5		35.0	35.0				6.0
Actuated g/C Ratio		0.48			0.35		0.41	0.41				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1514			1770		704	1275				190
v/s Ratio Prot		c0.01			c0.11		c0.21	0.08				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.32		0.51	0.20				0.03
Uniform Delay, d1		12.1			20.4		18.6	16.0				36.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.5		2.6	0.4				0.3
Delay (s)		12.2			20.8		21.2	16.4				37.1
Level of Service		B			C		C	B				D
Approach Delay (s)		12.2			20.8			18.6				37.1
Approach LOS		B			C			B				D

Intersection Summary

HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

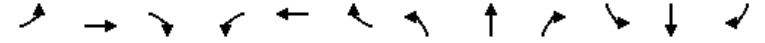
4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔	0	0
Volume (vph)	102	444	389	461	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.90	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1529	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1529	1428	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	121	529	463	549	0	0
RTOR Reduction (vph)	76	76	0	0	0	0
Lane Group Flow (vph)	257	241	463	549	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	36.4	36.4	13.6	60.0		
Effective Green, g (s)	36.4	36.4	13.6	60.0		
Actuated g/C Ratio	0.61	0.61	0.23	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	927	866	752	1801		
v/s Ratio Prot	0.17		c0.14	c0.30		
v/s Ratio Perm		0.17				
v/c Ratio	0.28	0.28	0.62	0.30		
Uniform Delay, d1	5.6	5.6	20.9	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	1.5	0.1		
Delay (s)	5.7	5.8	22.4	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	5.8			10.3	0.0	
Approach LOS	A			B	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)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			38.3%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	200	121	165	6	127	10	122	398	13	17	327	141
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1175	1943		1137	1253		1215	2411		1215	2244	
Fit Permitted	0.43	1.00		0.56	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	538	1943		670	1253		1215	2411		1215	2244	
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)	222	134	183	7	141	11	136	442	14	19	363	157
RTOR Reduction (vph)	0	119	0	0	3	0	0	2	0	0	49	0
Lane Group Flow (vph)	222	198	0	7	149	0	136	454	0	19	471	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.9	34.9		17.1	17.1		16.4	42.4		6.4	32.4	
Effective Green, g (s)	34.9	34.9		17.1	17.1		16.4	42.4		6.4	32.4	
Actuated g/C Ratio	0.35	0.35		0.17	0.17		0.16	0.42		0.06	0.32	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	678		114	214		199	1022		77	727	
v/s Ratio Prot	c0.10	0.10			0.12		c0.11	0.19		0.02	c0.21	
v/s Ratio Perm	c0.19			0.01								
v/c Ratio	0.83	0.29		0.06	0.69		0.68	0.44		0.25	0.65	
Uniform Delay, d1	27.8	23.6		34.7	39.0		39.4	20.4		44.5	28.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.10	1.02	
Incremental Delay, d2	19.3	0.2		0.2	9.4		9.3	1.4		1.2	3.2	
Delay (s)	47.1	23.8		35.0	48.4		48.7	21.8		50.1	32.7	
Level of Service	D	C		C	D		D	C		D	C	
Approach Delay (s)		33.4			47.8			28.0			33.3	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.9									C
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			90.2%									E
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	618	425	132	313	481	52	26	509	71	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.92		1.00	0.97			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	0.96		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2745		2987	2938			5477	938			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2745		2987	2938			5477	938			
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	702	483	150	356	547	59	30	578	81	0	0	0
RTOR Reduction (vph)	0	22	0	0	2	0	0	0	66	0	0	0
Lane Group Flow (vph)	702	611	0	356	604	0	0	608	15	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	28.5	50.8		20.4	42.7			19.9	19.9			
Effective Green, g (s)	28.5	50.8		20.4	42.7			19.9	19.9			
Actuated g/C Ratio	0.26	0.46		0.19	0.39			0.18	0.18			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1160	1267		553	1140			990	169			
v/s Ratio Prot	c0.16	0.22		c0.12	c0.21							
v/s Ratio Perm								0.11	0.02			
v/c Ratio	0.61	0.48		0.64	0.53			0.61	0.09			
Uniform Delay, d1	35.8	20.5		41.4	25.9			41.5	37.5			
Progression Factor	1.00	1.00		1.11	0.27			1.12	1.00			
Incremental Delay, d2	0.9	1.3		0.8	0.1			1.0	0.2			
Delay (s)	36.7	21.8		46.8	7.2			47.5	37.7			
Level of Service	D	C		D	A			D	D			
Approach Delay (s)		29.6			21.9			46.4		0.0		
Approach LOS		C			C			D		A		

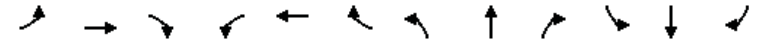
Intersection Summary

HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



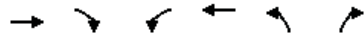
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕↕			↕↕↕	↕↕↕	↕↕↕	↕↕↕	↕↕↕
Volume (vph)	126	985	22	33	431	43	10	140	76	114	603	357
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.94			1.00	0.65	1.00	0.95	0.51
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00	0.73	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.98	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4373		1296	2408			1598	878	1123	2761	627
Fit Permitted	0.95	1.00		0.95	1.00			0.93	1.00	0.64	1.00	1.00
Satd. Flow (perm)	1540	4373		1296	2408			1499	878	758	2761	627
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	134	1048	23	35	459	46	11	149	81	121	641	380
RTOR Reduction (vph)	0	2	0	0	6	0	0	0	53	0	7	153
Lane Group Flow (vph)	134	1069	0	35	499	0	0	160	28	121	706	155
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	13.8	51.8		7.3	43.7			41.0	41.0	42.0	42.0	42.0
Effective Green, g (s)	13.8	51.8		7.3	43.7			41.0	41.0	42.0	42.0	42.0
Actuated g/C Ratio	0.12	0.43		0.06	0.36			0.34	0.34	0.35	0.35	0.35
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	177	1887		78	876			512	299	265	966	219
v/s Ratio Prot	0.09	c0.24		0.03	c0.21						c0.26	
v/s Ratio Perm								0.11	0.03	0.16		0.25
v/c Ratio	0.76	0.57		0.45	0.57			0.31	0.09	0.46	0.73	0.71
Uniform Delay, d1	51.5	25.7		54.4	30.6			29.1	26.9	30.2	34.1	33.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	1.2		4.1	0.9			0.4	0.1	1.2	2.9	10.0
Delay (s)	68.2	26.9		58.5	31.5			29.5	27.0	31.4	36.9	43.8
Level of Service	E	C		E	C			C	C	C	D	D
Approach Delay (s)		31.5			33.2			28.6			38.2	
Approach LOS		C			C			C			D	

Intersection Summary

HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	140.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1111	131	2	796	87	22
Ideal Flow (vphpl)	1200	1200	1200	1200	1200	1200
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1908			1944	972	857
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	1908			1853	972	857
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1145	135	2	821	90	23
RTOR Reduction (vph)	8	0	0	0	0	15
Lane Group Flow (vph)	1272	0	0	823	90	8
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA	Perm	NA	Prot	Perm	
Protected Phases	2		6	8		
Permitted Phases		6			8	
Actuated Green, G (s)	62.1		62.1	36.6	36.6	
Effective Green, g (s)	62.1		62.1	36.6	36.6	
Actuated g/C Ratio	0.56		0.56	0.33	0.33	
Clearance Time (s)	4.9		4.9	6.4	6.4	
Lane Grp Cap (vph)	1077		1046	323	285	
v/s Ratio Prot	c0.67			c0.09		
v/s Ratio Perm			0.44		0.01	
v/c Ratio	1.18		0.79	0.28	0.03	
Uniform Delay, d1	23.9		18.8	27.0	24.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	91.1		6.0	2.1	0.2	
Delay (s)	115.1		24.7	29.1	24.9	
Level of Service	F		C	C	C	
Approach Delay (s)	115.1		24.7	28.3		
Approach LOS	F		C	C		

Intersection Summary

HCM 2000 Control Delay	77.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↔
Volume (vph)	114	935	103	43	245	586	279	247	667	218
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	1.00
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.99			1.00	0.95			1.00	0.85
Fit Protected		1.00			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5800			2858	2445			4091	1122
Fit Permitted		1.00			0.68	1.00			0.95	1.00
Satd. Flow (perm)		5800			1962	2445			4091	1122
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	119	974	107	45	255	610	291	257	695	227
RTOR Reduction (vph)	0	24	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1176	0	0	300	898	0	0	975	204
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA	Perm	NA	NA	NA	Prot	Prot	Prot	
Protected Phases		6		4	4		7	7	7	
Permitted Phases	6		4							
Actuated Green, G (s)		20.0		22.0	22.0				15.5	15.5
Effective Green, g (s)		22.0		25.0	25.0				18.5	18.5
Actuated g/C Ratio		0.29		0.33	0.33				0.25	0.25
Clearance Time (s)		5.5		6.0	6.0				6.0	6.0
Vehicle Extension (s)		3.0		3.0	3.0				3.0	3.0
Lane Grp Cap (vph)		1701		654	815				1009	276
v/s Ratio Prot					c0.37				c0.24	0.18
v/s Ratio Perm		0.20		0.15						
v/c Ratio		0.69		0.46	1.10				0.97	0.74
Uniform Delay, d1		23.5		19.7	25.0				27.9	26.0
Progression Factor		1.00		1.00	1.00				1.00	1.00
Incremental Delay, d2		1.2		0.5	63.0				20.4	9.9
Delay (s)		24.7		20.2	88.0				48.4	35.9
Level of Service		C		C	F				D	D
Approach Delay (s)		24.7		20.2	88.0				46.2	
Approach LOS		C		C	F				D	

Intersection Summary

HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



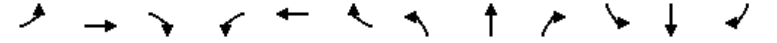
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	39	417	673	91	249	240	54	174	124	649
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0	4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor	1.00	0.81	0.81		0.91		0.91		0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.99		0.86		0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00
Frt	1.00	1.00	0.98		0.93		0.85		1.00	1.00
Fit Protected	0.95	0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)	810	1313	1889		2193		1161		1327	2554
Fit Permitted	0.95	0.95	1.00		1.00		1.00		0.23	0.94
Satd. Flow (perm)	810	1313	1889		2193		1161		326	2410
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	43	458	740	100	274	264	59	191	136	713
RTOR Reduction (vph)	0	0	17	0	1	0	42	0	0	0
Lane Group Flow (vph)	43	412	869	0	543	0	11	0	300	740
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)	18.5	18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)	21.0	18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio	0.27	0.24	0.27		0.23		0.21	0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	220	315	515		498		241	300	1040	
v/s Ratio Prot	0.05	0.31	c0.46		c0.25			c0.16	0.12	
v/s Ratio Perm						0.01		0.26	0.18	
v/c Ratio	0.20	1.31	1.69		1.14dr		0.05	1.00	0.71	
Uniform Delay, d1	21.5	29.2	28.0		29.8		24.4	26.1	18.4	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.0	159.6	317.3		67.3		0.4	52.0	4.1	
Delay (s)	23.5	188.9	345.3		97.0		24.8	78.0	22.5	
Level of Service	C	F	F		F		C	E	C	
Approach Delay (s)			286.9		90.6				38.5	
Approach LOS			F		F				D	

Intersection Summary			
HCM 2000 Control Delay	160.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	26	137	59	1	2	1	71	447	162	204	162	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		0.99		1.00	0.97		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	0.96		1.00	0.97	
Fit Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1604	1352		1535		1377	2554		1540	2980	
Fit Permitted		0.96	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1553	1352		1501		1377	2554		1540	2980	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	147	63	1	2	1	76	481	174	219	174	38
RTOR Reduction (vph)	0	0	44	0	1	0	0	30	0	0	17	0
Lane Group Flow (vph)	0	175	19	0	3	0	76	625	0	219	195	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.2	32.2		32.2		11.7	36.3		22.0	46.9	
Effective Green, g (s)		32.2	32.2		32.2		11.7	36.3		22.0	46.9	
Actuated g/C Ratio		0.30	0.30		0.30		0.11	0.34		0.21	0.44	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		469	409		454		151	871		318	1313	
v/s Ratio Prot							0.06	c0.24		c0.14	0.07	
v/s Ratio Perm		c0.11	0.01		0.00							
v/c Ratio		0.37	0.05		0.01		0.50	0.72		0.69	0.15	
Uniform Delay, d1		29.2	26.2		25.9		44.6	30.6		39.0	17.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5	0.0		0.0		2.6	2.9		6.1	0.1	
Delay (s)		29.7	26.3		25.9		47.2	33.4		45.1	17.9	
Level of Service		C	C		C		D	C		D	B	
Approach Delay (s)		28.8			25.9			34.9			31.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	106.4	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	12	11	13	7	8	93	21	106	16	195	168	33
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	0.99		1.00	0.96	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.98		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2381			1415	1227	1160	1412		1377	1360	
Fit Permitted		0.95			1.00	1.00	0.62	1.00		0.95	1.00	
Satd. Flow (perm)		2312			1448	1227	757	1412		1377	1360	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	13	12	14	8	9	102	23	116	18	214	185	36
RTOR Reduction (vph)	0	13	0	0	0	54	0	9	0	0	7	0
Lane Group Flow (vph)	0	26	0	0	17	48	23	125	0	214	214	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.2			2.2	20.0	7.4	7.4		17.8	30.2	
Effective Green, g (s)		2.2			2.2	20.0	7.4	7.4		17.8	30.2	
Actuated g/C Ratio		0.05			0.05	0.47	0.17	0.17		0.42	0.71	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		119			75	723	132	246		578	968	
v/s Ratio Prot						0.03		c0.09		c0.16	0.16	
v/s Ratio Perm		0.01			c0.01	0.01	0.03					
v/c Ratio		0.22			0.23	0.07	0.17	0.51		0.37	0.22	
Uniform Delay, d1		19.3			19.3	6.1	14.9	15.9		8.4	2.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9			1.5	0.0	0.6	1.6		0.4	0.1	
Delay (s)		20.2			20.8	6.1	15.5	17.5		8.9	2.2	
Level of Service		C			C	A	B	B		A	A	
Approach Delay (s)		20.2			8.2			17.2		5.5		
Approach LOS		C			A			B		A		

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	42	216	496	28	94	243
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	847	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	847	1134	1194
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	54	277	636	36	121	312
RTOR Reduction (vph)	0	246	0	8	0	0
Lane Group Flow (vph)	54	31	636	28	121	312
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	9.8	9.8	47.3	42.3	14.6	66.9
Effective Green, g (s)	9.8	9.8	47.3	42.3	14.6	66.9
Actuated g/C Ratio	0.11	0.11	0.55	0.49	0.17	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	128	197	837	462	190	921
v/s Ratio Prot	c0.05		c0.41	0.01	c0.11	0.26
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.42	0.16	0.76	0.06	0.64	0.34
Uniform Delay, d1	35.8	34.7	15.3	11.7	33.6	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.4	4.0	0.1	6.8	0.2
Delay (s)	38.0	35.1	19.3	11.8	40.4	3.3
Level of Service	D	D	B	B	D	A
Approach Delay (s)	35.6		18.9			13.7
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	37	33	19	287	82	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	44	39	23	342	98	51
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	439	174	199			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	174	199			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	95	98			
cM capacity (veh/h)	496	776	1319			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	44	39	137	228	65	84
Volume Left	44	0	23	0	0	0
Volume Right	0	39	0	0	0	51
cSH	496	776	1319	1700	1700	1700
Volume to Capacity	0.09	0.05	0.02	0.13	0.04	0.05
Queue Length 95th (ft)	7	4	1	0	0	0
Control Delay (s)	13.0	9.9	1.4	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	11.5		0.5		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			40.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	123	50	800	82	20	371
Ideal Flow (vphpl)	1200	1200	1200	1200	1200	1200
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.95	1.00		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	984	920	2122		1080	2161
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	984	920	2122		1080	2161
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	137	56	889	91	22	412
RTOR Reduction (vph)	0	43	5	0	0	0
Lane Group Flow (vph)	137	13	975	0	22	412
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	71.7		4.3	81.1
Effective Green, g (s)	28.7	28.7	71.7		4.3	81.1
Actuated g/C Ratio	0.24	0.24	0.60		0.04	0.68
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	235	220	1267		38	1460
v/s Ratio Prot			c0.46		c0.02	0.19
v/s Ratio Perm	c0.14	0.01				
v/c Ratio	0.58	0.06	0.77		0.58	0.28
Uniform Delay, d1	40.4	35.2	18.0		57.0	7.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	0.1	4.5		19.6	0.1
Delay (s)	44.0	35.4	22.5		76.6	7.9
Level of Service	D	D	C		E	A
Approach Delay (s)	41.5		22.5			11.4
Approach LOS	D		C			B
Intersection Summary						
HCM 2000 Control Delay			21.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	15.3	
Intersection Capacity Utilization			83.3%	ICU Level of Service	E	
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕↕	↕↕	
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	0	306	115	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	360	135	0
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total (vph)	0	120	240	90	45	
Volume Left (vph)	0	0	0	0	0	
Volume Right (vph)	0	0	0	0	0	
Hadj (s)	0.00	0.03	0.03	0.03	0.03	
Departure Headway (s)	4.9	4.6	4.6	4.8	4.8	
Degree Utilization, x	0.00	0.15	0.31	0.12	0.06	
Capacity (veh/h)	681	766	768	734	735	
Control Delay (s)	7.9	7.3	8.5	7.2	6.9	
Approach Delay (s)	0.0	8.1		7.1		
Approach LOS	A	A		A		
Intersection Summary						
Delay			7.8			
Level of Service			A			
Intersection Capacity Utilization		19.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕↕			↕↕		
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	0	9	70	22	18	0	108	0	3	0	0	0
Peak Hour Factor	0.92	0.77	0.77	0.77	0.77	0.92	0.77	0.92	0.77	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	91	29	23	0	140	0	4	0	0	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	103	52	144	0								
Volume Left (vph)	0	29	140	0								
Volume Right (vph)	91	0	4	0								
Hadj (s)	-0.50	0.14	0.21	0.00								
Departure Headway (s)	3.8	4.5	4.4	4.4								
Degree Utilization, x	0.11	0.06	0.18	0.00								
Capacity (veh/h)	906	760	781	792								
Control Delay (s)	7.3	7.8	8.4	7.4								
Approach Delay (s)	7.3	7.8	8.4	0.0								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.9									
Level of Service			A									
Intersection Capacity Utilization		31.1%		ICU Level of Service	A							
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	187	46	260	4	82	40	175	655	22	11	308	174
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1255	1365	1126	1282	1365	1099	2515	2577		1296	2428	
Fit Permitted	0.70	1.00	1.00	0.73	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	928	1365	1126	980	1365	1099	2515	2577		1296	2428	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	47	265	4	84	41	179	668	22	11	314	178
RTOR Reduction (vph)	0	0	174	0	0	27	0	2	0	0	79	0
Lane Group Flow (vph)	191	47	91	4	84	14	179	688	0	11	413	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	320	470	388	338	470	379	352	974		155	869	
v/s Ratio Prot		0.03			0.06		0.07	c0.27		0.01	c0.17	
v/s Ratio Perm	c0.21		0.08	0.00		0.01						
v/c Ratio	0.60	0.10	0.24	0.01	0.18	0.04	0.51	0.71		0.07	0.48	
Uniform Delay, d1	27.0	22.2	23.3	21.5	22.9	21.7	39.8	26.4		39.1	24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.78		1.00	1.00	
Incremental Delay, d2	8.0	0.4	1.4	0.1	0.8	0.2	3.3	2.8		0.9	1.9	
Delay (s)	35.0	22.6	24.8	21.6	23.7	21.9	39.9	23.3		39.9	26.7	
Level of Service	C	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		28.5			23.1			26.7			27.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	116	424	10	17	367	47	20	13	27	41	11	117
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1244	1621	1531		1492	1378	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.67	1.00		0.73	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1244	1147	1531		1147	1378	
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)	120	437	10	18	378	48	21	13	28	42	11	121
RTOR Reduction (vph)	0	0	5	0	0	27	0	21	0	0	90	0
Lane Group Flow (vph)	120	437	5	18	378	21	21	20	0	42	42	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8	8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.7	45.0	45.0	2.6	36.9	36.9	21.4	21.4		21.4	21.4	
Effective Green, g (s)	10.7	45.0	45.0	2.6	36.9	36.9	21.4	21.4		21.4	21.4	
Actuated g/C Ratio	0.13	0.54	0.54	0.03	0.44	0.44	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	913	776	50	749	546	292	390		292	351	
v/s Ratio Prot	c0.07	c0.26		0.01	0.22		0.02	0.02		0.01	0.03	
v/s Ratio Perm			0.00			0.02	0.02				c0.04	
v/c Ratio	0.58	0.48	0.01	0.36	0.50	0.04	0.07	0.05		0.14	0.12	
Uniform Delay, d1	34.5	12.2	9.1	39.9	17.0	13.4	23.8	23.6		24.2	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	1.8	0.0	4.4	0.5	0.0	0.1	0.1		0.2	0.2	
Delay (s)	38.7	14.0	9.1	44.3	17.5	13.5	23.9	23.7		24.4	24.2	
Level of Service	D	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		19.1			18.2		23.8				24.3	
Approach LOS		B			B		C				C	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	56	413	32	55	409	41	31	102	37	100	124	116
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	2956			3012	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.59	1.00			0.77	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	963	2956			2360	1072
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	64	469	36	62	465	47	35	116	42	114	141	132
RTOR Reduction (vph)	0	0	16	0	0	23	0	33	0	0	0	106
Lane Group Flow (vph)	64	469	20	62	465	24	35	125	0	0	255	26
Confl. Peds. (#/hr)						17						3
Confl. Bikes (#/hr)						36						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	7.2	40.7	40.7	5.1	37.6	37.6	15.8	15.8			14.8	14.8
Effective Green, g (s)	7.2	40.7	40.7	5.1	37.6	37.6	15.8	15.8			14.8	14.8
Actuated g/C Ratio	0.10	0.55	0.55	0.07	0.50	0.50	0.21	0.21			0.20	0.20
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	117	662	751	105	612	528	203	626			468	212
v/s Ratio Prot	c0.05	c0.39		0.04	c0.38			0.04				
v/s Ratio Perm			0.01			0.02	0.04				c0.11	0.02
v/c Ratio	0.55	0.71	0.03	0.59	0.76	0.04	0.17	0.20			0.54	0.12
Uniform Delay, d1	32.1	12.6	7.8	33.7	14.9	9.4	24.1	24.2			26.9	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	5.1	3.5	0.0	8.6	5.4	0.0	0.4	0.2			1.3	0.3
Delay (s)	37.3	16.0	7.8	42.3	20.3	9.4	24.5	24.4			28.2	24.8
Level of Service	D	B	A	D	C	A	C	C			C	C
Approach Delay (s)		17.9			21.8			24.4				27.0
Approach LOS		B			C			C				C

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	30	349	68	42	314	200	64	198	40	113	122	32
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1328	927		1335	1126	865	1070	957	917	1070	1075	
Fit Permitted	0.30	1.00		0.28	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	425	927		400	1126	865	1070	957	917	1070	1075	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	34	401	78	48	361	230	74	228	46	130	140	37
RTOR Reduction (vph)	0	6	0	0	0	95	0	0	36	0	9	0
Lane Group Flow (vph)	34	473	0	48	361	135	74	228	10	130	168	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8			7	4
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	51.1	51.1		52.8	52.8	64.8	14.0	23.0	23.0	12.0	21.0	
Effective Green, g (s)	51.1	51.1		52.8	52.8	64.8	14.0	23.0	23.0	12.0	21.0	
Actuated g/C Ratio	0.46	0.46		0.48	0.48	0.59	0.13	0.21	0.21	0.11	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	216	429		226	539	547	135	199	191	116	204	
v/s Ratio Prot	0.00	c0.51		0.01	c0.32	0.03	0.07	c0.24		c0.12	0.16	
v/s Ratio Perm	0.07			0.09		0.13			0.01			
v/c Ratio	0.16	1.10		0.21	0.67	0.25	0.55	1.15	0.05	1.12	0.82	
Uniform Delay, d1	18.0	29.6		27.3	22.0	10.9	45.1	43.6	34.9	49.1	42.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	73.9		0.5	3.2	0.2	4.5	108.5	0.1	119.7	22.8	
Delay (s)	18.4	103.4		27.8	25.2	11.2	49.6	152.1	35.0	168.8	65.7	
Level of Service	B	F		C	C	B	D	F	C	F	E	
Approach Delay (s)		97.8			20.3		114.9				109.3	
Approach LOS		F			C		F				F	

Intersection Summary			
HCM 2000 Control Delay	75.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	110.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	13	295	27	35	141	7	35	100	69	5	48	24
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	13	304	28	36	145	7	36	103	71	5	49	25

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	345	36	153	139	71	79
Volume Left (vph)	13	36	0	36	0	5
Volume Right (vph)	28	0	7	0	71	25
Hadj (s)	-0.01	0.53	0.00	0.16	-0.67	-0.14
Departure Headway (s)	5.7	6.4	5.8	6.3	5.5	6.3
Degree Utilization, x	0.54	0.06	0.25	0.24	0.11	0.14
Capacity (veh/h)	613	531	581	531	604	516
Control Delay (s)	15.1	8.6	9.5	10.1	7.9	10.3
Approach Delay (s)	15.1	9.4		9.4		10.3
Approach LOS	C	A		A		B

Intersection Summary						
Delay			11.9			
Level of Service			B			
Intersection Capacity Utilization		48.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	286	290	46	11	144	45	51	522	1300	1300	26	344
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1300	1300	1300	1300	1300	1300
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1491	2984		1509	2918		1170	2324		1170	2183	
Flt Permitted	0.62	1.00		0.48	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	980	2984		766	2918		1170	2324		1170	2183	
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)	308	312	49	12	155	48	55	561	22	28	370	217
RTOR Reduction (vph)	0	13	0	0	30	0	0	3	0	0	85	0
Lane Group Flow (vph)	308	348	0	12	173	0	55	580	0	28	502	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	291	886		227	866		197	927		174	827	
v/s Ratio Prot		0.12			0.06		0.05	c0.25		0.02	c0.23	
v/s Ratio Perm	c0.31			0.02								
v/c Ratio	1.06	0.39		0.05	0.20		0.28	0.63		0.16	0.61	
Uniform Delay, d1	35.1	28.0		25.1	26.3		36.2	24.1		37.1	25.0	
Progression Factor	1.00	1.00		1.00	1.00		0.83	0.74		1.41	0.65	
Incremental Delay, d2	69.0	1.3		0.4	0.5		2.3	2.1		1.8	3.0	
Delay (s)	104.1	29.3		25.5	26.8		32.4	19.9		54.0	19.2	
Level of Service	F	C		C	C		C	B		D	B	
Approach Delay (s)		63.7			26.7			21.0			20.8	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	20	636	55	6	419	9	36	0	5	17	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3380		1711	3410			1698		1711	1541	
Flt Permitted	0.48	1.00		0.31	1.00			0.81		0.73	1.00	
Satd. Flow (perm)	867	3380		555	3410			1441		1312	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	691	60	7	455	10	39	0	5	18	1	24
RTOR Reduction (vph)	0	11	0	0	3	0	0	22	0	0	15	0
Lane Group Flow (vph)	22	740	0	7	462	0	0	22	0	18	10	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	390	1521		249	1534			552		502	590	
v/s Ratio Prot		c0.22			0.14						0.01	
v/s Ratio Perm	0.03			0.01			c0.02			0.01		
v/c Ratio	0.06	0.49		0.03	0.30			0.04		0.04	0.02	
Uniform Delay, d1	9.3	11.6		9.2	10.5			11.6		11.6	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.1		0.2	0.5			0.1		0.1	0.1	
Delay (s)	9.6	12.7		9.4	11.0			11.7		11.7	11.5	
Level of Service	A	B		A	B			B		B	B	
Approach Delay (s)		12.6			11.0			11.7			11.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015

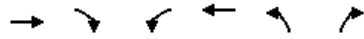


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	10	102	0	0	509	19	253	129	615	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.88				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3406			5104		1711	2997				2694
Flt Permitted		0.92			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3151			5104		1711	2997				2694
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	111	0	0	553	21	275	140	668	0	0	80
RTOR Reduction (vph)	0	0	0	0	4	0	0	393	0	0	0	75
Lane Group Flow (vph)	0	122	0	0	570	0	275	415	0	0	0	5
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		43.5			32.5		37.0	37.0				6.0
Effective Green, g (s)		43.5			32.5		37.0	37.0				6.0
Actuated g/C Ratio		0.48			0.36		0.41	0.41				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1539			1843		703	1232				179
v/s Ratio Prot		c0.01			c0.11		c0.16	0.14				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.31		0.39	0.34				0.03
Uniform Delay, d1		12.5			20.7		18.6	18.1				39.3
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.4		1.6	0.7				0.3
Delay (s)		12.6			21.1		20.2	18.9				39.6
Level of Service		B			C		C	B				D
Approach Delay (s)		12.6			21.1			19.2				39.6
Approach LOS		B			C			B				D

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	112	498	407	428	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.90	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1528	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1528	1428	3319	1801		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	127	566	462	486	0	0
RTOR Reduction (vph)	76	76	0	0	0	0
Lane Group Flow (vph)	277	264	462	486	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	36.4	36.4	13.6	60.0		
Effective Green, g (s)	36.4	36.4	13.6	60.0		
Actuated g/C Ratio	0.61	0.61	0.23	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	926	866	752	1801		
v/s Ratio Prot	0.18		c0.14	c0.27		
v/s Ratio Perm		0.18				
v/c Ratio	0.30	0.30	0.61	0.27		
Uniform Delay, d1	5.7	5.7	20.8	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	1.5	0.1		
Delay (s)	5.9	5.9	22.3	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	5.9			10.9	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			8.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			41.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔	↔	↔	↔	↔
Volume (vph)	206	154	144	3	120		9	127	336	9	8	305
Ideal Flow (vphpl)	1500	1500	1500	1500	1500		1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1173	1996		1139	1254		1215	2414		1215	2278	
Fit Permitted	0.44	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	545	1996		659	1254		1215	2414		1215	2278	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	231	173	162	3	135		10	143	378	10	9	343
RTOR Reduction (vph)	0	103	0	0	3		0	0	2	0	0	34
Lane Group Flow (vph)	231	232	0	3	142		0	143	386	0	9	421
Confl. Peds. (#/hr)	100		100	100		100				100		100
Confl. Bikes (#/hr)			10			10				10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.4	36.4		16.5	16.5		17.5	43.9		3.4	29.8	
Effective Green, g (s)	36.4	36.4		16.5	16.5		17.5	43.9		3.4	29.8	
Actuated g/C Ratio	0.36	0.36		0.16	0.16		0.18	0.44		0.03	0.30	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	726		108	206		212	1059		41	678	
v/s Ratio Prot	c0.12	0.12			0.11		c0.12	0.16		0.01	c0.18	
v/s Ratio Perm	c0.17			0.00								
v/c Ratio	0.80	0.32		0.03	0.69		0.67	0.36		0.22	0.62	
Uniform Delay, d1	26.0	22.9		35.0	39.3		38.6	18.7		47.0	30.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.21	1.07	
Incremental Delay, d2	14.0	0.3		0.1	9.2		8.2	1.0		1.9	3.1	
Delay (s)	40.0	23.1		35.1	48.5		46.8	19.7		58.9	35.3	
Level of Service	D	C		D	D		D	B		E	D	
Approach Delay (s)		30.0			48.2			27.0			35.8	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			32.2									C
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			91.1%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY LATE EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔	↕↔			↔↔↔	↕			
Volume (vph)	478	420	8	83	764	52	37	263	82	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.89			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (prot)	4480	3064		2987	3028			5482	1226			
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (perm)	4480	3064		2987	3028			5482	1226			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	576	506	10	100	920	63	45	317	99	0	0	0
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	87	0	0	0
Lane Group Flow (vph)	576	515	0	100	980	0	0	362	12	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	68.7		9.0	59.5			13.4	13.4			
Effective Green, g (s)	18.2	68.7		9.0	59.5			13.4	13.4			
Actuated g/C Ratio	0.17	0.62		0.08	0.54			0.12	0.12			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1913		244	1637			667	149			
v/s Ratio Prot	c0.13	0.17		0.03	c0.32							
v/s Ratio Perm								0.07	0.01			
v/c Ratio	0.78	0.27		0.41	0.60			0.54	0.08			
Uniform Delay, d1	44.0	9.3		48.0	17.1			45.4	42.8			
Progression Factor	0.55	0.25		1.51	0.22			1.00	1.00			
Incremental Delay, d2	4.5	0.3		0.3	0.2			0.9	0.2			
Delay (s)	28.7	2.6		72.9	4.0			46.3	43.1			
Level of Service	C	A		E	A			D	D			
Approach Delay (s)		16.3			10.3			45.6			0.0	
Approach LOS		B			B			D			A	

Intersection Summary

HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



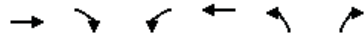
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	78	837	21	40	725	36	12	30	30	39	157	171
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.63	1.00	0.84	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.90	1.00	0.67	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.95	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1134	3218		1134	2186			1443	853	1027	2352	580
Flt Permitted	0.95	1.00		0.95	1.00			0.82	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1134	3218		1134	2186			1204	853	783	2352	580
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	93	996	25	48	863	43	14	36	36	46	187	204
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	31	0	56	102
Lane Group Flow (vph)	93	1019	0	48	904	0	0	50	5	46	215	18
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.5	62.9		11.9	58.7			15.3	15.3	16.3	16.3	16.3
Effective Green, g (s)	14.5	62.9		11.9	58.7			15.3	15.3	16.3	16.3	16.3
Actuated g/C Ratio	0.13	0.57		0.11	0.53			0.14	0.14	0.15	0.15	0.15
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	149	1840		122	1166			167	118	116	348	85
v/s Ratio Prot	0.08	c0.32		0.04	c0.41						c0.09	
v/s Ratio Perm								0.04	0.01	0.06		0.03
v/c Ratio	0.62	0.55		0.39	0.78			0.30	0.04	0.40	0.62	0.21
Uniform Delay, d1	45.2	14.8		45.7	20.4			42.5	41.0	42.4	43.9	41.2
Progression Factor	0.87	1.08		0.89	0.71			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.8		1.7	2.7			1.0	0.1	2.2	3.2	1.2
Delay (s)	44.4	16.7		42.4	17.1			43.5	41.2	44.6	47.2	42.4
Level of Service	D	B		D	B			D	D	D	D	D
Approach Delay (s)		19.0			18.4			42.5			45.6	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	925	62	0	908	28	11
Ideal Flow (vphpl)	1100	1100	1000	1000	1000	1000
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1764			1621	810	714
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1764			1621	810	714
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1101	74	0	1081	33	13
RTOR Reduction (vph)	2	0	0	0	0	12
Lane Group Flow (vph)	1173	0	0	1081	33	1
Confl. Peds. (#/hr)	10	10				3
Confl. Bikes (#/hr)	1					
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1462			1343	55	48
v/s Ratio Prot	0.67			c0.67	c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.80			0.80	0.60	0.02
Uniform Delay, d1	4.8			4.8	49.8	47.8
Progression Factor	1.00			1.54	1.00	1.00
Incremental Delay, d2	4.7			2.6	16.4	0.2
Delay (s)	9.6			10.1	66.2	48.0
Level of Service	A			B	E	D
Approach Delay (s)	9.6			10.1	61.0	
Approach LOS	A			B	E	
Intersection Summary						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio			0.79			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			70.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	143	771	99	35	123	323	194	76	182	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.94			0.99	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5762			2834	2410			4058	1122
Fit Permitted		0.99			0.77	1.00			0.95	1.00
Satd. Flow (perm)		5762			2209	2410			4058	1122
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	168	907	116	41	145	380	228	89	214	108
RTOR Reduction (vph)	0	24	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	1167	0	0	186	580	0	0	316	95
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		24.6			21.2	21.2			11.7	11.7
Effective Green, g (s)		26.6			24.2	24.2			14.7	14.7
Actuated g/C Ratio		0.35			0.32	0.32			0.20	0.20
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		2043			712	777			795	219
v/s Ratio Prot						c0.24			0.08	c0.08
v/s Ratio Perm		0.20			0.08					
v/c Ratio		0.57			0.26	0.75			0.40	0.43
Uniform Delay, d1		19.6			18.8	22.7			26.3	26.5
Progression Factor		1.00			0.51	1.00			1.00	1.00
Incremental Delay, d2		0.4			0.2	3.9			0.3	1.4
Delay (s)		20.0			9.8	26.6			26.6	27.9
Level of Service		B			A	C			C	C
Approach Delay (s)		20.0			9.8	26.6			26.9	
Approach LOS		B			A	C			C	
Intersection Summary										
HCM 2000 Control Delay					22.1				HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio					0.63					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					68.6%				ICU Level of Service	C
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015

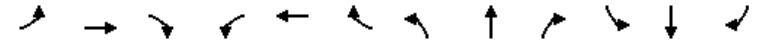


Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↕		↕	↕↔
Volume (vph)	27	203	210	22	131	112	14	170	20	352
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.87		1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1214	1895		2248		1188		1327	2553
Fit Permitted		0.95	0.99		1.00		1.00		0.52	0.95
Satd. Flow (perm)		1214	1895		2248		1188		720	2431
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	214	221	23	138	118	15	179	21	371
RTOR Reduction (vph)	0	0	12	0	1	0	10	0	0	0
Lane Group Flow (vph)	0	191	283	0	257	0	3	0	181	390
Confl. Peds. (#/hr)	25			60		200				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		299	530		524		253		413	1073
v/s Ratio Prot		c0.16	0.15		c0.11				c0.07	0.06
v/s Ratio Perm							0.00		0.12	0.10
v/c Ratio		0.64	0.53		0.49		0.01		0.44	0.36
Uniform Delay, d1		25.3	22.9		24.9		23.3		17.3	14.3
Progression Factor		1.00	1.00		1.00		1.00		1.05	1.06
Incremental Delay, d2		10.0	3.8		3.3		0.1		2.6	0.7
Delay (s)		35.3	26.7		28.2		23.3		20.8	15.8
Level of Service		D	C		C		C		C	B
Approach Delay (s)			30.1		27.9					17.4
Approach LOS			C		C					B

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↔		↕	↕↔		↕	↕↔	
Volume (vph)	9	10	13	3	1	12	5	188	4	1	50	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.90		1.00	1.00		1.00	0.99	
Fit Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1580	1347		1420		1272	2532		1540	3029	
Fit Permitted		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1618	1347		1434		1272	2532		1540	3029	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	11	12	16	4	1	15	6	229	5	1	61	6
RTOR Reduction (vph)	0	0	15	0	14	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	23	1	0	6	0	6	232	0	1	62	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		0.7	0.7		0.7		0.5	3.4		0.5	3.7	
Effective Green, g (s)		0.7	0.7		0.7		0.5	3.4		0.5	3.7	
Actuated g/C Ratio		0.03	0.03		0.03		0.02	0.17		0.02	0.18	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		55	45		48		31	419		37	546	
v/s Ratio Prot							0.00	c0.09		0.00	c0.02	
v/s Ratio Perm		c0.01	0.00		0.00							
v/c Ratio		0.42	0.01		0.11		0.19	0.55		0.03	0.11	
Uniform Delay, d1		9.7	9.6		9.6		9.8	7.9		9.8	7.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.1	0.1		1.1		1.1	1.6		0.1	0.1	
Delay (s)		14.8	9.7		10.7		10.9	9.4		9.9	7.1	
Level of Service		B	A		B		B	A		A	A	
Approach Delay (s)		12.7			10.7		9.5				7.2	
Approach LOS		B			B		A				A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	20.5	Sum of lost time (s)	15.9
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	5	2	3	1	1	9	2	20	5	24	47	8
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0			5.0			5.0			5.0		
Lane Util. Factor	0.95			1.00			1.00			1.00		
Frbp, ped/bikes	0.99			1.00			1.00			0.97		
Flpb, ped/bikes	0.99			1.00			0.83			1.00		
Frt	0.95			1.00			0.85			0.97		
Fit Protected	0.98			0.98			1.00			0.95		
Satd. Flow (prot)	2381			1413			1230			1142		
Fit Permitted	0.95			1.00			1.00			0.95		
Satd. Flow (perm)	2327			1448			1230			1369		
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	6	3	4	1	1	11	3	25	6	30	59	10
RTOR Reduction (vph)	0	4	0	0	0	5	0	6	0	0	3	0
Lane Group Flow (vph)	0	9	0	0	2	6	3	25	0	30	66	0
Confl. Peds. (#/hr)	28		3		3		28		213		213	
Confl. Bikes (#/hr)			1						18		10	
Parking (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases	4				8		1		2		6	
Permitted Phases	4		8		8		2					
Actuated Green, G (s)	1.1				1.1		20.9		1.2		19.8	
Effective Green, g (s)	1.1				1.1		20.9		1.2		19.8	
Actuated g/C Ratio	0.03				0.03		0.56		0.03		0.53	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		2.0		3.0		3.0	
Lane Grp Cap (vph)	68				42		858		38		734	
v/s Ratio Prot					0.00				c0.02		0.02	
v/s Ratio Perm	c0.00				0.00		0.00		0.00		c0.05	
v/c Ratio	0.13				0.05		0.01		0.08		0.57	
Uniform Delay, d1	17.5				17.5		3.6		17.4		17.7	
Progression Factor	1.00				1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.9				0.5		0.0		0.9		16.7	
Delay (s)	18.4				18.0		3.6		18.3		34.4	
Level of Service	B				B		A		B		C	
Approach Delay (s)	18.4				5.8				33.0		2.5	
Approach LOS	B				A				C		A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	6	74	112	11	39	52
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1745	1535	840	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1745	1535	840	1134	1194
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	7	88	133	13	46	62
RTOR Reduction (vph)	0	77	0	9	0	0
Lane Group Flow (vph)	7	11	133	4	46	62
Confl. Peds. (#/hr)	60		1		5	
Confl. Bikes (#/hr)			1		30	
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2		5	
Permitted Phases	4		2		6	
Actuated Green, G (s)	5.2		18.2		13.2	
Effective Green, g (s)	5.2		18.2		2.8	
Actuated g/C Ratio	0.13		0.44		0.32	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	143		220		678	
v/s Ratio Prot	0.01		c0.09		0.00	
v/s Ratio Perm			c0.01		0.00	
v/c Ratio	0.05		0.05		0.20	
Uniform Delay, d1	15.8		15.8		7.0	
Progression Factor	1.00		1.00		1.00	
Incremental Delay, d2	0.1		0.1		0.1	
Delay (s)	16.0		15.9		7.2	
Level of Service	B		B		A	
Approach Delay (s)	15.9		7.4		14.7	
Approach LOS	B		A		B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	3	2	46	27	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	3	4	3	69	40	9
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	185	125	99			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185	125	99			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	726	835	1434			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	3	4	26	46	27	22
Volume Left	3	0	3	0	0	0
Volume Right	0	4	0	0	0	9
cSH	726	835	1434	1700	1700	1700
Volume to Capacity	0.00	0.01	0.00	0.03	0.02	0.01
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	10.0	9.3	0.9	0.0	0.0	0.0
Lane LOS	A	A	A			
Approach Delay (s)	9.6		0.3		0.0	
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			29.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	19	4	191	5	3	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.92	1.00		1.00	1.00
Flpb, ped/bikes	0.94	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1614	1402	3400		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1614	1402	3400		1711	3421
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	22	5	220	6	3	218
RTOR Reduction (vph)	0	5	1	0	0	0
Lane Group Flow (vph)	22	0	225	0	3	218
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	3.0	3.0	56.7		1.2	63.0
Effective Green, g (s)	3.0	3.0	56.7		1.2	63.0
Actuated g/C Ratio	0.04	0.04	0.74		0.02	0.83
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	63	55	2529		26	2828
v/s Ratio Prot			c0.07		0.00	c0.06
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.35	0.00	0.09		0.12	0.08
Uniform Delay, d1	35.6	35.2	2.7		37.0	1.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.3	0.0	0.1		2.0	0.1
Delay (s)	39.0	35.2	2.7		39.0	1.3
Level of Service	D	D	A		D	A
Approach Delay (s)	38.3		2.7			1.8
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			4.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.10			
Actuated Cycle Length (s)			76.2	Sum of lost time (s)	15.3	
Intersection Capacity Utilization			40.4%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↑	
Volume (veh/h)	0	0	0	48	30	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	56	35	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	90	44	60			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	44	60			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	883	997	1512			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	19	38	24	12
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1512	1700	1700	1700
Volume to Capacity	0.00	0.00	0.02	0.01	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay	0.0				
Intersection Capacity Utilization	19.3%		ICU Level of Service		A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	P			↑	Y	
Volume (veh/h)	1	12	7	1	23	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	1	14	8	1	28	1
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			66		127	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			66		127	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			1478		799	874

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	10	29
Volume Left	0	8	28
Volume Right	14	0	1
cSH	1700	1478	801
Volume to Capacity	0.01	0.01	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	6.5	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	6.5	9.7
Approach LOS		A	

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	29.8%	ICU Level of Service	
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	46	10	68	1	13	10	51	140	0	3	149	57
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	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	1.00	0.85	1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1280	1365	1129	1291	1365	1118	2515	2593		1296	2467	
Fit Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1008	1365	1129	1019	1365	1118	2515	2593		1296	2467	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	54	12	80	1	15	12	60	165	0	4	175	67
RTOR Reduction (vph)	0	0	65	0	0	10	0	0	0	0	45	0
Lane Group Flow (vph)	54	12	15	1	15	2	60	165	0	4	197	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	6.1	6.1	6.1	6.1	6.1	6.1	2.1	9.2		1.2	8.3	
Effective Green, g (s)	6.1	6.1	6.1	6.1	6.1	6.1	2.1	9.2		1.2	8.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.07	0.29		0.04	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	258	213	193	258	211	164	740		48	635	
v/s Ratio Prot		0.01		0.01		0.01	0.02	c0.06		0.00	c0.08	
v/s Ratio Perm	c0.05		0.01	0.00		0.00						
v/c Ratio	0.28	0.05	0.07	0.01	0.06	0.01	0.37	0.22		0.08	0.31	
Uniform Delay, d1	11.2	10.7	10.7	10.6	10.7	10.6	14.4	8.8		15.0	9.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.1	0.1	0.0	0.1	0.0	1.4	0.2		0.7	0.3	
Delay (s)	12.0	10.7	10.9	10.6	10.8	10.6	15.8	8.9		15.7	9.9	
Level of Service	B	B	B	B	B	B	B	A		B	A	
Approach Delay (s)		11.3			10.7			10.8			10.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	15.7
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	42	112	3	4	106	10	5	6	1	11	2	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1255	1621	1674		1493	1364	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1255	1241	1674		1183	1364	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	47	126	3	4	119	11	6	7	1	12	2	43
RTOR Reduction (vph)	0	0	1	0	0	5	0	1	0	0	35	0
Lane Group Flow (vph)	47	126	2	4	119	6	6	7	0	12	10	0
Confl. Peds. (#/hr)	50				50							50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8			8		4
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Effective Green, g (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1012	860	48	905	666	232	313		221	255	
v/s Ratio Prot	c0.03	c0.07		0.00	0.07		0.00	0.00			0.01	
v/s Ratio Perm			0.00			0.00	0.00					
v/c Ratio	0.31	0.12	0.00	0.08	0.13	0.01	0.03	0.02		0.05	0.04	
Uniform Delay, d1	33.7	7.1	6.6	37.5	9.4	8.8	26.4	26.4		26.5	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.3	0.0	0.7	0.1	0.0	0.0	0.0		0.1	0.1	
Delay (s)	34.9	7.3	6.6	38.2	9.5	8.8	26.4	26.4		26.6	26.5	
Level of Service	C	A	A	D	A	A	C	C		C	C	
Approach Delay (s)		14.7			10.3			26.4			26.5	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	23	113	6	11	125	13	12	33	14	29	25	49
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1033	1540	2941			2998	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1033	1473	2941			2941	1074
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	28	138	7	13	152	16	15	40	17	35	30	60
RTOR Reduction (vph)	0	0	5	0	0	12	0	14	0	0	0	52
Lane Group Flow (vph)	28	138	2	13	152	4	15	43	0	0	65	8
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.8	6.5	6.5	0.8	5.5	5.5	4.4	4.4			3.4	3.4
Effective Green, g (s)	0.8	6.5	6.5	0.8	5.5	5.5	4.4	4.4			3.4	3.4
Actuated g/C Ratio	0.03	0.26	0.26	0.03	0.22	0.22	0.18	0.18			0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	39	319	362	49	270	230	262	523			404	147
v/s Ratio Prot	c0.02	0.11		0.01	c0.13			0.01				
v/s Ratio Perm			0.00			0.00	0.01				c0.02	0.01
v/c Ratio	0.72	0.43	0.01	0.27	0.56	0.02	0.06	0.08			0.16	0.06
Uniform Delay, d1	11.8	7.6	6.7	11.7	8.5	7.5	8.4	8.5			9.4	9.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	47.4	0.9	0.0	2.9	2.7	0.0	0.1	0.1			0.2	0.2
Delay (s)	59.2	8.5	6.7	14.6	11.2	7.5	8.5	8.5			9.6	9.4
Level of Service	E	A	A	B	B	A	A	A			A	A
Approach Delay (s)		16.6			11.1			8.5			9.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	24.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	109	56	14	121	50	15	29	12	21	23	6
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.93	1.00	1.00	0.92	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1327	898		1334	1126	892	1070	957	884	1070	1078	
Fit Permitted	0.40	1.00		0.61	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	560	898		850	1126	892	1070	957	884	1070	1078	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	24	131	67	17	146	60	18	35	14	25	28	7
RTOR Reduction (vph)	0	21	0	0	0	35	0	0	13	0	6	0
Lane Group Flow (vph)	24	177	0	17	146	25	18	35	1	25	29	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	14.3	14.3		13.7	13.7	18.0	1.0	3.4	3.4	4.3	6.7	
Effective Green, g (s)	14.3	14.3		13.7	13.7	18.0	1.0	3.4	3.4	4.3	6.7	
Actuated g/C Ratio	0.34	0.34		0.32	0.32	0.42	0.02	0.08	0.08	0.10	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	206	302		279	363	483	25	76	70	108	170	
v/s Ratio Prot	0.00	c0.20		0.00	c0.13	0.01	0.02	c0.04		0.02	c0.03	
v/s Ratio Perm	0.04			0.02		0.02			0.00			
v/c Ratio	0.12	0.59		0.06	0.40	0.05	0.72	0.46	0.02	0.23	0.17	
Uniform Delay, d1	9.8	11.6		9.9	11.2	7.2	20.6	18.6	18.0	17.5	15.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	2.9		0.1	0.7	0.0	67.0	4.4	0.1	1.1	0.5	
Delay (s)	10.0	14.5		10.0	11.9	7.2	87.5	23.0	18.1	18.6	15.9	
Level of Service	B	B		B	B	A	F	C	B	B	B	
Approach Delay (s)		14.0			10.5		39.3				17.1	
Approach LOS		B			B		D				B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



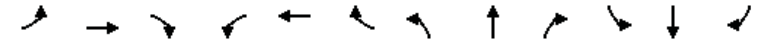
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	3	25	19	11	47	1	5	17	9	0	11	6
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	4	32	24	14	60	1	6	22	12	0	14	8

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	60	14	62	28	12	22
Volume Left (vph)	4	14	0	6	0	0
Volume Right (vph)	24	0	1	0	12	8
Hadj (s)	-0.20	0.53	0.02	0.15	-0.67	-0.18
Departure Headway (s)	4.5	5.2	4.7	5.0	4.2	4.7
Degree Utilization, x	0.08	0.02	0.08	0.04	0.01	0.03
Capacity (veh/h)	777	668	744	695	826	732
Control Delay (s)	7.9	7.1	6.9	7.0	6.0	7.8
Approach Delay (s)	7.9	7.0		6.7		7.8
Approach LOS	A	A		A		A

Intersection Summary						
Delay				7.3		
Level of Service				A		
Intersection Capacity Utilization		33.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	35	38	22	7	37	14	12	142	1400	1400	1400	1400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.96		1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3190		1677	3238		1260	2510		1260	2370	
Fit Permitted	0.71	1.00		0.71	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1250	3190		1248	3238		1260	2510		1260	2370	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	42	46	27	8	45	17	14	171	4	7	170	86
RTOR Reduction (vph)	0	20	0	0	13	0	0	1	0	0	40	0
Lane Group Flow (vph)	42	53	0	8	49	0	14	174	0	7	216	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	23.8	23.8		23.8	23.8		3.0	47.7		3.0	47.7	
Effective Green, g (s)	23.8	23.8		23.8	23.8		3.0	47.7		3.0	47.7	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.03	0.53		0.03	0.53	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	843		330	856		42	1330		42	1256	
v/s Ratio Prot		0.02			0.02		c0.01	0.07		0.01	c0.09	
v/s Ratio Perm	c0.03			0.01								
v/c Ratio	0.13	0.06		0.02	0.06		0.33	0.13		0.17	0.17	
Uniform Delay, d1	25.2	24.8		24.5	24.7		42.5	10.7		42.3	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		0.0	0.0		4.6	0.2		1.9	0.1	
Delay (s)	25.4	24.8		24.5	24.8		47.2	10.9		44.2	11.0	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		25.0			24.7			13.6			11.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	6	101	11	3	205	3	13	0	4	3	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3371		1711	3414			1681		1711	1531	
Flt Permitted	0.61	1.00		0.67	1.00			0.84		0.75	1.00	
Satd. Flow (perm)	1100	3371		1215	3414			1472		1343	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	110	12	3	223	3	14	0	4	3	0	11
RTOR Reduction (vph)	0	8	0	0	2	0	0	12	0	0	7	0
Lane Group Flow (vph)	7	114	0	3	224	0	0	6	0	3	4	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.0	9.0		9.0	9.0			10.5		10.5	10.5	
Effective Green, g (s)	9.0	9.0		9.0	9.0			10.5		10.5	10.5	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.36		0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	335	1028		370	1041			523		478	544	
v/s Ratio Prot		0.03			c0.07						0.00	
v/s Ratio Perm	0.01			0.00			c0.00			0.00		
v/c Ratio	0.02	0.11		0.01	0.22			0.01		0.01	0.01	
Uniform Delay, d1	7.2	7.4		7.1	7.6			6.1		6.1	6.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.0	0.1			0.0		0.0	0.0	
Delay (s)	7.2	7.4		7.1	7.7			6.2		6.1	6.1	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		7.4			7.7			6.2			6.1	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.11	A
Actuated Cycle Length (s)	29.5	Sum of lost time (s)
Intersection Capacity Utilization	21.7%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015

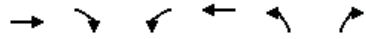


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	2	75	0	0	146	4	65	31	79	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.89				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3417			5110		1711	3052				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3262			5110		1711	3052				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	2	87	0	0	170	5	76	36	92	0	0	35
RTOR Reduction (vph)	0	0	0	0	3	0	0	54	0	0	0	33
Lane Group Flow (vph)	0	89	0	0	172	0	76	74	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1531			1781		697	1244				141
v/s Ratio Prot		c0.00			c0.03		c0.04	0.02				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.10		0.11	0.06				0.01
Uniform Delay, d1		11.1			16.7		13.9	13.7				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.1		0.3	0.1				0.2
Delay (s)		11.2			16.8		14.3	13.7				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.2			16.8			13.9				34.3
Approach LOS		B			B			B				C

Intersection Summary		
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.10	B
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	32.1%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	77	144	126	114	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1615	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1615	1428	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	92	171	150	136	0	0
RTOR Reduction (vph)	13	35	0	0	0	0
Lane Group Flow (vph)	125	90	150	136	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	43.1	43.1	6.9	60.0		
Effective Green, g (s)	43.1	43.1	6.9	60.0		
Actuated g/C Ratio	0.72	0.72	0.12	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1160	1025	381	1801		
v/s Ratio Prot	c0.08		c0.05	0.08		
v/s Ratio Perm		0.06				
v/c Ratio	0.11	0.09	0.39	0.08		
Uniform Delay, d1	2.6	2.5	24.6	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.0	0.0	0.7	0.0		
Delay (s)	2.6	2.6	25.3	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	2.6			13.3	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay		8.2			HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.15				
Actuated Cycle Length (s)		60.0		Sum of lost time (s)	10.0	
Intersection Capacity Utilization		20.6%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	38	69	111	4	66	3	120	111	2	5	145	69
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1186	1965		1156	1267		1215	2422		1215	2253	
Fit Permitted	0.43	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	541	1965		762	1267		1215	2422		1215	2253	
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)	42	77	123	4	73	3	133	123	2	6	161	77
RTOR Reduction (vph)	0	82	0	0	2	0	0	1	0	0	50	0
Lane Group Flow (vph)	42	118	0	4	74	0	133	124	0	6	188	0
Confl. Peds. (#/hr)	100		100	100		100			100		100	100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	21.8	21.8		10.6	10.6		10.1	23.6		3.3	16.8	
Effective Green, g (s)	21.8	21.8		10.6	10.6		10.1	23.6		3.3	16.8	
Actuated g/C Ratio	0.34	0.34		0.16	0.16		0.16	0.36		0.05	0.26	
Clearance Time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	659		124	206		188	879		61	582	
v/s Ratio Prot	0.01	c0.06		c0.06			c0.11	0.05		0.00	c0.08	
v/s Ratio Perm	0.05			0.01								
v/c Ratio	0.19	0.18		0.03	0.36		0.71	0.14		0.10	0.32	
Uniform Delay, d1	15.2	15.3		22.9	24.2		26.0	13.9		29.4	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	1.1		11.5	0.1		0.7	0.3	
Delay (s)	15.6	15.4		23.0	25.3		37.5	14.0		30.1	19.8	
Level of Service	B	B		C	C		D	B		C	B	
Approach Delay (s)		15.4			25.2			26.1			20.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		21.1									C	
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		65.0		Sum of lost time (s)	23.0							
Intersection Capacity Utilization		73.6%		ICU Level of Service	D							
Analysis Period (min)		15										
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY LATE EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	406	140	8	29	439	109	107	594	76	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.97			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (prot)	4480	3036		2987	2920			5461	1236			
Fit Permitted	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (perm)	4480	3036		2987	2920			5461	1236			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	489	169	10	35	529	131	129	716	92	0	0	0
RTOR Reduction (vph)	0	3	0	0	20	0	0	0	70	0	0	0
Lane Group Flow (vph)	489	176	0	35	640	0	0	845	22	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	28.5	60.0		4.5	36.0			26.6	26.6			
Effective Green, g (s)	28.5	60.0		4.5	36.0			26.6	26.6			
Actuated g/C Ratio	0.26	0.55		0.04	0.33			0.24	0.24			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1160	1656		122	955			1320	298			
v/s Ratio Prot	c0.11	0.06		0.01	c0.22							
v/s Ratio Perm								0.15	0.02			
v/c Ratio	0.42	0.11		0.29	0.67			0.64	0.07			
Uniform Delay, d1	33.9	12.1		51.2	31.9			37.4	32.2			
Progression Factor	1.00	1.00		1.23	0.29			1.29	37.37			
Incremental Delay, d2	0.2	0.1		0.4	0.6			1.0	0.1			
Delay (s)	34.1	12.2		63.4	9.7			49.2	1203.2			
Level of Service	C	B		E	A			D	F			
Approach Delay (s)		28.3			12.4			162.5			0.0	
Approach LOS		C			B			F			A	

Intersection Summary

HCM 2000 Control Delay	78.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



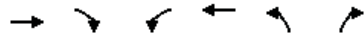
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	87	489	41	56	473	17	13	102	22	43	173	436
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.62	1.00	0.70	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00	0.70	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.92	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4239		1296	2523			1568	842	1077	1885	562
Fit Permitted	0.95	1.00		0.95	1.00			0.84	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1540	4239		1296	2523			1317	842	732	1885	562
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	104	582	49	67	563	20	15	121	26	51	206	519
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	21	0	203	203
Lane Group Flow (vph)	104	626	0	67	582	0	0	136	5	51	263	56
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				
Permitted Phases						4			4	7		7
Actuated Green, G (s)	12.5	65.1		9.9	60.9			25.1	25.1	26.1	26.1	26.1
Effective Green, g (s)	12.5	65.1		9.9	60.9			25.1	25.1	26.1	26.1	26.1
Actuated g/C Ratio	0.10	0.54		0.08	0.51			0.21	0.21	0.22	0.22	0.22
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	160	2299		106	1280			275	176	159	409	122
v/s Ratio Prot	c0.07	0.15		c0.05	c0.23							c0.14
v/s Ratio Perm								0.10	0.01	0.07		0.10
v/c Ratio	0.65	0.27		0.63	0.45			0.49	0.03	0.32	0.64	0.46
Uniform Delay, d1	51.6	14.7		53.3	18.9			41.9	37.8	39.5	42.7	40.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.3		11.7	0.3			1.4	0.1	1.2	3.4	2.8
Delay (s)	60.7	15.0		65.0	19.2			43.3	37.8	40.7	46.1	43.6
Level of Service	E	B		E	B			D	D	D	D	D
Approach Delay (s)		21.5			23.9			42.4			44.9	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	597	80	2	920	99	20
Ideal Flow (vphpl)	1400	1400	1000	1000	1400	1400
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2224			1620	1134	1000
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2224			1546	1134	1000
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	711	95	2	1095	118	24
RTOR Reduction (vph)	6	0	0	0	0	20
Lane Group Flow (vph)	800	0	0	1097	118	4
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		6				8
Actuated Green, G (s)	81.8			81.8	16.9	16.9
Effective Green, g (s)	81.8			81.8	16.9	16.9
Actuated g/C Ratio	0.74			0.74	0.15	0.15
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1653			1149	174	153
v/s Ratio Prot	0.36				c0.10	
v/s Ratio Perm				c0.71		0.00
v/c Ratio	0.48			0.95	0.68	0.02
Uniform Delay, d1	5.6			12.5	44.0	39.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			16.7	10.0	0.1
Delay (s)	6.7			29.2	54.0	39.6
Level of Service	A			C	D	D
Approach Delay (s)	6.7			29.2	51.6	
Approach LOS	A			C	D	
Intersection Summary						
HCM 2000 Control Delay			21.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.91			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			76.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	19	302	53	13	179	395	159	85	209	116
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.98			1.00	0.97			0.98	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			0.99	0.85
Fit Protected		1.00			1.00	1.00			0.96	1.00
Satd. Flow (prot)		5746			2872	2470			4028	1122
Fit Permitted		1.00			0.90	1.00			0.96	1.00
Satd. Flow (perm)		5746			2600	2470			4028	1122
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	355	62	15	211	465	187	100	246	136
RTOR Reduction (vph)	0	39	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	400	0	0	226	599	0	0	370	112
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		21.4			22.6	22.6			13.5	13.5
Effective Green, g (s)		23.4			25.6	25.6			16.5	16.5
Actuated g/C Ratio		0.31			0.34	0.34			0.22	0.22
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1792			887	843			886	246
v/s Ratio Prot						c0.24			0.09	c0.10
v/s Ratio Perm		0.07			0.09					
v/c Ratio		0.22			0.25	0.71			0.42	0.46
Uniform Delay, d1		19.1			17.8	21.5			25.1	25.4
Progression Factor		1.00			0.79	1.00			1.00	1.00
Incremental Delay, d2		0.1			0.1	2.8			0.3	1.3
Delay (s)		19.1			14.2	24.3			25.4	26.7
Level of Service		B			B	C			C	C
Approach Delay (s)		19.1			14.2	24.3			25.7	
Approach LOS		B			B	C			C	
Intersection Summary										
HCM 2000 Control Delay					22.2				HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio					0.49					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					56.5%				ICU Level of Service	B
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015

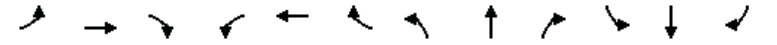


Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	37	270	196	35	155	125	25	166	48	285
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.87		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.93		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1214	1869		2249		1161		1327	2542
Fit Permitted		0.95	0.99		1.00		1.00		0.47	0.91
Satd. Flow (perm)		1214	1869		2249		1161		658	2324
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	39	284	206	37	163	132	26	175	51	300
RTOR Reduction (vph)	0	0	17	0	1	0	18	0	0	0
Lane Group Flow (vph)	0	224	325	0	297	0	5	0	180	346
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)		18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio		0.25	0.28		0.23		0.21	0.43	0.43	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		299	523		524		247	396	1043	
v/s Ratio Prot		c0.18	0.17		c0.13			c0.08	0.06	
v/s Ratio Perm							0.00	0.12	0.09	
v/c Ratio		0.75	0.62		0.57		0.02	0.45	0.33	
Uniform Delay, d1		26.1	23.5		25.4		23.3	18.1	14.1	
Progression Factor		1.00	1.00		1.00		1.00	0.69	0.70	
Incremental Delay, d2		15.8	5.5		4.4		0.1	2.9	0.7	
Delay (s)		41.9	29.0		29.8		23.5	15.5	10.5	
Level of Service		D	C		C		C	B	B	
Approach Delay (s)			34.1		29.4				12.2	
Approach LOS			C		C				B	
Intersection Summary										
HCM 2000 Control Delay			24.9		HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.49							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)			13.5		
Intersection Capacity Utilization			65.4%		ICU Level of Service			C		
Analysis Period (min)			15							

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↕	↕	↔	↕	↕
Volume (vph)	9	1	51	181	19	319	10	378	4	4	426	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1545	1356		2711		1377	2748		1540	3042	
Fit Permitted		0.65	1.00		0.85		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1053	1356		2339		1377	2748		1540	3042	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	11	1	62	221	23	389	12	461	5	5	520	38
RTOR Reduction (vph)	0	0	43	0	271	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	12	19	0	362	0	12	465	0	5	553	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA	NA	Prot	NA	Prot	NA	NA	NA
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8								
Actuated Green, G (s)		14.0	14.0		14.0		0.8	15.2		0.9	15.6	
Effective Green, g (s)		14.0	14.0		14.0		0.8	15.2		0.9	15.6	
Actuated g/C Ratio		0.30	0.30		0.30		0.02	0.33		0.02	0.34	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		320	412		711		23	908		30	1031	
v/s Ratio Prot							0.01	c0.17		0.00	c0.18	
v/s Ratio Perm		0.01	0.01		c0.15							
v/c Ratio		0.04	0.05		0.51		0.52	0.51		0.17	0.54	
Uniform Delay, d1		11.3	11.3		13.2		22.4	12.4		22.2	12.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0	0.0		0.6		9.5	0.5		1.0	0.5	
Delay (s)		11.3	11.3		13.8		31.9	12.9		23.1	12.8	
Level of Service		B	B		B		C	B		C	B	
Approach Delay (s)		11.3			13.8			13.4			12.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.3		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			46.0		Sum of lost time (s)			15.9				
Intersection Capacity Utilization			58.4%		ICU Level of Service			B				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	17	14	20	5	11	44	4	28	6	40	71	12
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	0.99		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.94			1.00	0.85	1.00	0.97		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2372			1428	1227	1160	1389		1377	1378	
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		2304			1449	1227	1221	1389		1377	1378	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	22	18	25	6	14	56	5	35	8	51	90	15
RTOR Reduction (vph)	0	23	0	0	0	27	0	7	0	0	5	0
Lane Group Flow (vph)	0	42	0	0	20	29	5	36	0	51	100	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.3			2.3	18.7	2.4	2.4		16.4	23.8	
Effective Green, g (s)		2.3			2.3	18.7	2.4	2.4		16.4	23.8	
Actuated g/C Ratio		0.06			0.06	0.52	0.07	0.07		0.45	0.66	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		146			92	805	81	92		625	908	
v/s Ratio Prot						0.02		c0.03		0.04	c0.07	
v/s Ratio Perm		c0.02			0.01	0.01	0.00					
v/c Ratio		0.28			0.22	0.04	0.06	0.39		0.08	0.11	
Uniform Delay, d1		16.1			16.0	4.3	15.8	16.1		5.6	2.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			1.2	0.0	0.3	2.7		0.0	0.1	
Delay (s)		17.2			17.2	4.3	16.1	18.8		5.6	2.3	
Level of Service		B			B	A	B	B		A	A	
Approach Delay (s)		17.2			7.7			18.5			3.4	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



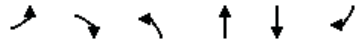
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	15	89	491	12	38	95
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1740	1535	849	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1740	1535	849	1134	1194
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	18	106	585	14	45	113
RTOR Reduction (vph)	0	98	0	3	0	0
Lane Group Flow (vph)	18	8	585	11	45	113
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	5.7	5.7	48.3	43.3	5.3	58.6
Effective Green, g (s)	5.7	5.7	48.3	43.3	5.3	58.6
Actuated g/C Ratio	0.08	0.08	0.65	0.58	0.07	0.79
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	86	133	997	551	80	941
v/s Ratio Prot	c0.02		c0.38	0.01	c0.04	0.09
v/s Ratio Perm		0.00		0.01		
v/c Ratio	0.21	0.06	0.59	0.02	0.56	0.12
Uniform Delay, d1	32.2	31.8	7.4	6.5	33.4	1.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	0.9	0.0	8.8	0.1
Delay (s)	33.4	32.0	8.2	6.6	42.1	1.9
Level of Service	C	C	A	A	D	A
Approach Delay (s)	32.2		8.2			13.4
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	4	4	21	334	84
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	3	6	6	31	499	125
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	689	412	674			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	689	412	674			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	349	545	878			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	3	6	16	21	332	292
Volume Left	3	0	6	0	0	0
Volume Right	0	6	0	0	0	125
cSH	349	545	878	1700	1700	1700
Volume to Capacity	0.01	0.01	0.01	0.01	0.20	0.17
Queue Length 95th (ft)	1	1	1	0	0	0
Control Delay (s)	15.4	11.7	3.4	0.0	0.0	0.0
Lane LOS	C	B	A			
Approach Delay (s)	12.9		1.5		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			31.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	79	33	203	7	5	383
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.94	1.00		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1558	1439	3400		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1558	1439	3400		1711	3421
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	91	38	233	8	6	440
RTOR Reduction (vph)	0	34	1	0	0	0
Lane Group Flow (vph)	91	4	240	0	6	440
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	12.4	12.4	90.9		1.4	97.4
Effective Green, g (s)	12.4	12.4	90.9		1.4	97.4
Actuated g/C Ratio	0.10	0.10	0.76		0.01	0.81
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	160	148	2575		19	2776
v/s Ratio Prot			0.07		0.00	c0.13
v/s Ratio Perm	c0.06	0.00				
v/c Ratio	0.57	0.03	0.09		0.32	0.16
Uniform Delay, d1	51.3	48.4	3.8		58.8	2.4
Progression Factor	1.00	1.00	1.03		1.00	1.00
Incremental Delay, d2	4.6	0.1	0.1		9.3	0.1
Delay (s)	55.8	48.4	4.0		68.2	2.6
Level of Service	E	D	A		E	A
Approach Delay (s)	53.7		4.0			3.4
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	25	338	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	29	398	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	438	225	423			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	225	423			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	536	763	1111			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	10	20	265	133
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1111	1700	1700	1700
Volume to Capacity	0.00	0.00	0.01	0.16	0.08
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization		22.4%		ICU Level of Service	A
Analysis Period (min)		15			

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	13	1	1	28	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	16	1	1	34	0
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			66		111	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			66		111	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1478		818	875

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	2	34
Volume Left	0	1	34
Volume Right	16	0	0
cSH	1700	1478	818
Volume to Capacity	0.01	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	3.7	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	9.6
Approach LOS			A

Intersection Summary			
Average Delay			6.4
Intersection Capacity Utilization		29.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	48	10	72	7	17	5	70	157	0	3	318	141
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.93	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.96	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1243	1365	1108	1278	1365	1074	2515	2593		1296	2457	
Fit Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	974	1365	1108	1008	1365	1074	2515	2593		1296	2457	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	56	12	85	8	20	6	82	185	0	4	374	166
RTOR Reduction (vph)	0	0	76	0	0	5	0	0	0	0	24	0
Lane Group Flow (vph)	56	12	9	8	20	1	82	185	0	4	516	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	12.5	12.5	12.5	12.5	12.5	12.5	8.0	90.4		1.4	83.8	
Effective Green, g (s)	12.5	12.5	12.5	12.5	12.5	12.5	8.0	90.4		1.4	83.8	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.07	0.75		0.01	0.70	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	142	115	105	142	111	167	1953		15	1715	
v/s Ratio Prot		0.01			0.01		c0.03	0.07		0.00	c0.21	
v/s Ratio Perm	c0.06		0.01	0.01		0.00						
v/c Ratio	0.55	0.08	0.08	0.08	0.14	0.01	0.49	0.09		0.27	0.30	
Uniform Delay, d1	51.1	48.6	48.5	48.5	48.9	48.2	54.0	3.9		58.8	6.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.06	0.80	
Incremental Delay, d2	6.4	0.3	0.3	0.3	0.5	0.0	2.3	0.1		9.3	0.1	
Delay (s)	57.5	48.8	48.8	48.8	49.3	48.2	56.3	4.0		71.7	5.6	
Level of Service	E	D	D	D	D	D	E	A		E	A	
Approach Delay (s)		52.0			49.0			20.1			6.1	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	44	104	2	3	210	14	4	6	1	25	2	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1261	1621	1674		1498	1361	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1261	1209	1674		1187	1361	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	49	117	2	3	236	16	4	7	1	28	2	72
RTOR Reduction (vph)	0	0	1	0	0	8	0	1	0	0	59	0
Lane Group Flow (vph)	49	117	1	3	236	8	4	7	0	28	15	0
Confl. Peds. (#/hr)	50				50				39			8
Confl. Bikes (#/hr)					10				4			14
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8			8		4
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.1	44.8	44.8	2.3	40.0	40.0	14.3	14.3		14.3	14.3	
Effective Green, g (s)	7.1	44.8	44.8	2.3	40.0	40.0	14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.52	0.52	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1000	850	48	893	660	226	313		222	254	
v/s Ratio Prot	c0.03	c0.07		0.00	c0.14		0.01	0.00		0.00	0.01	
v/s Ratio Perm			0.00			0.01	0.00				c0.02	
v/c Ratio	0.33	0.12	0.00	0.06	0.26	0.01	0.02	0.02		0.13	0.06	
Uniform Delay, d1	32.4	7.0	6.5	36.0	10.1	8.7	25.3	25.3		25.8	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.2	0.0	0.5	0.2	0.0	0.0	0.0		0.3	0.1	
Delay (s)	33.7	7.3	6.5	36.6	10.2	8.7	25.4	25.4		26.1	25.6	
Level of Service	C	A	A	D	B	A	C	C		C	C	
Approach Delay (s)		15.0			10.4		25.4				25.8	
Approach LOS		B			B		C				C	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015

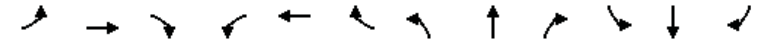


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	12	119	6	11	259	8	12	33	14	16	25	40
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1049	1540	2941			3019	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00			0.93	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1049	1473	2941			2857	1074
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	15	145	7	13	316	10	15	40	17	20	30	49
RTOR Reduction (vph)	0	0	4	0	0	6	0	15	0	0	0	44
Lane Group Flow (vph)	15	145	3	13	316	4	15	42	0	0	50	5
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.7	13.5	13.5	0.5	12.3	12.3	4.4	4.4			3.4	3.4
Effective Green, g (s)	0.7	13.5	13.5	0.5	12.3	12.3	4.4	4.4			3.4	3.4
Actuated g/C Ratio	0.02	0.43	0.43	0.02	0.39	0.39	0.14	0.14			0.11	0.11
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	27	522	592	24	475	410	206	412			309	116
v/s Ratio Prot	c0.01	0.12		0.01	c0.26			0.01				
v/s Ratio Perm			0.00			0.00	0.01				c0.02	0.00
v/c Ratio	0.56	0.28	0.01	0.54	0.67	0.01	0.07	0.10			0.16	0.05
Uniform Delay, d1	15.2	5.8	5.1	15.3	7.9	5.8	11.7	11.8			12.7	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	22.5	0.3	0.0	22.7	3.5	0.0	0.2	0.1			0.2	0.2
Delay (s)	37.7	6.1	5.1	38.0	11.4	5.8	11.9	11.9			13.0	12.7
Level of Service	D	A	A	D	B	A	B	B			B	B
Approach Delay (s)		8.9			12.2			11.9			12.8	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	31.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	15	106	59	25	159	126	19	44	9	22	51	13
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1328	893		1333	1126	897	1070	957	908	1070	1079	
Fit Permitted	0.34	1.00		0.60	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	482	893		849	1126	897	1070	957	908	1070	1079	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	18	128	71	30	192	152	23	53	11	27	61	16
RTOR Reduction (vph)	0	26	0	0	0	87	0	0	9	0	11	0
Lane Group Flow (vph)	18	173	0	30	192	65	23	53	2	27	66	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10						
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8			7	4
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	12.5	12.5		13.8	13.8	20.3	0.9	6.9	6.9	6.5	12.5	
Effective Green, g (s)	12.5	12.5		13.8	13.8	20.3	0.9	6.9	6.9	6.5	12.5	
Actuated g/C Ratio	0.26	0.26		0.29	0.29	0.43	0.02	0.14	0.14	0.14	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	135	234		263	325	475	20	138	131	145	282	
v/s Ratio Prot	0.00	c0.19		0.00	c0.17	0.02	0.02	c0.06		0.03	c0.06	
v/s Ratio Perm	0.03			0.03		0.05			0.00			
v/c Ratio	0.13	0.74		0.11	0.59	0.14	1.15	0.38	0.01	0.19	0.23	
Uniform Delay, d1	13.5	16.1		12.5	14.5	8.4	23.4	18.5	17.5	18.3	13.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	11.9		0.2	2.9	0.1	252.2	1.8	0.0	0.6	0.4	
Delay (s)	13.9	28.0		12.7	17.4	8.5	275.6	20.3	17.5	18.9	14.3	
Level of Service	B	C		B	B	A	F	C	B	B	B	
Approach Delay (s)		26.8			13.4			87.4			15.5	
Approach LOS		C			B			F			B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	47.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop	Stop		Stop	
Volume (vph)	2	36	10	205	154	12	5	17	13	2	10	6
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	3	46	13	263	197	15	6	22	17	3	13	8
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	62	263	213	28	17	23						
Volume Left (vph)	3	263	0	6	0	3						
Volume Right (vph)	13	0	15	0	17	8						
Hadj (s)	-0.08	0.53	-0.02	0.15	-0.67	-0.14						
Departure Headway (s)	5.1	5.3	4.7	5.9	5.1	5.6						
Degree Utilization, x	0.09	0.39	0.28	0.05	0.02	0.04						
Capacity (veh/h)	690	668	747	563	645	592						
Control Delay (s)	8.6	10.4	8.4	8.0	7.0	8.8						
Approach Delay (s)	8.6	9.5		7.7		8.8						
Approach LOS	A	A		A		A						

Intersection Summary						
Delay			9.2			
Level of Service			A			
Intersection Capacity Utilization		33.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	37	36	17	13	145	1900	1400	183	6	6	188	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	1.00		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	3220		1673	3391		1260	2506		1260	2283	
Flt Permitted	0.64	1.00		0.71	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1115	3220		1257	3391		1260	2506		1260	2283	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	45	43	20	16	175	8	25	220	7	7	227	245
RTOR Reduction (vph)	0	14	0	0	4	0	0	2	0	0	152	0
Lane Group Flow (vph)	45	49	0	16	179	0	25	225	0	7	320	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	331	956		373	1007		212	999		187	865	
v/s Ratio Prot		0.02			c0.05		0.02	c0.09		0.01	c0.14	
v/s Ratio Perm	0.04			0.01								
v/c Ratio	0.14	0.05		0.04	0.18		0.12	0.22		0.04	0.37	
Uniform Delay, d1	25.8	25.1		25.0	26.1		35.2	19.8		36.4	22.4	
Progression Factor	1.00	1.00		1.00	1.00		0.87	0.76		1.00	1.00	
Incremental Delay, d2	0.9	0.1		0.2	0.4		0.7	0.3		0.4	1.2	
Delay (s)	26.6	25.2		25.2	26.5		31.2	15.4		36.8	23.6	
Level of Service	C	C		C	C		C	B		D	C	
Approach Delay (s)		25.8			26.4			17.0			23.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



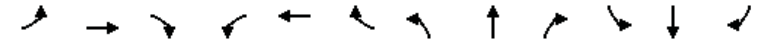
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔		↔	↕↔			↕↔		↔	↕↔	
Volume (vph)	6	86	11	3	455	3	13	0	4	3	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3363		1711	3418			1681		1711	1531	
Flt Permitted	0.47	1.00		0.69	1.00			0.80		0.75	1.00	
Satd. Flow (perm)	846	3363		1235	3418			1406		1343	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	93	12	3	495	3	14	0	4	3	0	11
RTOR Reduction (vph)	0	7	0	0	1	0	0	13	0	0	8	0
Lane Group Flow (vph)	7	98	0	3	497	0	0	5	0	3	3	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.9	10.9		10.9	10.9			7.8		7.8	7.8	
Effective Green, g (s)	10.9	10.9		10.9	10.9			7.8		7.8	7.8	
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.27		0.27	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1277		469	1298			382		364	416	
v/s Ratio Prot		0.03			c0.15						0.00	
v/s Ratio Perm	0.01			0.00			c0.00			0.00		
v/c Ratio	0.02	0.08		0.01	0.38			0.01		0.01	0.01	
Uniform Delay, d1	5.6	5.7		5.5	6.5			7.6		7.6	7.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.0	0.2			0.0		0.0	0.0	
Delay (s)	5.6	5.7		5.5	6.6			7.6		7.6	7.6	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		5.7			6.6			7.6			7.6	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.23	A
Actuated Cycle Length (s)	28.7	Sum of lost time (s)
Intersection Capacity Utilization	28.6%	10.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



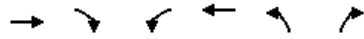
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↔			↕↔			↕↔			↕↔	↕↔
Volume (vph)	2	43	0	0	395	4	70	31	84	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			5.0	5.0			5.0
Lane Util. Factor		0.95			*0.95			1.00	0.95			0.88
Frt		1.00			1.00			1.00	0.89			0.85
Flt Protected		1.00			1.00			0.95	1.00			1.00
Satd. Flow (prot)		3415			5124			1711	3046			2694
Flt Permitted		0.95			1.00			0.95	1.00			1.00
Satd. Flow (perm)		3250			5124			1711	3046			2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	2	50	0	0	459	5	81	36	98	0	0	35
RTOR Reduction (vph)	0	0	0	0	1	0	0	58	0	0	0	33
Lane Group Flow (vph)	0	52	0	0	463	0	81	76	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1526			1786		697	1242				141
v/s Ratio Prot		c0.00			c0.09		c0.05	0.02				0.00
v/s Ratio Perm		0.01										
v/c Ratio		0.03			0.26		0.12	0.06				0.01
Uniform Delay, d1		11.0			17.7		14.0	13.7				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.0			0.4		0.3	0.1				0.2
Delay (s)		11.0			18.1		14.3	13.8				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.0			18.1			14.0				34.3
Approach LOS		B			B		B	B				C

Intersection Summary		
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.17	B
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	32.1%	14.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	45	196	366	128	0	0
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	*0.85	*0.85	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.91	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1081	1008	2620	1422		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1081	1008	2620	1422		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	54	233	436	152	0	0
RTOR Reduction (vph)	39	59	0	0	0	0
Lane Group Flow (vph)	108	81	436	152	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	34.9	34.9	15.1	60.0		
Effective Green, g (s)	34.9	34.9	15.1	60.0		
Actuated g/C Ratio	0.58	0.58	0.25	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	628	586	659	1422		
v/s Ratio Prot	c0.10		c0.17	0.11		
v/s Ratio Perm		0.08				
v/c Ratio	0.17	0.14	0.66	0.11		
Uniform Delay, d1	5.8	5.7	20.2	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.1	2.5	0.0		
Delay (s)	6.0	5.8	22.7	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	5.9			16.8	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			13.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.32			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	23	42	85	6	191	1	105	85	5	0	126	263
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5			5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95			0.95	
Frbp, ped/bikes	1.00	0.91		1.00	1.00		1.00	0.99			0.91	
Flpb, ped/bikes	0.97	1.00		0.90	1.00		1.00	1.00			1.00	
Frt	1.00	0.90		1.00	1.00		1.00	0.99			0.90	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1183	1866		1096	1278		1215	2390			1998	
Fit Permitted	0.36	1.00		0.66	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	452	1866		764	1278		1215	2390			1998	
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)	26	47	94	7	212	1	117	94	6	0	140	292
RTOR Reduction (vph)	0	66	0	0	0	0	0	2	0	0	168	0
Lane Group Flow (vph)	26	75	0	7	213	0	117	98	0	0	264	0
Confl. Peds. (#/hr)	100		100	100		100			100		100	100
Confl. Bikes (#/hr)			10			10			10		10	10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.1	36.1		25.1	25.1		16.7	73.1			50.9	
Effective Green, g (s)	36.1	36.1		25.1	25.1		16.7	73.1			50.9	
Actuated g/C Ratio	0.30	0.30		0.21	0.21		0.14	0.61			0.42	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	170	561		159	267		169	1455			847	
v/s Ratio Prot	0.01	c0.04			c0.17		c0.10	0.04			c0.13	
v/s Ratio Perm	0.04			0.01								
v/c Ratio	0.15	0.13		0.04	0.80		0.69	0.07			0.31	
Uniform Delay, d1	30.7	30.6		37.9	45.0		49.2	9.6			22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	0.1		0.1	15.2		11.6	0.1			1.0	
Delay (s)	31.1	30.7		38.0	60.2		60.8	9.6			23.9	
Level of Service	C	C		D	E		E	A			C	
Approach Delay (s)		30.7			59.5			37.2			23.9	
Approach LOS		C			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.3								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			120.0								Sum of lost time (s)	21.6
Intersection Capacity Utilization			75.3%								ICU Level of Service	D
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
NO SF GIANTS GAME AT AT&T PARK
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



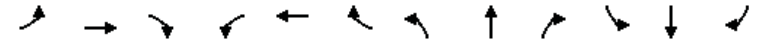
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	133	569	78	43	483	154	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.89			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3018		2987	2982			5514	1233			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3018		2987	2982			5514	1233			
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)	708	744	64	148	632	87	48	537	171	0	0	0
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	140	0	0	0
Lane Group Flow (vph)	708	804	0	148	711	0	0	585	31	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.6	60.4		10.8	45.6			19.9	19.9			
Effective Green, g (s)	25.6	60.4		10.8	45.6			19.9	19.9			
Actuated g/C Ratio	0.23	0.55		0.10	0.41			0.18	0.18			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1042	1657		293	1236			997	223			
v/s Ratio Prot	c0.16	0.27		0.05	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.68	0.49		0.51	0.58			0.59	0.14			
Uniform Delay, d1	38.5	15.2		47.1	24.8			41.3	37.8			
Progression Factor	0.58	0.25		1.36	0.25			1.12	3.29			
Incremental Delay, d2	1.6	0.9		0.4	0.2			0.8	0.3			
Delay (s)	23.7	4.7		64.2	6.3			47.1	124.7			
Level of Service	C	A		E	A			D	F			
Approach Delay (s)		13.6			16.2			64.7			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015

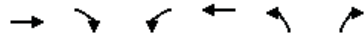


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	207	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.96	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2437			1539	852	1033	2863	580
Fit Permitted	0.95	1.00		0.95	1.00			0.94	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2437			1452	852	781	2863	580
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	220	103
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	26	0	3	79
Lane Group Flow (vph)	162	1439	0	54	593	0	0	59	4	64	227	14
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	17.5	66.0		8.9	55.8			15.2	15.2	16.2	16.2	16.2
Effective Green, g (s)	17.5	66.0		8.9	55.8			15.2	15.2	16.2	16.2	16.2
Actuated g/C Ratio	0.16	0.60		0.08	0.51			0.14	0.14	0.15	0.15	0.15
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	245	2572		104	1236			200	117	115	421	85
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						0.08	
v/s Ratio Perm								0.04	0.00	c0.08		0.02
v/c Ratio	0.66	0.56		0.52	0.48			0.29	0.04	0.56	0.54	0.16
Uniform Delay, d1	43.5	13.2		48.5	17.6			42.6	41.1	43.6	43.4	41.0
Progression Factor	0.90	1.29		0.84	0.51			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.7		3.6	0.2			0.8	0.1	5.7	1.3	0.9
Delay (s)	44.4	17.8		44.2	9.2			43.4	41.2	49.3	44.8	41.9
Level of Service	D	B		D	A			D	D	D	D	D
Approach Delay (s)		20.5			12.1			42.7			44.8	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

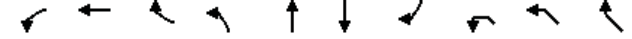
4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.55	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			1.2	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			1.2	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio			0.64		A	
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			69.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↔	↑↑	↑↑		↔	↔
Volume (vph)	262	1267	145	34	172	356	188	134	443	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.97	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			0.98	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		5770			2846	2429			3976	1122
Fit Permitted		0.99			0.83	1.00			0.96	1.00
Satd. Flow (perm)		5770			2373	2429			3976	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	138	457	270
RTOR Reduction (vph)	0	22	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1703	0	0	212	555	0	0	665	200
Confl. Peds. (#/hr)		50		100	100		100	50	100	100
Confl. Bikes (#/hr)				10			10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		22.4			20.4	20.4			14.7	14.7
Effective Green, g (s)		24.4			23.4	23.4			17.7	17.7
Actuated g/C Ratio		0.33			0.31	0.31			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1877			740	757			938	264
v/s Ratio Prot						c0.23			0.17	c0.18
v/s Ratio Perm		0.30			0.09					
v/c Ratio		0.91			0.29	0.73			0.71	0.76
Uniform Delay, d1		24.2			19.5	23.0			26.3	26.7
Progression Factor		1.00			0.71	1.00			1.00	1.00
Incremental Delay, d2		6.8			0.2	3.7			2.5	11.7
Delay (s)		31.0			14.0	26.7			28.8	38.4
Level of Service		C			B	C			C	D
Approach Delay (s)		31.0			14.0	26.7			31.0	
Approach LOS		C			B	C			C	
Intersection Summary										
HCM 2000 Control Delay					29.2				HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio					0.84				C	
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					84.6%				ICU Level of Service	E
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



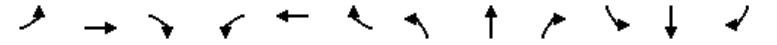
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	51	301	276	49	155	105	14	231	55	466
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2621		2297		1161		1327	2547
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.91
Satd. Flow (perm)		1700	2621		2297		1161		621	2321
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	372	341	60	191	130	17	285	68	575
RTOR Reduction (vph)	0	0	19	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	331	486	0	322	0	3	0	292	636
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)		18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio		0.25	0.28		0.23		0.21	0.43	0.43	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		419	733		535		247	386	1043	
v/s Ratio Prot		c0.19	0.19		0.14			c0.13	0.10	
v/s Ratio Perm							0.00	c0.20	0.16	
v/c Ratio		0.79	0.66		0.60		0.01	0.76	0.61	
Uniform Delay, d1		26.4	23.9		25.6		23.3	20.1	16.4	
Progression Factor		1.00	1.00		1.00		1.00	0.88	0.89	
Incremental Delay, d2		14.1	4.7		5.0		0.1	10.1	2.0	
Delay (s)		40.5	28.5		30.6		23.4	27.9	16.7	
Level of Service		D	C		C		C	C	B	
Approach Delay (s)			33.3		30.3				20.2	
Approach LOS			C		C				C	

Intersection Summary	
HCM 2000 Control Delay	27.0 HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	75.0 Sum of lost time (s) 13.5
Intersection Capacity Utilization	65.4% ICU Level of Service C
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↑	↑	↔	↔	↔
Volume (vph)	10	2	39	8	4	14	9	321	2	7	72	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1550	1350		1464		1272	2541		1540	3032	
Fit Permitted		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1614	1350		1486		1272	2541		1540	3032	
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)	10	2	40	8	4	14	9	331	2	7	74	7
RTOR Reduction (vph)	0	0	37	0	13	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	12	3	0	13	0	9	332	0	7	76	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Effective Green, g (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Actuated g/C Ratio		0.07	0.07		0.07		0.02	0.33		0.02	0.34	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		111	93		103		27	834		33	1029	
v/s Ratio Prot							0.01	c0.13		0.00	c0.03	
v/s Ratio Perm		0.01	0.00		c0.01							
v/c Ratio		0.11	0.03		0.13		0.33	0.40		0.21	0.07	
Uniform Delay, d1		12.0	11.9		12.0		13.2	7.1		13.2	6.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4	0.1		0.6		2.6	0.3		1.2	0.0	
Delay (s)		12.4	12.0		12.5		15.8	7.4		14.3	6.2	
Level of Service		B	B		B		B	A		B	A	
Approach Delay (s)		12.1			12.5			7.6			6.8	
Approach LOS		B			B			A			A	

Intersection Summary	
HCM 2000 Control Delay	8.2 HCM 2000 Level of Service A
HCM 2000 Volume to Capacity ratio	0.35
Actuated Cycle Length (s)	27.4 Sum of lost time (s) 15.9
Intersection Capacity Utilization	46.8% ICU Level of Service A
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	
Volume (vph)	7	5	7	2	2	16	5	29	1	44	59	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2372			1413	1230	1148	1438		1377	1379	
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		2306			1448	1230	1208	1438		1377	1379	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	8	6	8	2	2	18	6	33	1	51	68	11
RTOR Reduction (vph)	0	8	0	0	0	8	0	1	0	0	3	0
Lane Group Flow (vph)	0	14	0	0	4	10	6	33	0	51	76	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		1.1			1.1	20.5	1.2	1.2		19.4	25.6	
Effective Green, g (s)		1.1			1.1	20.5	1.2	1.2		19.4	25.6	
Actuated g/C Ratio		0.03			0.03	0.56	0.03	0.03		0.53	0.70	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		69			43	854	39	47		727	961	
v/s Ratio Prot						0.01		c0.02		0.04	c0.05	
v/s Ratio Perm		c0.01			0.00	0.00	0.00					
v/c Ratio		0.21			0.09	0.01	0.15	0.70		0.07	0.08	
Uniform Delay, d1		17.4			17.3	3.6	17.3	17.6		4.2	1.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.9	0.0	1.8	38.1		0.0	0.0	
Delay (s)		18.9			18.3	3.6	19.1	55.6		4.2	1.8	
Level of Service		B			B	A	B	E		A	A	
Approach Delay (s)		18.9			6.3			50.2			2.8	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	20	88	184	25	39	76
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1744	1535	846	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1744	1535	846	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	101	211	29	45	87
RTOR Reduction (vph)	0	89	0	17	0	0
Lane Group Flow (vph)	23	12	211	12	45	87
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	5.9	5.9	25.2	20.2	3.1	33.3
Effective Green, g (s)	5.9	5.9	25.2	20.2	3.1	33.3
Actuated g/C Ratio	0.12	0.12	0.51	0.41	0.06	0.68
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	135	209	786	433	71	808
v/s Ratio Prot	c0.02		c0.14	0.01	c0.04	0.07
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.17	0.06	0.27	0.03	0.63	0.11
Uniform Delay, d1	19.5	19.2	6.8	8.6	22.5	2.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.2	0.0	17.0	0.1
Delay (s)	20.1	19.3	7.0	8.7	39.5	2.8
Level of Service	C	B	A	A	D	A
Approach Delay (s)	19.4		7.2			15.3
Approach LOS	B		A			B

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	7	57	33	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	1	8	68	39	4
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	192	121	93			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	121	93			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	717	839	1442			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	4	1	31	45	26	17
Volume Left	4	0	8	0	0	0
Volume Right	0	1	0	0	0	4
cSH	717	839	1442	1700	1700	1700
Volume to Capacity	0.00	0.00	0.01	0.03	0.02	0.01
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	10.0	9.3	2.1	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	9.9		0.8		0.0	
Approach LOS	A					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			29.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	4	287	7	2	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.85	1.00		1.00	1.00
Flpb, ped/bikes	0.94	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1613	1304	3401		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1613	1304	3401		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	4	309	8	2	243
RTOR Reduction (vph)	0	4	1	0	0	0
Lane Group Flow (vph)	11	0	316	0	2	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	1.4	1.4	59.1		1.2	65.4
Effective Green, g (s)	1.4	1.4	59.1		1.2	65.4
Actuated g/C Ratio	0.02	0.02	0.77		0.02	0.85
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	29	23	2610		26	2905
v/s Ratio Prot			c0.09		0.00	c0.07
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.38	0.00	0.12		0.08	0.08
Uniform Delay, d1	37.4	37.1	2.3		37.4	0.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	8.1	0.1	0.1		1.3	0.1
Delay (s)	45.5	37.2	2.4		38.6	1.0
Level of Service	D	D	A		D	A
Approach Delay (s)	43.3		2.4			1.3
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	3.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↑	
Volume (veh/h)	0	0	0	64	34	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	75	40	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	104	46	65			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104	46	65			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	866	993	1506			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	25	50	27	13
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1506	1700	1700	1700
Volume to Capacity	0.00	0.00	0.03	0.02	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay	0.0				
Intersection Capacity Utilization	19.3%		ICU Level of Service		A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	P			↑	Y	
Volume (veh/h)	1	20	2	2	28	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	25	3	3	35	1
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			77		122	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		122	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1464		807	868

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	27	5	37
Volume Left	0	3	35
Volume Right	25	0	1
cSH	1700	1464	809
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	3.7	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	9.7
Approach LOS		A	

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	29.9%	ICU Level of Service	
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	46	18	99	1	23	6	62	242	2	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	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	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1280	1365	1128	1291	1365	1116	2515	2590		1296	2454	
Fit Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	997	1365	1128	1011	1365	1116	2515	2590		1296	2454	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	52	20	111	1	26	7	70	272	2	1	183	80
RTOR Reduction (vph)	0	0	92	0	0	6	0	1	0	0	59	0
Lane Group Flow (vph)	52	20	19	1	26	1	70	273	0	1	204	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	5.9	5.9	5.9	5.9	5.9	5.9	3.4	11.3		1.0	8.9	
Effective Green, g (s)	5.9	5.9	5.9	5.9	5.9	5.9	3.4	11.3		1.0	8.9	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.10	0.33		0.03	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	237	196	175	237	194	252	863		38	644	
v/s Ratio Prot		0.01		0.02	0.02		0.03	c0.11		0.00	c0.08	
v/s Ratio Perm	c0.05		0.02	0.00		0.00						
v/c Ratio	0.30	0.08	0.10	0.01	0.11	0.01	0.28	0.32		0.03	0.32	
Uniform Delay, d1	12.2	11.7	11.8	11.6	11.8	11.6	14.1	8.4		16.0	10.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.2	0.2	0.0	0.2	0.0	0.6	0.2		0.3	0.3	
Delay (s)	13.2	11.9	12.0	11.6	12.0	11.6	14.7	8.6		16.3	10.3	
Level of Service	B	B	B	B	B	B	B	A		B	B	
Approach Delay (s)		12.3			11.9			9.9			10.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	33.9	Sum of lost time (s)	15.7
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	39	144	1	2	141	12	3	5	1	17	1	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1255	1621	1663		1493	1356	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1255	1239	1663		1185	1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	150	1	2	147	12	3	5	1	18	1	46
RTOR Reduction (vph)	0	0	0	0	0	6	0	1	0	0	37	0
Lane Group Flow (vph)	41	150	1	2	147	6	3	5	0	18	10	0
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8				4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Effective Green, g (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1012	860	48	905	666	232	311		222	254	
v/s Ratio Prot	c0.03	c0.09		0.00	c0.09		0.01	0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.27	0.15	0.00	0.04	0.16	0.01	0.01	0.02		0.08	0.04	
Uniform Delay, d1	33.5	7.2	6.6	37.4	9.6	8.8	26.3	26.3		26.7	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.3	0.0	0.4	0.1	0.0	0.0	0.0		0.2	0.1	
Delay (s)	34.5	7.5	6.6	37.8	9.7	8.8	26.3	26.4		26.8	26.5	
Level of Service	C	A	A	D	A	A	C	C		C	C	
Approach Delay (s)		13.3			9.9			26.3			26.6	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	14	151	3	5	179	4	11	42	13	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1500	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1044	1540	2967			2989	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1044	1543	2967			2941	1074
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	170	3	6	201	4	12	47	15	24	16	44
RTOR Reduction (vph)	0	0	2	0	0	3	0	13	0	0	0	39
Lane Group Flow (vph)	16	170	1	6	201	1	12	49	0	0	40	5
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.8	10.3	10.3	0.6	9.1	9.1	4.2	4.2			3.2	3.2
Effective Green, g (s)	0.8	10.3	10.3	0.6	9.1	9.1	4.2	4.2			3.2	3.2
Actuated g/C Ratio	0.03	0.37	0.37	0.02	0.32	0.32	0.15	0.15			0.11	0.11
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	34	445	505	32	393	338	230	443			334	122
v/s Ratio Prot	c0.01	0.14		0.00	c0.17			c0.02				
v/s Ratio Perm			0.00			0.00	0.01				0.01	0.00
v/c Ratio	0.47	0.38	0.00	0.19	0.51	0.00	0.05	0.11			0.12	0.04
Uniform Delay, d1	13.4	6.6	5.6	13.5	7.7	6.4	10.2	10.3			11.2	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	9.9	0.5	0.0	2.8	1.1	0.0	0.1	0.1			0.2	0.1
Delay (s)	23.4	7.1	5.6	16.3	8.8	6.4	10.3	10.4			11.3	11.2
Level of Service	C	A	A	B	A	A	B	B			B	B
Approach Delay (s)		8.5			9.0			10.4			11.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	28.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	20	140	60	8	174	47	31	91	8	20	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.92	1.00	1.00	0.96	1.00	0.98	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	0.94
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1329	1129		1333	1407	1101	1337	1196	1147	1337	1302	1302
Fit Permitted	0.36	1.00		0.61	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	501	1129		859	1407	1101	1337	1196	1147	1337	1302	1302
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	165	71	9	205	55	36	107	9	24	47	28
RTOR Reduction (vph)	0	20	0	0	0	37	0	0	7	0	22	0
Lane Group Flow (vph)	24	216	0	9	205	18	36	107	2	24	53	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)		10	10					10				
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	12.0	12.0		12.0	12.0	15.3	3.1	9.8	9.8	3.3	10.0	
Effective Green, g (s)	12.0	12.0		12.0	12.0	15.3	3.1	9.8	9.8	3.3	10.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.34	0.07	0.22	0.22	0.07	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	139	297		230	371	491	91	257	247	96	286	
v/s Ratio Prot	0.00	c0.19		0.00	c0.15	0.00	0.03	c0.09		0.02	c0.04	
v/s Ratio Perm	0.04			0.01		0.01			0.00			
v/c Ratio	0.17	0.73		0.04	0.55	0.04	0.40	0.42	0.01	0.25	0.19	
Uniform Delay, d1	14.2	15.3		12.5	14.4	10.2	20.3	15.4	14.0	19.9	14.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	8.6		0.1	1.8	0.0	2.8	1.1	0.0	1.4	0.3	
Delay (s)	14.8	23.9		12.5	16.2	10.2	23.1	16.5	14.0	21.3	14.8	
Level of Service	B	C		B	B	B	C	B	B	C	B	
Approach Delay (s)		23.0			14.9			17.9			16.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	45.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015

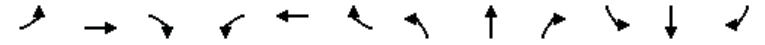


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	2	39	27	26	54	7	22	24	30	5	24	7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	2	49	34	32	68	9	28	30	38	6	30	9
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	85	33	76	58	38	45						
Volume Left (vph)	3	33	0	28	0	6						
Volume Right (vph)	34	0	9	0	38	9						
Hadj (s)	-0.20	0.53	-0.05	0.27	-0.67	-0.05						
Departure Headway (s)	4.8	5.5	4.9	5.3	4.4	5.0						
Degree Utilization, x	0.11	0.05	0.10	0.08	0.05	0.06						
Capacity (veh/h)	727	632	709	650	784	675						
Control Delay (s)	8.4	7.5	7.2	7.6	6.4	8.4						
Approach Delay (s)	8.4	7.3		7.1		8.4						
Approach LOS	A	A		A		A						

Intersection Summary						
Delay	7.7					
Level of Service	A					
Intersection Capacity Utilization	33.8%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	46	42	21	11	59	13	16	247	14	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.97		1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1664	3212		1677	3300		1260	2495		1260	2391	
Fit Permitted	0.70	1.00		0.71	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1227	3212		1249	3300		1260	2495		1260	2391	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	48	24	13	68	15	18	284	16	14	206	83
RTOR Reduction (vph)	0	18	0	0	11	0	0	3	0	0	35	0
Lane Group Flow (vph)	53	54	0	13	72	0	18	297	0	14	254	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.5	22.5		22.5	22.5		6.5	48.9		2.5	44.9	
Effective Green, g (s)	22.5	22.5		22.5	22.5		6.5	48.9		2.5	44.9	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.07	0.55		0.03	0.50	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	808		314	830		91	1364		35	1200	
v/s Ratio Prot		0.02			0.02		0.01	0.12		0.01	0.11	
v/s Ratio Perm	c0.04			0.01								
v/c Ratio	0.17	0.07		0.04	0.09		0.20	0.22		0.40	0.21	
Uniform Delay, d1	26.2	25.5		25.3	25.6		39.0	10.4		42.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.1	0.0		1.1	0.4		7.3	0.1	
Delay (s)	26.4	25.5		25.3	25.6		40.1	10.8		50.1	12.5	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		25.9			25.6			12.4			14.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	15.5
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



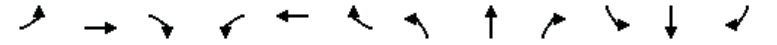
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	2	132	11	2	142	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3382		1711	3418			1705		1711	1621	
Flt Permitted	0.75	1.00		0.75	1.00			0.85		0.75	1.00	
Satd. Flow (perm)	1359	3382		1359	3418			1514		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	143	12	2	154	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	10	0	0	1	0	0	8	0	0	1	0
Lane Group Flow (vph)	2	145	0	2	154	0	0	7	0	2	2	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	5.3	5.3		5.3	5.3			12.9		12.9	12.9	
Effective Green, g (s)	5.3	5.3		5.3	5.3			12.9		12.9	12.9	
Actuated g/C Ratio	0.19	0.19		0.19	0.19			0.46		0.46	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	255	635		255	642			692		615	741	
v/s Ratio Prot		0.04			c0.05						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.01	0.23		0.01	0.24			0.01		0.00	0.00	
Uniform Delay, d1	9.3	9.7		9.3	9.7			4.2		4.2	4.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.2			0.0		0.0	0.0	
Delay (s)	9.3	9.9		9.3	9.9			4.2		4.2	4.2	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		9.9			9.9			4.2			4.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	28.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



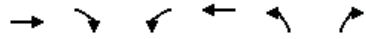
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	1	85	0	0	212	2	155	43	68	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.91				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3420			5126		1711	3107				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3265			5126		1711	3107				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	1	106	0	0	265	2	194	54	85	0	0	31
RTOR Reduction (vph)	0	0	0	0	1	0	0	50	0	0	0	29
Lane Group Flow (vph)	0	107	0	0	266	0	194	89	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1533			1787		697	1267				141
v/s Ratio Prot		c0.00			c0.05		c0.11	0.03				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.15		0.28	0.07				0.01
Uniform Delay, d1		11.2			17.0		15.0	13.7				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.0	0.1				0.1
Delay (s)		11.2			17.2		16.0	13.8				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.2			17.2		15.1					34.3
Approach LOS		B			B		B					C

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	86	169	153	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1609	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1609	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	105	206	187	291	0	0
RTOR Reduction (vph)	18	46	0	0	0	0
Lane Group Flow (vph)	145	102	187	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	41.3	41.3	8.7	60.0		
Effective Green, g (s)	41.3	41.3	8.7	60.0		
Actuated g/C Ratio	0.69	0.69	0.14	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1107	982	481	1801		
v/s Ratio Prot	0.09		c0.06	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.13	0.10	0.39	0.16		
Uniform Delay, d1	3.2	3.1	23.2	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	0.5	0.0		
Delay (s)	3.3	3.2	23.8	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.2			9.3	0.0	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay			6.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.22			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			22.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	49	33	105	2	25	0	85	164	0	6	154	53
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1190	1903		1160	1279		1215	2431		1215	2295	
Fit Permitted	0.40	1.00		0.83	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	496	1903		1018	1279		1215	2431		1215	2295	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	55	37	118	2	28	0	96	184	0	7	173	60
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	55	68	0	2	28	0	96	184	0	7	207	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10				10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	14.9	14.9		4.8	4.8		6.0	23.2		2.2	19.4	
Effective Green, g (s)	14.9	14.9		4.8	4.8		6.0	23.2		2.2	19.4	
Actuated g/C Ratio	0.26	0.26		0.08	0.08		0.11	0.41		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	500		86	108		128	996		47	786	
v/s Ratio Prot	c0.02	0.04			0.02		c0.08	0.08		0.01	c0.09	
v/s Ratio Perm	c0.05			0.00								
v/c Ratio	0.29	0.14		0.02	0.26		0.75	0.18		0.15	0.26	
Uniform Delay, d1	16.4	15.9		23.8	24.2		24.6	10.7		26.3	13.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		0.1	1.3		21.6	0.1		1.5	0.2	
Delay (s)	17.2	16.1		23.9	25.5		46.2	10.8		27.8	13.6	
Level of Service	B	B		C	C		D	B		C	B	
Approach Delay (s)		16.4			25.4			22.9			14.0	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.4									B
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			56.6							21.6		
Intersection Capacity Utilization			70.8%									C
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 (NO PROJECT)
WITH SF GIANTS GAME AT AT&T PARK
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



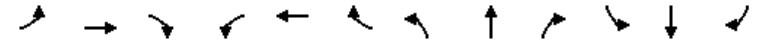
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	462	634	95	176	575	87	26	419	83	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.89			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			
Frt	1.00	0.98		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2979		2987	2974			5531	1231			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2979		2987	2974			5531	1231			
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	570	783	117	217	710	107	32	517	102	0	0	0
RTOR Reduction (vph)	0	8	0	0	9	0	0	0	85	0	0	0
Lane Group Flow (vph)	570	892	0	217	808	0	0	549	17	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	22.8	59.8		13.2	50.2			18.1	18.1			
Effective Green, g (s)	22.8	59.8		13.2	50.2			18.1	18.1			
Actuated g/C Ratio	0.21	0.54		0.12	0.46			0.16	0.16			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	928	1619		358	1357			910	202			
v/s Ratio Prot	0.13	c0.30		0.07	c0.27							
v/s Ratio Perm								0.10	0.01			
v/c Ratio	0.61	0.55		0.61	0.60			0.60	0.08			
Uniform Delay, d1	39.6	16.4		45.9	22.3			42.6	38.9			
Progression Factor	1.00	1.00		1.36	0.23			1.08	8.40			
Incremental Delay, d2	1.2	1.4		0.9	0.2			1.0	0.2			
Delay (s)	40.8	17.7		63.1	5.4			47.1	327.0			
Level of Service	D	B		E	A			D	F			
Approach Delay (s)		26.7			17.5			91.0			0.0	
Approach LOS		C			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015

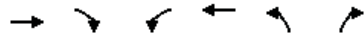


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↕↕	↕↕	↕
Volume (vph)	108	972	45	50	492	59	11	72	40	179	368	241
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.98		1.00	0.93			1.00	0.62	1.00	0.93	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00	0.68	1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85	1.00	0.98	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4319		1296	2376			1559	843	1043	2686	563
Fit Permitted	0.95	1.00		0.95	1.00			0.92	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1540	4319		1296	2376			1438	843	764	2686	563
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	123	1105	51	57	559	67	12	82	45	203	418	274
RTOR Reduction (vph)	0	3	0	0	7	0	0	0	31	0	11	143
Lane Group Flow (vph)	123	1153	0	57	619	0	0	94	14	203	470	68
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	13.5	52.0		10.3	47.2			37.8	37.8	38.8	38.8	38.8
Effective Green, g (s)	13.5	52.0		10.3	47.2			37.8	37.8	38.8	38.8	38.8
Actuated g/C Ratio	0.11	0.43		0.09	0.39			0.31	0.31	0.32	0.32	0.32
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	173	1871		111	934			452	265	247	868	182
v/s Ratio Prot	0.08	c0.27		0.04	c0.26						0.18	
v/s Ratio Perm								0.07	0.02	c0.27		0.12
v/c Ratio	0.71	0.62		0.51	0.66			0.21	0.05	0.82	0.54	0.37
Uniform Delay, d1	51.4	26.3		52.5	29.9			30.1	28.6	37.4	33.3	31.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.9	1.5		4.0	1.8			0.2	0.1	19.3	0.7	1.3
Delay (s)	64.3	27.8		56.4	31.7			30.4	28.7	56.7	34.0	32.6
Level of Service	E	C		E	C			C	C	E	C	C
Approach Delay (s)		31.3			33.7			29.8			38.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1088	105	0	744	48	37
Ideal Flow (vphpl)	1000	1000	1000	1000	1000	1000
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1597			1621	810	714
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1597			1621	810	714
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1196	115	0	818	53	41
RTOR Reduction (vph)	4	0	0	0	0	35
Lane Group Flow (vph)	1307	0	0	818	53	6
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	83.8			83.8	14.9	14.9
Effective Green, g (s)	83.8			83.8	14.9	14.9
Actuated g/C Ratio	0.76			0.76	0.14	0.14
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1216			1234	109	96
v/s Ratio Prot	c0.82			0.50	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	1.08			0.66	0.49	0.06
Uniform Delay, d1	13.1			6.3	44.0	41.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	48.6			1.4	3.4	0.3
Delay (s)	61.7			7.7	47.4	41.7
Level of Service	E			A	D	D
Approach Delay (s)	61.7			7.7	44.9	
Approach LOS	E			A	D	
Intersection Summary						
HCM 2000 Control Delay			41.1		HCM 2000 Level of Service D	
HCM 2000 Volume to Capacity ratio			0.99			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			88.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↔
Volume (vph)	31	352	98	28	284	654	209	193	562	249
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.97			1.00	0.97			0.99	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.97			1.00	0.96			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5634			2870	2501			4086	1122
Fit Permitted		1.00			0.78	1.00			0.95	1.00
Satd. Flow (perm)		5634			2244	2501			4086	1122
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	371	103	29	299	688	220	203	592	262
RTOR Reduction (vph)	0	70	0	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	437	0	0	328	876	0	0	821	236
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		13.3			23.3	23.3			20.9	20.9
Effective Green, g (s)		15.3			26.3	26.3			23.9	23.9
Actuated g/C Ratio		0.20			0.35	0.35			0.32	0.32
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1149			786	877			1302	357
v/s Ratio Prot						c0.35			0.20	c0.21
v/s Ratio Perm		0.08			0.15					
v/c Ratio		0.38			0.42	1.00			0.63	0.66
Uniform Delay, d1		25.8			18.5	24.3			21.8	22.1
Progression Factor		1.00			0.91	1.00			1.00	1.00
Incremental Delay, d2		0.2			0.1	29.7			1.0	4.5
Delay (s)		26.0			16.9	54.1			22.8	26.6
Level of Service		C			B	D			C	C
Approach Delay (s)		26.0			16.9	54.1			23.6	
Approach LOS		C			B	D			C	
Intersection Summary										
HCM 2000 Control Delay					33.1				HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio					0.77					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					81.0%				ICU Level of Service	D
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



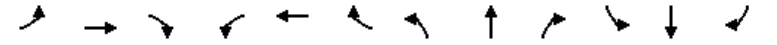
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↕↔
Volume (vph)	70	392	558	56	242	215	40	322	61	495
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.87		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1700	2661		2224		1161		1327	2546
Fit Permitted		0.95	1.00		1.00		1.00		0.29	0.89
Satd. Flow (perm)		1700	2661		2224		1161		401	2277
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	74	417	594	60	257	229	43	343	65	527
RTOR Reduction (vph)	0	0	13	0	1	0	31	0	0	0
Lane Group Flow (vph)	0	449	683	0	489	0	8	0	349	586
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)		18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio		0.25	0.28		0.23		0.21	0.43	0.43	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		419	745		518		247	328	1031	
v/s Ratio Prot		c0.26	0.26		0.22			c0.18	0.09	
v/s Ratio Perm							0.01	c0.28	0.15	
v/c Ratio		1.07	0.92		0.94		0.03	1.06	0.57	
Uniform Delay, d1		28.2	26.2		28.3		23.4	24.1	16.0	
Progression Factor		1.00	1.00		1.00		1.00	0.84	0.91	
Incremental Delay, d2		64.4	18.0		27.9		0.3	51.5	1.0	
Delay (s)		92.6	44.1		56.2		23.6	71.9	15.6	
Level of Service		F	D		E		C	E	B	
Approach Delay (s)			63.2		53.8				36.6	
Approach LOS			E		D				D	

Intersection Summary				
HCM 2000 Control Delay		51.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio		0.85		
Actuated Cycle Length (s)		75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization		75.7%	ICU Level of Service	D
Analysis Period (min)		15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↔		↔↔	↕↔		↔	↕↔	↕↔
Volume (vph)	26	28	55	0	3	3	20	401	25	99	132	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	0.99		1.00	0.97	
Fit Protected		0.98	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1567	1346		1485		1377	2700		1540	2981	
Fit Permitted		0.84	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1353	1346		1485		1377	2700		1540	2981	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	29	31	62	0	3	3	22	451	28	111	148	31
RTOR Reduction (vph)	0	0	57	0	3	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	60	5	0	3	0	22	477	0	111	174	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	NA	NA	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		9.3	9.3		9.3		4.6	79.7		15.1	90.5	
Effective Green, g (s)		9.3	9.3		9.3		4.6	79.7		15.1	90.5	
Actuated g/C Ratio		0.08	0.08		0.08		0.04	0.66		0.13	0.75	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		104	104		115		52	1793		193	2248	
v/s Ratio Prot					0.00		0.02	c0.18		c0.07	0.06	
v/s Ratio Perm		c0.04	0.00									
v/c Ratio		0.58	0.05		0.03		0.42	0.27		0.58	0.08	
Uniform Delay, d1		53.5	51.2		51.2		56.4	8.2		49.4	3.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.5	0.2		0.1		2.0	0.4		2.6	0.0	
Delay (s)		61.0	51.4		51.3		58.4	8.6		52.0	3.9	
Level of Service		E	D		D		E	A		D	A	
Approach Delay (s)		56.1			51.3			10.8			22.3	
Approach LOS		E			D			B			C	

Intersection Summary				
HCM 2000 Control Delay		20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.34		
Actuated Cycle Length (s)		120.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization		51.0%	ICU Level of Service	A
Analysis Period (min)		15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	3	9	3	4	44	1	36	5	100	109	8
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.98			1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes		1.00			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.91			1.00	0.85	1.00	0.98		1.00	0.99	
Fit Protected		0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2285			1417	1230	1160	1408		1377	1413	
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		2204			1448	1230	1221	1408		1377	1413	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	4	4	12	4	5	59	1	48	7	133	145	11
RTOR Reduction (vph)	0	12	0	0	0	27	0	7	0	0	2	0
Lane Group Flow (vph)	0	8	0	0	9	32	1	48	0	133	154	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		1.0			1.0	20.9	2.7	2.7		19.9	27.6	
Effective Green, g (s)		1.0			1.0	20.9	2.7	2.7		19.9	27.6	
Actuated g/C Ratio		0.03			0.03	0.54	0.07	0.07		0.52	0.72	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		57			37	825	85	98		709	1010	
v/s Ratio Prot						0.02		c0.03		c0.10	0.11	
v/s Ratio Perm		0.00			c0.01	0.01	0.00					
v/c Ratio		0.15			0.24	0.04	0.01	0.49		0.19	0.15	
Uniform Delay, d1		18.4			18.4	4.1	16.7	17.3		5.0	1.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			3.4	0.0	0.1	3.9		0.0	0.1	
Delay (s)		19.6			21.8	4.2	16.8	21.2		5.1	1.8	
Level of Service		B			C	A	B	C		A	A	
Approach Delay (s)		19.6			6.5			21.1			3.3	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	26	120	303	19	68	114
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1744	1535	851	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1744	1535	851	1134	1194
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	33	154	388	24	87	146
RTOR Reduction (vph)	0	134	0	11	0	0
Lane Group Flow (vph)	33	20	388	13	87	146
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.6	8.6	31.9	26.9	9.2	46.1
Effective Green, g (s)	8.6	8.6	31.9	26.9	9.2	46.1
Actuated g/C Ratio	0.13	0.13	0.49	0.42	0.14	0.71
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	150	231	756	419	161	850
v/s Ratio Prot	c0.03		c0.25	0.01	c0.08	0.12
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.22	0.09	0.51	0.03	0.54	0.17
Uniform Delay, d1	25.1	24.6	11.1	11.2	25.8	3.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	0.6	0.0	3.7	0.1
Delay (s)	25.8	24.8	11.7	11.2	29.5	3.1
Level of Service	C	C	B	B	C	A
Approach Delay (s)	25.0		11.7			13.0
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	6	3	11	83	53	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	9	5	17	126	80	18
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	286	149	148			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	149	148			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	623	805	1376			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	9	5	59	84	54	45
Volume Left	9	0	17	0	0	0
Volume Right	0	5	0	0	0	18
cSH	623	805	1376	1700	1700	1700
Volume to Capacity	0.01	0.01	0.01	0.05	0.03	0.03
Queue Length 95th (ft)	1	0	1	0	0	0
Control Delay (s)	10.9	9.5	2.2	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.4		0.9		0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			29.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	15	10	354	17	15	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.91	1.00		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1558	1390	3391		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1558	1390	3391		1711	3421
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	13	460	22	19	362
RTOR Reduction (vph)	0	12	1	0	0	0
Lane Group Flow (vph)	19	1	481	0	19	362
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	4.8	4.8	96.6		3.3	105.0
Effective Green, g (s)	4.8	4.8	96.6		3.3	105.0
Actuated g/C Ratio	0.04	0.04	0.80		0.03	0.88
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	62	55	2729		47	2993
v/s Ratio Prot			c0.14		c0.01	0.11
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.31	0.01	0.18		0.40	0.12
Uniform Delay, d1	56.0	55.3	2.7		57.4	1.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.8	0.1	0.1		5.6	0.1
Delay (s)	58.8	55.4	2.8		63.0	1.1
Level of Service	E	E	A		E	A
Approach Delay (s)	57.4		2.8			4.2
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↑	
Volume (veh/h)	0	0	0	94	56	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	111	66	0
Pedestrians	25			1	1	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	147	59	91			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	147	59	91			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	814	975	1473			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	37	74	44	22
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1473	1700	1700	1700
Volume to Capacity	0.00	0.00	0.04	0.03	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0	0.0		
Approach LOS	A				

Intersection Summary					
Average Delay	0.0				
Intersection Capacity Utilization	19.3%		ICU Level of Service		A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	P			↑	Y	
Volume (veh/h)	2	56	3	2	46	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	2	62	3	2	51	2
Pedestrians	50			50	50	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	4			4	4	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	499					
pX, platoon unblocked						
vC, conflicting volume			114		142	133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		142	133
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		94	100
cM capacity (veh/h)			1419		785	848

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	64	5	53
Volume Left	0	3	51
Volume Right	62	0	2
cSH	1700	1419	788
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (ft)	0	0	5
Control Delay (s)	0.0	4.5	9.9
Lane LOS	A		A
Approach Delay (s)	0.0	4.5	9.9
Approach LOS	A		A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	30.3%	ICU Level of Service	
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	65	41	112	1	27	20	111	286	9	8	194	91
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1274	1365	1125	1289	1365	1110	2515	2578		1296	2450	
Fit Permitted	0.74	1.00	1.00	0.72	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	986	1365	1125	983	1365	1110	2515	2578		1296	2450	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	79	50	137	1	33	24	135	349	11	10	237	111
RTOR Reduction (vph)	0	0	115	0	0	20	0	2	0	0	53	0
Lane Group Flow (vph)	79	50	22	1	33	4	135	358	0	10	295	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	7.5	7.5	7.5	7.5	7.5	7.5	6.0	21.5		1.4	16.9	
Effective Green, g (s)	7.5	7.5	7.5	7.5	7.5	7.5	6.0	21.5		1.4	16.9	
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.13	0.47		0.03	0.37	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	222	183	159	222	180	327	1202		39	898	
v/s Ratio Prot		0.04			0.02		0.05	c0.14		0.01	c0.12	
v/s Ratio Perm	c0.08		0.02	0.00		0.00						
v/c Ratio	0.49	0.23	0.12	0.01	0.15	0.02	0.41	0.30		0.26	0.33	
Uniform Delay, d1	17.6	16.8	16.5	16.2	16.6	16.2	18.4	7.6		21.8	10.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.5	0.3	0.0	0.3	0.0	0.8	0.1		3.5	0.2	
Delay (s)	20.0	17.3	16.8	16.2	16.9	16.3	19.3	7.8		25.3	10.7	
Level of Service	B	B	B	B	B	B	B	A		C	B	
Approach Delay (s)		17.8			16.6			10.9			11.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	15.7
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	47	188	1	1	202	25	3	5		28	1	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1260	1621	1669		1497	1357	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1260	1220	1669		1187	1357	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	53	211	1	1	227	28	3	6		31	1	63
RTOR Reduction (vph)	0	0	0	0	0	13	0	1		0	0	51
Lane Group Flow (vph)	53	211	1	1	227	15	3	6		31	13	0
Confl. Peds. (#/hr)						50						50
Confl. Bikes (#/hr)						10						10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.2	45.0	45.0	2.4	40.2	40.2	14.3	14.3		14.3	14.3	
Effective Green, g (s)	7.2	45.0	45.0	2.4	40.2	40.2	14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.52	0.52	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	152	1000	850	50	894	660	227	311		221	253	
v/s Ratio Prot	c0.03	c0.12		0.00	c0.13		0.01	0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					c0.03
v/c Ratio	0.35	0.21	0.00	0.02	0.25	0.02	0.01	0.02		0.14	0.05	
Uniform Delay, d1	32.6	7.5	6.6	36.0	10.0	8.8	25.4	25.5		26.1	25.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.5	0.0	0.2	0.2	0.0	0.0	0.0		0.3	0.1	
Delay (s)	33.9	8.0	6.6	36.2	10.2	8.8	25.5	25.5		26.4	25.7	
Level of Service	C	A	A	D	B	A	C	C		C	C	
Approach Delay (s)		13.1			10.1			25.5			25.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	22	209	9	5	242	14	11	42	13	15	14	20
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	2970			3002	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	1621	2970			2941	1074
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	28	261	11	6	302	18	14	52	16	19	18	25
RTOR Reduction (vph)	0	0	6	0	0	11	0	14	0	0	0	23
Lane Group Flow (vph)	28	261	5	6	302	7	14	54	0	0	37	2
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	1.8	14.8	14.8	0.6	12.6	12.6	4.0	4.0			3.0	3.0
Effective Green, g (s)	1.8	14.8	14.8	0.6	12.6	12.6	4.0	4.0			3.0	3.0
Actuated g/C Ratio	0.06	0.46	0.46	0.02	0.39	0.39	0.12	0.12			0.09	0.09
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	67	555	629	28	472	407	200	366			272	99
v/s Ratio Prot	c0.02	0.21		0.00	c0.25			c0.02				
v/s Ratio Perm			0.00			0.01	0.01				0.01	0.00
v/c Ratio	0.42	0.47	0.01	0.21	0.64	0.02	0.07	0.15			0.14	0.02
Uniform Delay, d1	14.8	6.1	4.8	15.7	8.1	6.1	12.6	12.7			13.5	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	4.2	0.6	0.0	3.8	2.8	0.0	0.1	0.2			0.2	0.1
Delay (s)	19.0	6.7	4.8	19.5	10.9	6.1	12.7	12.9			13.7	13.5
Level of Service	B	A	A	B	B	A	B	B			B	B
Approach Delay (s)		7.8			10.8			12.8				13.6
Approach LOS		A			B			B				B

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	15	188	58	7	171	95	48	158	3	49	45	20
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1321	915		1333	1126	875	1070	957	921	1070	1052	
Fit Permitted	0.43	1.00		0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	604	915		748	1126	875	1070	957	921	1070	1052	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	219	67	8	199	110	56	184	3	57	52	23
RTOR Reduction (vph)	0	12	0	0	0	61	0	0	2	0	19	0
Lane Group Flow (vph)	17	274	0	8	199	49	56	184	1	57	56	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	26.4	26.4		26.4	26.4	32.2	12.4	19.0	19.0	5.8	12.4	
Effective Green, g (s)	26.4	26.4		26.4	26.4	32.2	12.4	19.0	19.0	5.8	12.4	
Actuated g/C Ratio	0.37	0.37		0.37	0.37	0.45	0.17	0.26	0.26	0.08	0.17	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	228	336		279	414	453	184	253	243	86	181	
v/s Ratio Prot	0.00	c0.30		0.00	c0.18	0.01	0.05	c0.19		c0.05	0.05	
v/s Ratio Perm	0.03			0.01		0.05			0.00			
v/c Ratio	0.07	0.82		0.03	0.48	0.11	0.30	0.73	0.00	0.66	0.31	
Uniform Delay, d1	14.9	20.5		14.9	17.4	11.5	25.9	24.0	19.4	32.1	26.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	14.1		0.0	0.9	0.1	0.9	10.0	0.0	17.6	1.0	
Delay (s)	15.1	34.6		15.0	18.3	11.6	26.9	34.0	19.4	49.6	26.9	
Level of Service	B	C		B	B	B	C	C	B	D	C	
Approach Delay (s)		33.5			15.9		32.2				36.7	
Approach LOS		C			B		C				D	

Intersection Summary

HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop			Stop	Stop		Stop	
Volume (vph)	3	73	34	42	63	9	35	39	60	9	41	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	81	38	47	70	10	39	43	67	10	46	8

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	122	47	80	82	67	63
Volume Left (vph)	3	47	0	39	0	10
Volume Right (vph)	38	0	10	0	67	8
Hadj (s)	-0.15	0.53	-0.05	0.27	-0.67	-0.01
Departure Headway (s)	5.1	5.7	5.1	5.5	4.6	5.3
Degree Utilization, x	0.17	0.07	0.11	0.13	0.08	0.09
Capacity (veh/h)	672	600	669	625	747	634
Control Delay (s)	9.1	8.0	7.6	8.1	6.8	8.9
Approach Delay (s)	9.1	7.7		7.5		8.9
Approach LOS	A	A		A		A

Intersection Summary						
Delay			8.2			
Level of Service			A			
Intersection Capacity Utilization		36.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	93	75	45	9	81	15	45	298	14	21	204	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	3183		1680	3313		1260	2494		1260	2391	
Flt Permitted	0.68	1.00		0.66	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1191	3183		1169	3313		1260	2494		1260	2391	

Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	111	89	54	11	96	18	54	355	17	25	243	98
RTOR Reduction (vph)	0	47	0	0	16	0	0	2	0	0	30	0
Lane Group Flow (vph)	111	96	0	11	98	0	54	370	0	25	311	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	16.8	16.8		16.8	16.8		28.0	84.1		5.6	61.7	
Effective Green, g (s)	16.8	16.8		16.8	16.8		28.0	84.1		5.6	61.7	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.23	0.69		0.05	0.51	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	164	438		160	456		289	1719		57	1209	
v/s Ratio Prot		0.03			0.03		0.04	0.15		0.02	0.13	
v/s Ratio Perm	0.09			0.01								
v/c Ratio	0.68	0.22		0.07	0.22		0.19	0.22		0.44	0.26	
Uniform Delay, d1	50.0	46.8		45.8	46.7		37.8	6.9		56.7	17.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.5	0.3		0.2	0.2		0.3	0.3		5.3	0.1	
Delay (s)	60.6	47.0		46.0	47.0		38.2	7.2		62.0	17.2	
Level of Service	E	D		D	D		D	A		E	B	
Approach Delay (s)		52.9			46.9			11.1			20.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	122.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



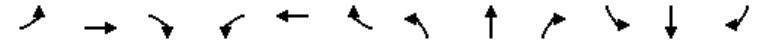
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	2	232	11	2	197	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3398		1711	3419			1705		1711	1621	
Flt Permitted	0.62	1.00		0.59	1.00			0.82		0.75	1.00	
Satd. Flow (perm)	1111	3398		1060	3419			1465		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	252	12	2	214	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	7	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	2	257	0	2	214	0	0	6	0	2	2	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.2	7.2		7.2	7.2			10.1		10.1	10.1	
Effective Green, g (s)	7.2	7.2		7.2	7.2			10.1		10.1	10.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.37		0.37	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	293	896		279	901			541		497	599	
v/s Ratio Prot		c0.08			0.06						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.01	0.29		0.01	0.24			0.01		0.00	0.00	
Uniform Delay, d1	7.4	8.0		7.4	7.9			5.4		5.4	5.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.1			0.0		0.0	0.0	
Delay (s)	7.4	8.2		7.4	8.0			5.4		5.4	5.4	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		8.2			8.0			5.4			5.4	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.13	A
Actuated Cycle Length (s)	27.3	Sum of lost time (s)
Intersection Capacity Utilization	22.5%	10.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



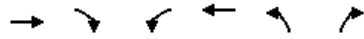
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	1	74	0	0	260	2	209	43	168	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.88				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3419			5127		1711	3012				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3265			5127		1711	3012				2694
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	81	0	0	286	2	230	47	185	0	0	27
RTOR Reduction (vph)	0	0	0	0	1	0	0	110	0	0	0	26
Lane Group Flow (vph)	0	82	0	0	287	0	230	122	0	0	0	1
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1533			1787		697	1228				141
v/s Ratio Prot		c0.00			c0.06		c0.13	0.04				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.05			0.16		0.33	0.10				0.01
Uniform Delay, d1		11.1			17.1		15.4	13.9				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.3	0.2				0.1
Delay (s)		11.1			17.3		16.7	14.0				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.1			17.3			15.3				34.3
Approach LOS		B			B			B				C

Intersection Summary		
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.24	B
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	35.3%	14.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	75	175	269	325	0	0
Ideal Flow (vphpl)	1000	1000	1000	1000	1000	1000
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	*0.85	*0.85	*0.60	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.94	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	748	672	1080	948		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	748	672	1080	948		
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	86	201	309	374	0	0
RTOR Reduction (vph)	36	76	0	0	0	0
Lane Group Flow (vph)	114	61	309	374	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	26.7	26.7	23.3	60.0		
Effective Green, g (s)	26.7	26.7	23.3	60.0		
Actuated g/C Ratio	0.44	0.44	0.39	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	332	299	419	948		
v/s Ratio Prot	0.15		c0.29	c0.39		
v/s Ratio Perm		0.09				
v/c Ratio	0.34	0.20	0.74	0.39		
Uniform Delay, d1	10.9	10.2	15.7	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.6	0.3	6.6	0.3		
Delay (s)	11.5	10.5	22.4	0.3		
Level of Service	B	B	C	A		
Approach Delay (s)	11.0			10.3	0.0	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			37.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔	↔	↔	↔	↔
Volume (vph)	98	79	150	2	84	4	115	237	5	3	194	95
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	0.95	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	1872		1116	1260		1215	2417		1215	2215	
Fit Permitted	0.47	1.00		0.58	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	572	1872		684	1260		1215	2417		1215	2215	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	118	95	181	2	101	5	139	286	6	4	234	114
RTOR Reduction (vph)	0	126	0	0	2	0	0	1	0	0	41	0
Lane Group Flow (vph)	118	150	0	2	104	0	139	291	0	4	307	0
Confl. Peds. (#/hr)			100	100		100			100			100
Confl. Bikes (#/hr)			10	10		10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.5	36.5		15.3	15.3		19.1	62.3		4.9	48.1	
Effective Green, g (s)	36.5	36.5		15.3	15.3		19.1	62.3		4.9	48.1	
Actuated g/C Ratio	0.30	0.30		0.13	0.13		0.16	0.52		0.04	0.40	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	569		87	160		193	1254		49	887	
v/s Ratio Prot	c0.06	0.08			c0.08		c0.11	0.12		0.00	c0.14	
v/s Ratio Perm	0.08			0.00								
v/c Ratio	0.47	0.26		0.02	0.65		0.72	0.23		0.08	0.35	
Uniform Delay, d1	32.6	31.6		45.8	49.8		47.9	15.8		55.4	25.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.2		0.1	9.1		12.4	0.4		0.7	1.1	
Delay (s)	33.9	31.8		45.9	59.0		60.3	16.2		56.1	26.1	
Level of Service	C	C		D	E		E	B		E	C	
Approach Delay (s)			32.5		58.7			30.4			26.4	
Approach LOS			C		E			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.3									C
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			120.0							21.6		
Intersection Capacity Utilization			73.8%									D
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT - NO EVENT
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	889	733	12	150	907	36	53	1074	293	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5481	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5481	942			
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)	916	756	12	155	935	37	55	1107	302	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	202	0	0	0
Lane Group Flow (vph)	916	767	0	155	972	0	0	1162	100	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.1		13.2	36.6			36.3	36.3			
Effective Green, g (s)	18.2	40.1		13.2	36.6			36.3	36.3			
Actuated g/C Ratio	0.17	0.36		0.12	0.33			0.33	0.33			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1114		358	1005			1808	310			
v/s Ratio Prot	c0.20	0.25		0.05	c0.32							
v/s Ratio Perm								0.21	0.11			
v/c Ratio	1.24	0.69		0.43	0.97			0.64	0.32			
Uniform Delay, d1	45.9	29.6		44.9	36.1			31.3	27.6			
Progression Factor	1.38	1.60		1.54	1.02			0.90	2.85			
Incremental Delay, d2	113.5	2.1		0.3	9.2			0.7	0.6			
Delay (s)	176.8	49.6		69.3	45.9			29.0	79.2			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		118.8			49.1			39.3			0.0	
Approach LOS		F			D			D			A	

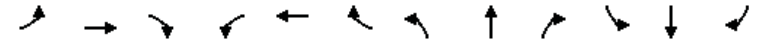
Intersection Summary

HCM 2000 Control Delay	73.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	285	304
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.84	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4155		1296	2553			1585	858	1044	2374	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1459	4155		1296	2553			1542	858	778	2374	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	291	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	39	120
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	376	66
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1733		70	833			535	297	277	846	207
v/s Ratio Prot	0.11	c0.38		0.02	c0.37						c0.16	
v/s Ratio Perm								0.05	0.03	0.04		0.11
v/c Ratio	0.81	0.91		0.34	1.14			0.14	0.09	0.13	0.44	0.32
Uniform Delay, d1	46.5	30.1		50.1	37.0			24.6	24.2	23.9	27.1	25.7
Progression Factor	0.58	1.19		0.88	0.90			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.9		1.0	70.4			0.1	0.1	0.2	0.4	0.9
Delay (s)	29.5	36.9		45.1	103.7			24.8	24.4	24.1	27.4	26.6
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		36.2			102.2			24.6			27.0	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	69.5			0.9	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	
Intersection Summary						
HCM 2000 Control Delay		59.2			HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio		0.78				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	11.3
Intersection Capacity Utilization		98.4%			ICU Level of Service	F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↖↑	↗↑			↖↖↖	↗↗↗
Volume (vph)	272	1171	161	52	302	537	219	199	735	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4087	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4087	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	216	790	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1035	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1226	293
v/s Ratio Prot							c0.33		0.25	
v/s Ratio Perm		0.30			0.20					c0.26
v/c Ratio		0.92			0.65	1.05			0.84	0.87
Uniform Delay, d1		29.4			26.7	31.0			29.5	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	47.9			7.2	28.4
Delay (s)		50.1			2.1	78.9			36.7	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	78.9			41.0	
Approach LOS		D			A	E			D	
Intersection Summary										
HCM 2000 Control Delay			48.5						HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.97							
Actuated Cycle Length (s)			90.0						Sum of lost time (s)	9.0
Intersection Capacity Utilization			109.4%						ICU Level of Service	H
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



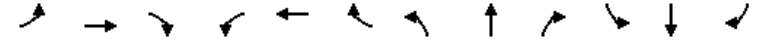
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↔↔
Volume (vph)	16	506	568	45	338	362	24	255	129	624
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1912		2130		1163		1327	2541
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.63
Satd. Flow (perm)		1313	1912		2130		1163		207	1622
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	544	611	48	363	389	26	274	139	671
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	479	734	0	755	0	6	0	307	777
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0			23.0	42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5			23.0	43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27			0.26	0.48	0.48
Clearance Time (s)		4.5	4.5		4.0			4.0	4.0	4.0
Lane Grp Cap (vph)		328	531		579			297	305	952
v/s Ratio Prot		0.36	c0.38		c0.35				c0.18	0.15
v/s Ratio Perm							0.01		0.30	0.24
v/c Ratio		1.46	1.38		1.42dr		0.02		1.01	0.82
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	19.8
Progression Factor		1.00	1.00		1.00		1.00		1.10	1.15
Incremental Delay, d2		223.3	183.3		149.0		0.1		28.5	2.2
Delay (s)		257.1	215.8		181.8		25.2		62.7	25.1
Level of Service		F	F		F		C		E	C
Approach Delay (s)			232.0		177.1					35.7
Approach LOS			F		F					D

Intersection Summary			
HCM 2000 Control Delay	149.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔↔		↔	↔↔		↔	↔↔	
Volume (vph)	17	15	83	19	10	67	20	951	18	12	174	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1569	1353		1426		1272	2531		1540	3040	
Fit Permitted		0.87	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1405	1353		1373		1272	2531		1540	3040	
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)	18	16	87	20	11	71	21	1001	19	13	183	14
RTOR Reduction (vph)	0	0	59	0	48	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	34	28	0	54	0	21	1019	0	13	191	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Effective Green, g (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.14	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		451	434		440		175	974		207	1170	
v/s Ratio Prot							0.02	c0.40		0.01	c0.06	
v/s Ratio Perm		0.02	0.02		c0.04							
v/c Ratio		0.08	0.06		0.12		0.12	1.05		0.06	0.16	
Uniform Delay, d1		23.6	23.5		24.0		37.8	30.8		37.7	20.2	
Progression Factor		1.00	1.00		1.00		1.21	0.23		1.00	1.00	
Incremental Delay, d2		0.3	0.3		0.6		1.0	37.6		0.6	0.3	
Delay (s)		23.9	23.8		24.6		46.7	44.7		38.3	20.5	
Level of Service		C	C		C		D	D		D	C	
Approach Delay (s)		23.9			24.6			44.7			21.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	12	10	3	10	30	7	84	6	97	114	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2552			1434	1227	1152	1432		1377	1392	
Fit Permitted		0.95			1.00	1.00	0.80	1.00		0.95	1.00	
Satd. Flow (perm)		2493			1449	1227	970	1432		1377	1392	
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)	20	13	11	3	11	32	8	90	6	104	123	15
RTOR Reduction (vph)	0	10	0	0	0	16	0	4	0	0	5	0
Lane Group Flow (vph)	0	34	0	0	14	16	8	92	0	104	133	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.3			2.3	19.1	5.0	5.0		16.8	26.8	
Effective Green, g (s)		2.3			2.3	19.1	5.0	5.0		16.8	26.8	
Actuated g/C Ratio		0.06			0.06	0.49	0.13	0.13		0.43	0.69	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		146			85	756	124	183		591	954	
v/s Ratio Prot						0.01		c0.06		c0.08	0.10	
v/s Ratio Perm		c0.01			0.01	0.00	0.01					
v/c Ratio		0.23			0.16	0.02	0.06	0.50		0.18	0.14	
Uniform Delay, d1		17.6			17.5	5.2	15.0	15.9		6.9	2.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.9	0.0	0.2	2.1		0.1	0.1	
Delay (s)		18.4			18.4	5.2	15.2	18.0		7.0	2.2	
Level of Service		B			B	A	B	B		A	A	
Approach Delay (s)		18.4			9.2			17.8			4.3	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015

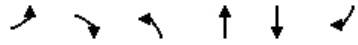


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (vph)	34	242	794	29	84	253
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	263	863	32	91	275
RTOR Reduction (vph)	0	235	0	5	0	0
Lane Group Flow (vph)	37	28	863	27	91	275
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.7	8.7	47.6	42.6	10.0	62.6
Effective Green, g (s)	8.7	8.7	47.6	42.6	10.0	62.6
Actuated g/C Ratio	0.11	0.11	0.59	0.52	0.12	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	121	186	898	496	139	919
v/s Ratio Prot	c0.03		c0.56	0.01	c0.08	0.23
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.31	0.15	0.96	0.05	0.65	0.30
Uniform Delay, d1	33.5	32.9	16.0	9.5	34.0	2.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.4	21.0	0.0	10.6	0.2
Delay (s)	34.9	33.3	37.0	9.5	44.6	3.0
Level of Service	C	C	D	A	D	A
Approach Delay (s)	33.5		36.0			13.3
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	19	43	13	174	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1670	1431		3151	3063	
Fit Permitted	0.95	1.00		0.93	1.00	
Satd. Flow (perm)	1670	1431		2949	3063	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	14	193	232	46
RTOR Reduction (vph)	0	45	0	0	15	0
Lane Group Flow (vph)	21	3	0	207	263	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	2.3	2.3		20.6	20.6	
Effective Green, g (s)	2.3	2.3		20.6	20.6	
Actuated g/C Ratio	0.07	0.07		0.65	0.65	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	120	103		1904	1977	
v/s Ratio Prot					c0.09	
v/s Ratio Perm	c0.01	0.00		0.07		
v/c Ratio	0.17	0.03		0.11	0.13	
Uniform Delay, d1	13.9	13.8		2.2	2.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.1		0.0	0.0	
Delay (s)	14.6	13.9		2.2	2.2	
Level of Service	B	B		A	A	
Approach Delay (s)	14.1			2.2	2.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	31.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	189	158	860	17	45	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3408		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3408		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	176	956	19	50	541
RTOR Reduction (vph)	0	125	2	0	0	0
Lane Group Flow (vph)	210	51	973	0	50	541
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1639		135	2090
v/s Ratio Prot			c0.29		c0.03	0.16
v/s Ratio Perm	c0.13	0.03				
v/c Ratio	0.46	0.12	0.59		0.37	0.26
Uniform Delay, d1	29.3	26.3	18.9		43.7	9.0
Progression Factor	1.00	1.00	1.90		1.07	1.32
Incremental Delay, d2	0.7	0.1	1.0		1.7	0.1
Delay (s)	30.1	26.5	36.7		48.4	12.0
Level of Service	C	C	D		D	B
Approach Delay (s)	28.4		36.7			15.0
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	20	177	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1520	1343		3060	2948	
Flt Permitted	0.95	1.00		0.89	1.00	
Satd. Flow (perm)	1520	1343		2733	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	12	24	208	226	71
RTOR Reduction (vph)	0	12	0	0	57	0
Lane Group Flow (vph)	12	0	0	232	240	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		9.1	9.1	
Effective Green, g (s)	0.6	0.6		9.1	9.1	
Actuated g/C Ratio	0.01	0.01		0.20	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	20	17		552	596	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.08		
v/c Ratio	0.60	0.01		0.42	0.40	
Uniform Delay, d1	22.1	21.9		15.7	15.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.2	0.2		0.5	0.4	
Delay (s)	62.3	22.1		16.2	16.0	
Level of Service	E	C		B	B	
Approach Delay (s)	42.2			16.2	16.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	167	8	67	49	28	5	130	45	9	5	197	164
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	182	9	77	56	32	5	149	49	10	5	214	178
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	182	86	56	38	209	220	178					
Volume Left (vph)	182	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	178					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.15	0.05	-0.67					
Departure Headway (s)	6.9	5.7	7.2	6.6	6.3	6.0	5.3					
Degree Utilization, x	0.35	0.14	0.11	0.07	0.36	0.36	0.26					
Capacity (veh/h)	495	586	458	497	548	575	651					
Control Delay (s)	12.2	8.4	9.9	8.9	12.8	11.2	8.9					
Approach Delay (s)	11.0		9.5		12.8	10.2						
Approach LOS	B		A		B	B						

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	134	168	266	3	272	47	264	696	56	18	472	186
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1269	1365	1126	1285	1365	1099	2515	2555		1296	2464	
Fit Permitted	0.45	1.00	1.00	0.60	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	603	1365	1126	816	1365	1099	2515	2555		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	147	185	292	3	299	52	290	765	62	20	519	204
RTOR Reduction (vph)	0	0	191	0	0	34	0	6	0	0	42	0
Lane Group Flow (vph)	147	185	101	3	299	18	290	821	0	20	681	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	208	470	388	281	470	379	352	965		155	882	
v/s Ratio Prot		0.14			0.22		0.12	c0.32		0.02	c0.28	
v/s Ratio Perm	c0.24		0.09	0.00		0.02						
v/c Ratio	0.71	0.39	0.26	0.01	0.64	0.05	0.82	0.85		0.13	0.77	
Uniform Delay, d1	28.4	24.8	23.6	21.5	27.5	21.8	41.8	28.5		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.63	0.77		1.16	1.19	
Incremental Delay, d2	18.3	2.5	1.6	0.1	6.4	0.2	7.3	3.4		1.7	6.3	
Delay (s)	46.7	27.3	25.2	21.6	33.9	22.0	33.7	25.2		47.3	40.2	
Level of Service	D	C	C	C	C	C	C	C		D	D	
Approach Delay (s)		30.9			32.1			27.4			40.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	89	493	8	6	686	30	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	536	9	7	746	33	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	18	0	28	0	0	85	0
Lane Group Flow (vph)	97	536	5	7	746	15	36	36	0	45	32	0
Confl. Peds. (#/hr)		50				50			10			50
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.06	c0.31		0.00	c0.44			0.02			0.02	
v/s Ratio Perm			0.00			0.01	0.03				c0.04	
v/c Ratio	0.48	0.58	0.01	0.14	0.97	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.5	13.1	9.0	41.1	23.3	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	2.6	0.0	1.3	24.7	0.0	0.2	0.1		0.3	0.1	
Delay (s)	37.3	15.7	9.0	42.4	48.0	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	D	B	C	C		C	C	
Approach Delay (s)		18.9			46.5			25.3			25.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



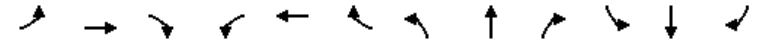
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	118	417	14	21	725	78	49	134	61	112	54	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1279	1378	1540	1279	1049	1540	2934			2978	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.69	1.00
Satd. Flow (perm)	1215	1279	1378	1540	1279	1049	1041	2934			2120	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	123	434	15	22	755	81	51	140	64	117	56	152
RTOR Reduction (vph)	0	0	5	0	0	23	0	54	0	0	0	130
Lane Group Flow (vph)	123	434	10	22	755	58	51	150	0	0	173	22
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	9.0	57.6	57.6	1.9	49.5	49.5	13.3	13.3			12.3	12.3
Effective Green, g (s)	9.0	57.6	57.6	1.9	49.5	49.5	13.3	13.3			12.3	12.3
Actuated g/C Ratio	0.10	0.67	0.67	0.02	0.58	0.58	0.16	0.16			0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	127	858	925	34	737	605	161	454			303	153
v/s Ratio Prot	c0.10	0.34		0.01	c0.59			0.05				
v/s Ratio Perm			0.01			0.06	0.05				c0.08	0.02
v/c Ratio	0.97	0.51	0.01	0.65	1.02	1.01	0.32	0.33			0.57	0.14
Uniform Delay, d1	38.3	7.0	4.7	41.6	18.1	8.1	32.2	32.3			34.3	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	69.3	2.1	0.0	35.3	39.5	0.1	1.1	0.4			2.6	0.4
Delay (s)	107.5	9.1	4.7	76.9	57.6	8.2	33.3	32.7			36.9	32.6
Level of Service	F	A	A	E	E	A	C	C			D	C
Approach Delay (s)		30.2			53.5			32.8			34.9	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	47	410	70	33	509	378	61	249	30	109	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	931		1336	1126	861	1070	957	919	1070	1068	
Fit Permitted	0.12	1.00		0.27	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	169	931		374	1126	861	1070	957	919	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	436	74	35	541	402	65	265	32	116	147	46
RTOR Reduction (vph)	0	5	0	0	0	121	0	0	25	0	11	0
Lane Group Flow (vph)	50	505	0	35	541	281	65	265	7	116	182	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10						
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	52.8	52.8		52.1	52.1	62.1	12.9	25.1	25.1	10.0	22.2	
Effective Green, g (s)	52.8	52.8		52.1	52.1	62.1	12.9	25.1	25.1	10.0	22.2	
Actuated g/C Ratio	0.48	0.48		0.47	0.47	0.56	0.12	0.23	0.23	0.09	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	113	445		197	531	523	125	217	209	97	214	
v/s Ratio Prot	0.01	c0.54		0.00	c0.48	0.05	0.06	c0.28		c0.11	0.17	
v/s Ratio Perm	0.20			0.08		0.28			0.01			
v/c Ratio	0.44	1.13		0.18	1.02	0.54	1.22	0.03	1.20	0.85		
Uniform Delay, d1	21.7	28.8		28.3	29.1	15.1	45.8	42.6	33.2	50.1	42.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	84.8		0.4	43.9	1.1	3.9	133.6	0.1	153.3	25.6	
Delay (s)	24.4	113.6		28.7	73.0	16.2	49.7	176.2	33.2	203.4	68.1	
Level of Service	C	F		C	E	B	D	F	C	F	E	
Approach Delay (s)		105.6			48.0			140.9			118.9	
Approach LOS		F			D			F			F	

Intersection Summary

HCM 2000 Control Delay	87.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

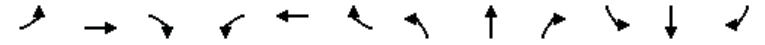


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	64	74	39	45	162	2	31	116	78	11	51	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.97		1.00	1.00			1.00	0.85		0.89	
Fit Protected		0.98		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1694		1689	1797			1780	1500		1572	
Fit Permitted		0.81		0.66	1.00			0.86	1.00		0.99	
Satd. Flow (perm)		1403		1179	1797			1539	1500		1554	
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)	71	82	43	50	180	2	34	129	87	12	57	276
RTOR Reduction (vph)	0	13	0	0	1	0	0	0	65	0	202	0
Lane Group Flow (vph)	0	183	0	50	181	0	0	163	22	0	143	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		13.1		13.1	13.1			13.1	13.1		13.1	
Effective Green, g (s)		13.1		13.1	13.1			13.1	13.1		13.1	
Actuated g/C Ratio		0.26		0.26	0.26			0.26	0.26		0.26	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		361		303	462			396	386		399	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.13		0.04				c0.11	0.01		0.09	
v/c Ratio		0.51		0.17	0.39			0.41	0.06		0.36	
Uniform Delay, d1		16.1		14.7	15.6			15.7	14.2		15.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.1		0.3	0.6			0.7	0.1		0.6	
Delay (s)		17.3		14.9	16.2			16.4	14.3		16.0	
Level of Service		B		B	B			B	B		B	
Approach Delay (s)		17.3			15.9			15.7			16.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	50.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Volume (vph)	146	126	51	86	331	23	40	847	35	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3239		1679	3378		1260	2501		1260	2331	
Fit Permitted	0.49	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	859	3239		1119	3378		1260	2501		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	134	54	91	352	24	43	901	37	17	453	318
RTOR Reduction (vph)	0	35	0	0	5	0	0	3	0	0	127	0
Lane Group Flow (vph)	155	153	0	91	371	0	43	935	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	298	1123		388	1172		149	872		187	883	
v/s Ratio Prot		0.05			0.11		0.03	c0.37		0.01	c0.28	
v/s Ratio Perm	c0.18			0.08								
v/c Ratio	0.52	0.14		0.23	0.32		0.29	1.07		0.09	0.73	
Uniform Delay, d1	26.0	22.4		23.2	23.9		40.2	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.81		1.55	0.62	
Incremental Delay, d2	6.4	0.3		1.4	0.7		3.8	48.7		0.7	3.8	
Delay (s)	32.4	22.6		24.6	24.7		40.5	75.0		57.6	20.3	
Level of Service	C	C		C	C		D	E		E	C	
Approach Delay (s)		27.0			24.7			73.5			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



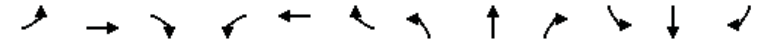
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	6	277	38	4	723	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3360		1711	3420			1678		1711	1531	
Flt Permitted	0.27	1.00		0.55	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	483	3360		983	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	301	41	4	786	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	17	0	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	325	0	4	788	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	193	1344		393	1368			635		563	663	
v/s Ratio Prot		0.10			c0.23						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.04	0.24		0.01	0.58			0.05		0.02	0.01	
Uniform Delay, d1	11.0	12.0		10.8	14.0			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		0.0	1.8			0.2		0.1	0.0	
Delay (s)	11.3	12.4		10.9	15.8			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.4			15.8			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



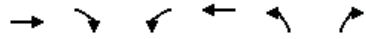
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	3	86	0	0	834	6	382	112	239	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			5.0	5.0			3.5
Lane Util. Factor		0.95			*0.95			1.00	0.95			0.88
Frt		1.00			1.00			1.00	1.00			1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00			1.00
Frt		1.00			1.00			1.00	0.90			0.85
Flt Protected		1.00			1.00			0.95	1.00			1.00
Satd. Flow (prot)		3416			5126			1711	3071			2694
Flt Permitted		0.95			1.00			0.95	1.00			1.00
Satd. Flow (perm)		3244			5126			1711	3071			2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	88	0	0	851	6	390	114	244	0	0	130
RTOR Reduction (vph)	0	0	0	0	1	0	0	126	0	0	0	121
Lane Group Flow (vph)	0	91	0	0	856	0	390	232	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1412			1700		824	1479				183
v/s Ratio Prot		c0.00			c0.17		c0.23	0.08				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.50		0.47	0.16				0.05
Uniform Delay, d1		18.3			29.5		19.1	16.0				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.1		1.9	0.2				0.5
Delay (s)		18.4			30.6		21.1	16.2				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.4			30.6			18.7				48.4
Approach LOS		B			C			B				D

Intersection Summary

HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

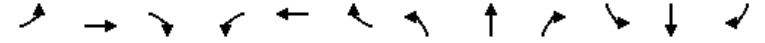
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	89	566	794	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1501	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1501	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	584	819	566	0	0
RTOR Reduction (vph)	30	30	0	0	0	0
Lane Group Flow (vph)	313	303	819	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	37.0	37.0	23.0	70.0		
Effective Green, g (s)	37.0	37.0	23.0	70.0		
Actuated g/C Ratio	0.53	0.53	0.33	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	793	753	1090	1801		
v/s Ratio Prot	0.21		c0.25	0.31		
v/s Ratio Perm		c0.21				
v/c Ratio	0.39	0.40	0.75	0.31		
Uniform Delay, d1	9.8	9.9	21.0	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.4	3.0	0.1		
Delay (s)	10.2	10.2	23.9	0.1		
Level of Service	B	B	C	A		
Approach Delay (s)	10.2			14.2	0.0	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			54.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	203	135	181	7	204	13	176	590	16	17	586	173
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2414		1215	2289	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2414		1215	2289	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	211	141	189	7	212	14	183	615	17	18	610	180
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	27	0
Lane Group Flow (vph)	211	203	0	7	224	0	183	630	0	18	763	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Effective Green, g (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.47		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	639		144	275		210	1129		48	766	
v/s Ratio Prot	c0.06	0.10		0.18			c0.15	0.26		0.01	c0.33	
v/s Ratio Perm	c0.30			0.01								
v/c Ratio	1.10	0.32		0.05	0.81		0.87	0.56		0.38	1.00	
Uniform Delay, d1	34.2	25.1		30.8	37.1		40.3	19.2		46.8	33.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.04	0.81	
Incremental Delay, d2	95.9	0.3		0.1	16.6		30.2	2.0		4.0	28.5	
Delay (s)	130.1	25.4		31.0	53.7		70.5	21.2		52.5	55.3	
Level of Service	F	C		C	D		E	C		D	E	
Approach Delay (s)		66.3			53.0			32.2			55.3	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			49.7							HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			100.0							Sum of lost time (s)	21.6	
Intersection Capacity Utilization			100.2%							ICU Level of Service	G	
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT - NO EVENT
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	152	569	78	43	515	175	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3018		2987	2982			5517	1233			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3018		2987	2982			5517	1233			
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)	708	744	64	169	632	87	48	572	194	0	0	0
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	157	0	0	0
Lane Group Flow (vph)	708	804	0	169	711	0	0	620	37	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.4	58.7		11.5	44.8			20.9	20.9			
Effective Green, g (s)	25.4	58.7		11.5	44.8			20.9	20.9			
Actuated g/C Ratio	0.23	0.53		0.10	0.41			0.19	0.19			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1034	1610		312	1214			1048	234			
v/s Ratio Prot	c0.16	0.27		0.06	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.68	0.50		0.54	0.59			0.59	0.16			
Uniform Delay, d1	38.6	16.3		46.7	25.4			40.7	37.2			
Progression Factor	0.57	0.25		1.31	0.26			1.15	3.59			
Incremental Delay, d2	1.7	1.0		0.6	0.2			0.8	0.3			
Delay (s)	23.7	5.0		61.6	6.7			47.4	133.7			
Level of Service	C	A		E	A			D	F			
Approach Delay (s)		13.8			17.2			68.0			0.0	
Approach LOS		B			B			E			A	

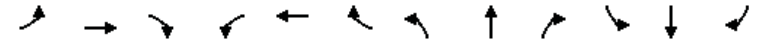
Intersection Summary

HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	235	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.96	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2437			1543	853	1033	2873	580
Fit Permitted	0.95	1.00		0.95	1.00			0.93	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2437			1450	853	781	2873	580
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	250	103
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	26	0	3	79
Lane Group Flow (vph)	162	1439	0	54	593	0	0	59	4	64	257	14
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	17.5	65.6		8.9	55.4			15.6	15.6	16.6	16.6	16.6
Effective Green, g (s)	17.5	65.6		8.9	55.4			15.6	15.6	16.6	16.6	16.6
Actuated g/C Ratio	0.16	0.60		0.08	0.50			0.14	0.14	0.15	0.15	0.15
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	245	2557		104	1227			205	120	117	433	87
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						c0.09	
v/s Ratio Perm								0.04	0.00	0.08		0.02
v/c Ratio	0.66	0.56		0.52	0.48			0.29	0.04	0.55	0.59	0.16
Uniform Delay, d1	43.5	13.5		48.5	17.9			42.2	40.7	43.2	43.5	40.6
Progression Factor	0.90	1.29		0.83	0.48			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.7		3.6	0.2			0.8	0.1	5.1	2.2	0.9
Delay (s)	44.4	18.1		43.7	8.9			43.0	40.8	48.4	45.7	41.5
Level of Service	D	B		D	A			D	D	D	D	D
Approach Delay (s)		20.8			11.8			42.3			45.2	
Approach LOS		C			B			D			D	

Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.51	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			1.1	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			1.1	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay		5.6			HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.64				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	11.3
Intersection Capacity Utilization		69.3%			ICU Level of Service	C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↖↖↖	↗
Volume (vph)	262	1267	145	34	172	356	188	145	465	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.98	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			0.99	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		5770			2846	2429			3997	1122
Fit Permitted		0.99			0.83	1.00			0.96	1.00
Satd. Flow (perm)		5770			2373	2429			3997	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	149	479	270
RTOR Reduction (vph)	0	22	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1703	0	0	212	555	0	0	690	208
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		22.4			20.4	20.4			14.7	14.7
Effective Green, g (s)		24.4			23.4	23.4			17.7	17.7
Actuated g/C Ratio		0.33			0.31	0.31			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1877			740	757			943	264
v/s Ratio Prot						c0.23			0.17	c0.19
v/s Ratio Perm		0.30			0.09					
v/c Ratio		0.91			0.29	0.73			0.73	0.79
Uniform Delay, d1		24.2			19.5	23.0			26.5	26.9
Progression Factor		1.00			0.70	1.00			1.00	1.00
Incremental Delay, d2		6.8			0.2	3.7			3.0	14.4
Delay (s)		31.0			13.7	26.7			29.4	41.2
Level of Service		C			B	C			C	D
Approach Delay (s)		31.0			13.7	26.7			32.2	
Approach LOS		C			B	C			C	
Intersection Summary										
HCM 2000 Control Delay			29.5			HCM 2000 Level of Service				C
HCM 2000 Volume to Capacity ratio			0.85							
Actuated Cycle Length (s)			75.0			Sum of lost time (s)				12.5
Intersection Capacity Utilization			85.3%			ICU Level of Service				E
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↑	↑	↔	↔	↔	↔
Volume (vph)	51	328	276	49	155	105	14	231	55	477
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2620		2297		1161		1327	2547
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.91
Satd. Flow (perm)		1700	2620		2297		1161		621	2323
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	405	341	60	191	130	17	285	68	589
RTOR Reduction (vph)	0	0	18	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	342	509	0	322	0	3	0	292	650
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	Perm	pm+pt	pm+pt	NA		
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)		18.5	18.5		16.0		16.0	31.0		31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0	32.5		32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21	0.43		0.43
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0		4.0
Lane Grp Cap (vph)		419	733		535		247	386		1043
v/s Ratio Prot		c0.20	0.19		0.14			c0.13		0.10
v/s Ratio Perm						0.00		c0.20		0.17
v/c Ratio		0.82	0.69		0.60		0.01	0.76		0.62
Uniform Delay, d1		26.6	24.1		25.6		23.3	20.1		16.5
Progression Factor		1.00	1.00		1.00		1.00	0.88		0.89
Incremental Delay, d2		16.0	5.4		5.0		0.1	10.1		2.1
Delay (s)		42.6	29.5		30.6		23.4	27.8		16.8
Level of Service		D	C		C		C	C		B
Approach Delay (s)			34.7		30.3					20.2
Approach LOS			C		C					C
Intersection Summary										
HCM 2000 Control Delay			27.6		HCM 2000 Level of Service					C
HCM 2000 Volume to Capacity ratio			0.63							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)			13.5		
Intersection Capacity Utilization			65.4%		ICU Level of Service					C
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↑	↑	↔	↔	↔
Volume (vph)	10	2	67	8	4	14	9	374	2	7	91	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1550	1350		1464		1272	2541		1540	3042	
Fit Permitted		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1614	1350		1486		1272	2541		1540	3042	
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)	10	2	69	8	4	14	9	386	2	7	94	7
RTOR Reduction (vph)	0	0	64	0	13	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	12	5	0	13	0	9	387	0	7	96	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		1.9	1.9		1.9		0.6	9.1		0.6	9.4	
Effective Green, g (s)		1.9	1.9		1.9		0.6	9.1		0.6	9.4	
Actuated g/C Ratio		0.07	0.07		0.07		0.02	0.33		0.02	0.34	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		111	93		102		27	840		33	1039	
v/s Ratio Prot						0.01	c0.15			0.00	c0.03	
v/s Ratio Perm		0.01	0.00		c0.01							
v/c Ratio		0.11	0.05		0.13		0.33	0.46		0.21	0.09	
Uniform Delay, d1		12.0	12.0		12.0		13.3	7.3		13.2	6.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4	0.2		0.6		2.6	0.4		1.2	0.0	
Delay (s)		12.4	12.2		12.6		15.9	7.7		14.4	6.2	
Level of Service		B	B		B		B	A		B	A	
Approach Delay (s)		12.2			12.6			7.9			6.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.4		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			27.5		Sum of lost time (s)			15.9				
Intersection Capacity Utilization			46.8%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↖	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔	↔	↔	↔		↔	↔		
Volume (vph)	7	5	7	2	2	16	5	29	1	72	59	10	
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00		
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.97		
Flpb, ped/bikes		0.99			1.00	1.00	0.83	1.00		1.00	1.00		
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.98		
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		2370			1413	1230	1145	1438		1377	1378		
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00		
Satd. Flow (perm)		2305			1448	1230	1206	1438		1377	1378		
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	
Adj. Flow (vph)	8	6	8	2	2	18	6	33	1	83	68	11	
RTOR Reduction (vph)	0	8	0	0	0	8	0	1	0	0	3	0	
Lane Group Flow (vph)	0	14	0	0	4	10	6	33	0	83	76	0	
Confl. Peds. (#/hr)	28		3	3		28	213		19			213	
Confl. Bikes (#/hr)			1						18			10	
Parking (#/hr)		2											
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA		
Protected Phases		4			8	1		2		1	6		
Permitted Phases	4			8		8	2						
Actuated Green, G (s)		1.0			1.0	20.9	1.2	1.2		19.9	26.1		
Effective Green, g (s)		1.0			1.0	20.9	1.2	1.2		19.9	26.1		
Actuated g/C Ratio		0.03			0.03	0.56	0.03	0.03		0.54	0.70		
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0		
Lane Grp Cap (vph)		62			39	858	39	46		738	969		
v/s Ratio Prot						0.01		c0.02		c0.06	0.05		
v/s Ratio Perm		c0.01			0.00	0.00	0.00						
v/c Ratio		0.23			0.10	0.01	0.15	0.72		0.11	0.08		
Uniform Delay, d1		17.7			17.6	3.6	17.5	17.8		4.2	1.7		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.9			1.2	0.0	1.8	41.6		0.0	0.0		
Delay (s)		19.6			18.8	3.6	19.3	59.4		4.3	1.8		
Level of Service		B			B	A	B	E		A	A		
Approach Delay (s)		19.6			6.3			53.4			3.0		
Approach LOS		B			A			D			A		
Intersection Summary													
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio		0.15											
Actuated Cycle Length (s)		37.1			Sum of lost time (s)					15.0			
Intersection Capacity Utilization		42.8%			ICU Level of Service					A			
Analysis Period (min)		15											
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015

	↖	↙	↑	↘	↙	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖	↑	↘	↙	↓
Volume (vph)	20	115	242	25	61	129
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	849	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	849	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	132	278	29	70	148
RTOR Reduction (vph)	0	119	0	17	0	0
Lane Group Flow (vph)	23	13	278	12	70	148
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	5.6	5.6	28.9	23.9	7.5	41.4
Effective Green, g (s)	5.6	5.6	28.9	23.9	7.5	41.4
Actuated g/C Ratio	0.10	0.10	0.51	0.42	0.13	0.73
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	111	171	778	430	149	867
v/s Ratio Prot	c0.02		c0.18	0.01	c0.06	0.12
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.21	0.08	0.36	0.03	0.47	0.17
Uniform Delay, d1	23.7	23.3	8.5	9.7	22.9	2.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.2	0.3	0.0	2.3	0.1
Delay (s)	24.6	23.5	8.7	9.8	25.2	2.5
Level of Service	C	C	A	A	C	A
Approach Delay (s)	23.7		8.8			9.8
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			12.5		HCM 2000 Level of Service	
HCM 2000 Volume to Capacity ratio		0.41				
Actuated Cycle Length (s)		57.0		Sum of lost time (s)		20.0
Intersection Capacity Utilization		36.1%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	3	1	7	67	43	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.90		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1671	1371		3144	3120	
Fit Permitted	0.95	1.00		0.94	1.00	
Satd. Flow (perm)	1671	1371		2974	3120	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	4	1	8	80	51	4
RTOR Reduction (vph)	0	1	0	0	1	0
Lane Group Flow (vph)	4	0	0	88	54	0
Confl. Peds. (#/hr)	50	50	50			50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.9	0.9		21.3	21.3	
Effective Green, g (s)	0.9	0.9		21.3	21.3	
Actuated g/C Ratio	0.03	0.03		0.66	0.66	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	46	38		1967	2063	
v/s Ratio Prot	c0.00				0.02	
v/s Ratio Perm		0.00		c0.03		
v/c Ratio	0.09	0.00		0.04	0.03	
Uniform Delay, d1	15.2	15.2		1.9	1.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.0		0.0	0.0	
Delay (s)	16.1	15.2		1.9	1.9	
Level of Service	B	B		A	A	
Approach Delay (s)	15.9			1.9	1.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.05		
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	85	287	7	71	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.95	1.00		1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1634	1458	3403		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1634	1458	3403		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	91	309	8	76	243
RTOR Reduction (vph)	0	82	1	0	0	0
Lane Group Flow (vph)	11	9	316	0	76	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	5.9	5.9	33.9		5.1	44.1
Effective Green, g (s)	5.9	5.9	33.9		5.1	44.1
Actuated g/C Ratio	0.10	0.10	0.56		0.08	0.73
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	160	142	1916		144	2506
v/s Ratio Prot			c0.09		c0.04	0.07
v/s Ratio Perm	c0.01	0.01				
v/c Ratio	0.07	0.06	0.16		0.53	0.10
Uniform Delay, d1	24.7	24.6	6.3		26.4	2.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.2	0.2		3.5	0.1
Delay (s)	24.8	24.8	6.5		29.9	2.4
Level of Service	C	C	A		C	A
Approach Delay (s)	24.8		6.5			8.9
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	15.3
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	5	5	64	34	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1521	1344		2873	2769	
Flt Permitted	0.95	1.00		0.93	1.00	
Satd. Flow (perm)	1521	1344		2683	2769	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	6	6	75	40	12
RTOR Reduction (vph)	0	6	0	0	10	0
Lane Group Flow (vph)	12	0	0	81	42	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.7	0.7		6.6	6.6	
Effective Green, g (s)	0.7	0.7		6.6	6.6	
Actuated g/C Ratio	0.02	0.02		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	25	22		416	430	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.03		
v/c Ratio	0.48	0.00		0.19	0.10	
Uniform Delay, d1	20.7	20.6		15.6	15.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	0.1		0.2	0.1	
Delay (s)	34.5	20.6		15.9	15.5	
Level of Service	C	C		B	B	
Approach Delay (s)	29.9			15.9	15.5	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			17.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.06			
Actuated Cycle Length (s)			42.5		Sum of lost time (s)	15.0
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	230	1	20	2	2	5	28	68	6	5	159	178
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	250	1	25	3	3	5	35	74	8	5	173	193
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	250	27	3	8	117	178	193					
Volume Left (vph)	250	0	3	0	35	5	0					
Volume Right (vph)	0	25	0	5	8	0	193					
Hadj (s)	0.53	-0.63	0.53	-0.44	0.06	0.05	-0.67					
Departure Headway (s)	6.3	5.1	6.7	5.7	5.9	5.6	4.9					
Degree Utilization, x	0.44	0.04	0.00	0.01	0.19	0.28	0.26					
Capacity (veh/h)	548	662	489	568	583	617	708					
Control Delay (s)	12.9	7.1	8.6	7.6	10.2	9.5	8.4					
Approach Delay (s)	12.3		7.8		10.2	8.9						
Approach LOS	B		A		B	A						
Intersection Summary												
Delay			10.3									
Level of Service			B									
Intersection Capacity Utilization			50.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	46	184	99	1	201	6	62	242	66	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	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	1.00	0.85	1.00	0.97		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1279	1365	1131	1290	1365	1116	2515	2491		1296	2454	
Fit Permitted	0.62	1.00	1.00	0.63	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	831	1365	1131	853	1365	1116	2515	2491		1296	2454	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	52	207	111	1	226	7	70	272	74	1	183	80
RTOR Reduction (vph)	0	0	79	0	0	5	0	24	0	0	52	0
Lane Group Flow (vph)	52	207	32	1	226	2	70	322	0	1	211	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						4
Actuated Green, G (s)	13.4	13.4	13.4	13.4	13.4	13.4	3.9	16.7		0.8	13.6	
Effective Green, g (s)	13.4	13.4	13.4	13.4	13.4	13.4	3.9	16.7		0.8	13.6	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.08	0.36		0.02	0.29	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	238	392	325	245	392	320	210	892		22	716	
v/s Ratio Prot		0.15			c0.17		0.03	c0.13		0.00	c0.09	
v/s Ratio Perm	0.06		0.03	0.00		0.00						
v/c Ratio	0.22	0.53	0.10	0.00	0.58	0.01	0.33	0.36		0.05	0.29	
Uniform Delay, d1	12.6	13.9	12.2	11.8	14.2	11.8	20.1	11.0		22.5	12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3	0.1	0.0	2.1	0.0	0.9	0.3		0.9	0.2	
Delay (s)	13.1	15.2	12.3	11.8	16.2	11.9	21.1	11.3		23.4	13.0	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		14.1			16.1			12.9			13.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	15.7
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	39	310	1	2	319	12	3	5	1	17	1	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1255	1621	1663		1493	1356	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1255	1239	1663		1185	1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	323	1	2	332	12	3	5	1	18	1	46
RTOR Reduction (vph)	0	0	0	0	0	6	0	1	0	0	37	0
Lane Group Flow (vph)	41	323	1	2	332	6	3	5	0	18	10	0
Confl. Peds. (#/hr)	50					50						50
Confl. Bikes (#/hr)						10						10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Effective Green, g (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1012	860	48	905	666	232	311		222	254	
v/s Ratio Prot	c0.03	c0.19		0.00	c0.19			0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					0.01
v/c Ratio	0.27	0.32	0.00	0.04	0.37	0.01	0.01	0.02		0.08	0.04	
Uniform Delay, d1	33.5	8.1	6.6	37.4	10.9	8.8	26.3	26.3		26.7	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.8	0.0	0.4	0.3	0.0	0.0	0.0		0.2	0.1	
Delay (s)	34.5	8.9	6.6	37.8	11.1	8.8	26.3	26.4		26.8	26.5	
Level of Service	C	A	A	D	B	A	C	C		C	C	
Approach Delay (s)		11.8			11.2			26.3			26.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	14	317	3	5	357	4	11	42	13	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1500	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1053	1540	2967			2989	1073
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.93	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1053	1508	2967			2941	1073
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	356	3	6	401	4	12	47	15	24	16	44
RTOR Reduction (vph)	0	0	1	0	0	2	0	13	0	0	0	40
Lane Group Flow (vph)	16	356	2	6	401	2	12	49	0	0	40	4
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.5	20.0	20.0	0.6	19.1	19.1	4.3	4.3			3.3	3.3
Effective Green, g (s)	0.5	20.0	20.0	0.6	19.1	19.1	4.3	4.3			3.3	3.3
Actuated g/C Ratio	0.01	0.53	0.53	0.02	0.50	0.50	0.11	0.11			0.09	0.09
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	16	641	727	24	612	530	171	336			256	93
v/s Ratio Prot	c0.01	0.29		0.00	c0.33			c0.02				
v/s Ratio Perm			0.00			0.00	0.01				0.01	0.00
v/c Ratio	1.00	0.56	0.00	0.25	0.66	0.00	0.07	0.14			0.16	0.04
Uniform Delay, d1	18.7	6.0	4.2	18.4	7.0	4.7	15.0	15.1			16.0	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	225.0	1.0	0.0	5.4	2.5	0.0	0.2	0.2			0.3	0.2
Delay (s)	243.7	7.0	4.2	23.8	9.5	4.7	15.2	15.3			16.3	16.0
Level of Service	F	A	A	C	A	A	B	B			B	B
Approach Delay (s)		17.1			9.7			15.3			16.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	252	60	8	295	105	31	91	8	73	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.92	1.00	1.00	0.95	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1329	922		1334	1126	880	1070	957	913	1070	1039	
Fit Permitted	0.30	1.00		0.45	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	424	922		632	1126	880	1070	957	913	1070	1039	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	296	71	9	347	124	36	107	9	86	47	28
RTOR Reduction (vph)	0	8	0	0	0	55	0	0	7	0	22	0
Lane Group Flow (vph)	24	359	0	9	347	69	36	107	2	86	53	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	35.6	35.6		34.9	34.9	43.7	4.8	13.6	13.6	8.8	17.6	
Effective Green, g (s)	35.6	35.6		34.9	34.9	43.7	4.8	13.6	13.6	8.8	17.6	
Actuated g/C Ratio	0.45	0.45		0.44	0.44	0.56	0.06	0.17	0.17	0.11	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	207	417		286	499	544	65	165	157	119	232	
v/s Ratio Prot	0.00	c0.39		0.00	c0.31	0.01	0.03	c0.11		c0.08	0.05	
v/s Ratio Perm	0.05			0.01		0.06			0.00			
v/c Ratio	0.12	0.86		0.03	0.70	0.13	0.55	0.65	0.01	0.72	0.23	
Uniform Delay, d1	13.3	19.3		14.3	17.6	8.4	35.9	30.3	27.0	33.8	25.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	16.4		0.0	4.2	0.1	9.8	8.5	0.0	19.4	0.5	
Delay (s)	13.5	35.7		14.3	21.8	8.5	45.7	38.8	27.0	53.2	25.5	
Level of Service	B	D		B	C	A	D	D	C	D	C	
Approach Delay (s)		34.3			18.2		39.7			40.3		
Approach LOS		C			B		D			D		

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

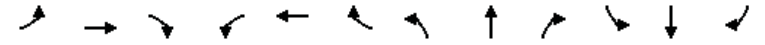


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	70	39	27	26	54	7	22	24	30	5	24	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		0.99		0.99	1.00			1.00	1.00		1.00	
Frt		0.97		1.00	0.98			1.00	0.85		0.88	
Fit Protected		0.97		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1431		1689	1762			1752	1500		1325	
Fit Permitted		0.80		0.71	1.00			0.81	1.00		0.99	
Satd. Flow (perm)		1171		1260	1762			1450	1500		1318	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	88	49	34	32	68	9	28	30	38	6	30	208
RTOR Reduction (vph)	0	11	0	0	6	0	0	0	30	0	162	0
Lane Group Flow (vph)	0	160	0	32	71	0	0	58	8	0	82	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4			4	8		
Actuated Green, G (s)		13.1		13.1	13.1			10.9	10.9		10.9	
Effective Green, g (s)		13.1		13.1	13.1			10.9	10.9		10.9	
Actuated g/C Ratio		0.27		0.27	0.27			0.22	0.22		0.22	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		313		337	472			323	334		293	
v/s Ratio Prot				0.04								
v/s Ratio Perm	c0.14		0.03					0.04	0.01		c0.06	
v/c Ratio	0.51		0.09	0.15				0.18	0.03		0.28	
Uniform Delay, d1	15.2		13.4	13.7				15.4	14.8		15.8	
Progression Factor	1.00		1.00	1.00				1.00	1.00		1.00	
Incremental Delay, d2	1.4		0.1	0.1				0.3	0.0		0.5	
Delay (s)	16.6		13.6	13.8				15.6	14.9		16.3	
Level of Service	B		B	B				B	B		B	
Approach Delay (s)	16.6			13.7				15.3			16.3	
Approach LOS	B			B				B			B	

Intersection Summary	
HCM 2000 Control Delay	15.8 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.28
Actuated Cycle Length (s)	48.9 Sum of lost time (s) 14.0
Intersection Capacity Utilization	55.1% ICU Level of Service B
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕	↕	↕	↕	↕
Volume (vph)	46	110	21	80	150	13	16	311	14	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1669	3320		1680	3367		1260	2500		1260	2390	
Fit Permitted	0.63	1.00		0.66	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1114	3320		1161	3367		1260	2500		1260	2390	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	126	24	92	172	15	18	357	16	14	206	83
RTOR Reduction (vph)	0	15	0	0	6	0	0	3	0	0	40	0
Lane Group Flow (vph)	53	135	0	92	181	0	18	370	0	14	249	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Effective Green, g (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.07	0.48		0.03	0.43	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	364	1085		379	1100		93	1191		35	1030	
v/s Ratio Prot		0.04			0.05		0.01	c0.15		0.01	c0.10	
v/s Ratio Perm	0.05				c0.08							
v/c Ratio	0.15	0.12		0.24	0.16		0.19	0.31		0.40	0.24	
Uniform Delay, d1	21.9	21.8		22.7	22.1		40.1	14.8		44.0	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.3	0.1		1.0	0.7		7.3	0.1	
Delay (s)	22.1	21.8		23.0	22.1		41.1	15.5		51.3	16.8	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		21.9			22.4			16.7			18.4	
Approach LOS		C			C			B			B	

Intersection Summary	
HCM 2000 Control Delay	19.4 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.29
Actuated Cycle Length (s)	92.1 Sum of lost time (s) 15.5
Intersection Capacity Utilization	90.2% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



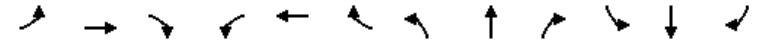
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	2	200	11	2	233	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3394		1711	3419			1705		1711	1621	
Flt Permitted	0.59	1.00		0.61	1.00			0.82		0.75	1.00	
Satd. Flow (perm)	1071	3394		1097	3419			1465		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	217	12	2	253	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	9	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	2	220	0	2	253	0	0	6	0	2	2	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.2	7.2		7.2	7.2			10.1		10.1	10.1	
Effective Green, g (s)	7.2	7.2		7.2	7.2			10.1		10.1	10.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.37		0.37	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	282	895		289	901			541		497	599	
v/s Ratio Prot		0.06			c0.07						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.01	0.25		0.01	0.28			0.01		0.00	0.00	
Uniform Delay, d1	7.4	7.9		7.4	8.0			5.4		5.4	5.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.1		0.0	0.2			0.0		0.0	0.0	
Delay (s)	7.4	8.1		7.4	8.2			5.4		5.4	5.4	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		8.1			8.2			5.4			5.4	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.12	
Actuated Cycle Length (s)	27.3	Sum of lost time (s)
Intersection Capacity Utilization	22.3%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



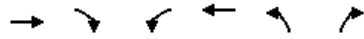
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	1	85	0	0	303	2	155	43	136	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.89				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3420			5128		1711	3032				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3265			5128		1711	3032				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	1	106	0	0	379	2	194	54	170	0	0	31
RTOR Reduction (vph)	0	0	0	0	1	0	0	101	0	0	0	29
Lane Group Flow (vph)	0	107	0	0	380	0	194	123	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1533			1788		697	1236				141
v/s Ratio Prot		c0.00			c0.07		c0.11	0.04				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.21		0.28	0.10				0.01
Uniform Delay, d1		11.2			17.4		15.0	13.9				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.3		1.0	0.2				0.1
Delay (s)		11.2			17.7		16.0	14.0				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.2			17.7			15.0				34.3
Approach LOS		B			B			B				C

Intersection Summary		
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.24	
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	32.3%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	86	169	244	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1609	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1609	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	105	206	298	291	0	0
RTOR Reduction (vph)	20	51	0	0	0	0
Lane Group Flow (vph)	143	97	298	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	39.3	39.3	10.7	60.0		
Effective Green, g (s)	39.3	39.3	10.7	60.0		
Actuated g/C Ratio	0.65	0.65	0.18	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1053	935	591	1801		
v/s Ratio Prot	0.09		c0.09	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.14	0.10	0.50	0.16		
Uniform Delay, d1	3.9	3.8	22.3	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	0.7	0.0		
Delay (s)	4.0	3.9	22.9	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.9			11.6	0.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔↔	
Volume (vph)	62	33	105	2	25	0	85	215	0	6	209	67
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1185	1895		1154	1279		1215	2431		1215	2300	
Fit Permitted	0.41	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	515	1895		794	1279		1215	2431		1215	2300	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	70	37	118	2	28	0	96	242	0	7	235	75
RTOR Reduction (vph)	0	84	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	70	71	0	2	28	0	96	242	0	7	286	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	17.9	17.9		6.7	6.7		8.8	26.0		2.6	19.8	
Effective Green, g (s)	17.9	17.9		6.7	6.7		8.8	26.0		2.6	19.8	
Actuated g/C Ratio	0.29	0.29		0.11	0.11		0.14	0.41		0.04	0.32	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	209	540		84	136		170	1006		50	725	
v/s Ratio Prot	c0.03	0.04			0.02		c0.08	0.10		0.01	c0.12	
v/s Ratio Perm	c0.06			0.00								
v/c Ratio	0.33	0.13		0.02	0.21		0.56	0.24		0.14	0.39	
Uniform Delay, d1	17.3	16.7		25.1	25.6		25.2	12.0		29.0	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.1	0.8		4.2	0.1		1.3	0.4	
Delay (s)	18.3	16.8		25.2	26.4		29.5	12.1		30.3	17.2	
Level of Service	B	B		C	C		C	B		C	B	
Approach Delay (s)		17.2			26.3			17.0			17.5	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	21.6
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

EXISTING 2015 PLUS PROJECT - CONVENTION EVENT
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	889	733	12	166	907	36	53	1117	343	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5484	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5484	942			
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)	916	756	12	171	935	37	55	1152	354	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	212	0	0	0
Lane Group Flow (vph)	916	767	0	171	972	0	0	1207	142	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	39.3		13.2	35.8			37.1	37.1			
Effective Green, g (s)	18.2	39.3		13.2	35.8			37.1	37.1			
Actuated g/C Ratio	0.17	0.36		0.12	0.33			0.34	0.34			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1092		358	983			1849	317			
v/s Ratio Prot	c0.20	0.25		0.06	c0.32							
v/s Ratio Perm								0.22	0.15			
v/c Ratio	1.24	0.70		0.48	0.99			0.65	0.45			
Uniform Delay, d1	45.9	30.3		45.2	36.9			31.0	28.5			
Progression Factor	1.38	1.59		1.54	1.01			0.92	2.13			
Incremental Delay, d2	111.8	1.8		0.3	13.6			0.8	1.0			
Delay (s)	175.4	50.1		69.8	50.8			29.1	61.5			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		118.2			53.7			36.5			0.0	
Approach LOS		F			D			D			A	

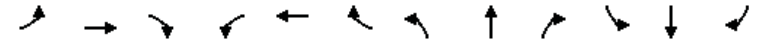
Intersection Summary

HCM 2000 Control Delay	72.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



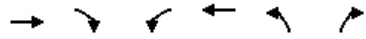
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	299	304
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.85	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3693		1296	2553			1586	858	1044	2401	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1296	3693		1296	2553			1542	858	778	2401	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	305	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	35	122
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	391	67
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	169	1540		70	833			535	297	277	855	207
v/s Ratio Prot	0.12	c0.43		0.02	c0.37						c0.16	
v/s Ratio Perm								0.05	0.03	0.04		0.12
v/c Ratio	0.91	1.02		0.34	1.14			0.14	0.09	0.13	0.46	0.33
Uniform Delay, d1	47.2	32.0		50.1	37.0			24.6	24.2	23.9	27.2	25.8
Progression Factor	0.58	1.24		0.88	0.89			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	14.2		0.9	69.8			0.1	0.1	0.2	0.4	0.9
Delay (s)	34.6	53.9		44.9	102.7			24.8	24.4	24.1	27.6	26.7
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		52.2			101.3			24.6			27.2	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	69.5			0.9	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	272	1171	161	52	302	537	219	199	734	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4087	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4087	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	216	789	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1034	256
Confl. Peds. (#/hr)		50		100	100		100	50	100	100
Confl. Bikes (#/hr)				10			10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1226	293
v/s Ratio Prot						c0.33			0.25	
v/s Ratio Perm		0.30			0.20					c0.26
v/c Ratio		0.92			0.65	1.05			0.84	0.87
Uniform Delay, d1		29.4			26.7	31.0			29.5	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	47.9			7.2	28.4
Delay (s)		50.1			2.1	78.9			36.7	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	78.9			41.0	
Approach LOS		D			A	E			D	

Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



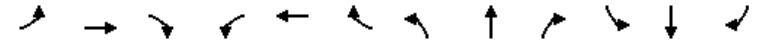
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	16	522	568	45	338	362	24	255	129	624
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1912		2130		1163		1327	2541
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.63
Satd. Flow (perm)		1313	1912		2130		1163		207	1622
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	561	611	48	363	389	26	274	139	671
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	488	742	0	755	0	6	0	307	777
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0		23.0		42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5		23.0		43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27		0.26		0.48	0.48
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		328	531		579		297		305	952
v/s Ratio Prot		0.37	c0.39		c0.35				c0.18	0.15
v/s Ratio Perm							0.01		0.30	0.24
v/c Ratio		1.49	1.40		1.42dr		0.02		1.01	0.82
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	19.8
Progression Factor		1.00	1.00		1.00		1.00		1.10	1.15
Incremental Delay, d2		235.1	189.8		149.0		0.1		28.6	2.2
Delay (s)		268.9	222.3		181.8		25.2		62.8	25.1
Level of Service		F	F		F		C		E	C
Approach Delay (s)			240.7		177.1					35.7
Approach LOS			F		F					D

Intersection Summary			
HCM 2000 Control Delay	153.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↕	↕	↔	↕	↕
Volume (vph)	17	15	97	19	10	67	20	1044	18	12	190	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1569	1353		1426		1272	2533		1540	3043	
Fit Permitted		0.87	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1405	1353		1373		1272	2533		1540	3043	
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)	18	16	102	20	11	71	21	1099	19	13	200	14
RTOR Reduction (vph)	0	0	69	0	48	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	34	33	0	54	0	21	1117	0	13	209	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		12.8	41.5		10.5	39.5	
Effective Green, g (s)		32.1	32.1		32.1		12.8	41.5		10.5	39.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.13	0.42		0.10	0.40	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		451	434		440		162	1051		161	1201	
v/s Ratio Prot							0.02	c0.44		0.01	c0.07	
v/s Ratio Perm		0.02	0.02		c0.04							
v/c Ratio		0.08	0.08		0.12		0.13	1.06		0.08	0.17	
Uniform Delay, d1		23.6	23.6		24.0		38.7	29.2		40.4	19.7	
Progression Factor		1.00	1.00		1.00		1.23	0.34		1.00	1.00	
Incremental Delay, d2		0.3	0.3		0.6		1.3	43.2		1.0	0.3	
Delay (s)		23.9	24.0		24.6		48.8	53.2		41.4	20.0	
Level of Service		C	C		C		D	D		D	B	
Approach Delay (s)		24.0			24.6			53.2			21.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	12	10	3	10	30	7	84	6	111	114	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2552			1434	1227	1150	1432		1377	1392	
Fit Permitted		0.95			1.00	1.00	0.80	1.00		0.95	1.00	
Satd. Flow (perm)		2492			1449	1227	969	1432		1377	1392	
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)	20	13	11	3	11	32	8	90	6	119	123	15
RTOR Reduction (vph)	0	10	0	0	0	16	0	4	0	0	5	0
Lane Group Flow (vph)	0	34	0	0	14	16	8	92	0	119	133	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.2			2.2	19.4	5.0	5.0		17.2	27.2	
Effective Green, g (s)		2.2			2.2	19.4	5.0	5.0		17.2	27.2	
Actuated g/C Ratio		0.06			0.06	0.49	0.13	0.13		0.44	0.69	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		139			80	759	122	181		601	960	
v/s Ratio Prot						0.01		c0.06		c0.09	0.10	
v/s Ratio Perm		c0.01			0.01	0.00	0.01					
v/c Ratio		0.24			0.17	0.02	0.07	0.51		0.20	0.14	
Uniform Delay, d1		17.8			17.7	5.1	15.1	16.0		6.8	2.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9			1.0	0.0	0.2	2.2		0.2	0.1	
Delay (s)		18.7			18.8	5.1	15.4	18.3		7.0	2.2	
Level of Service		B			B	A	B	B		A	A	
Approach Delay (s)		18.7			9.3			18.0			4.4	
Approach LOS		B			A			B			A	

Intersection Summary

HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	39.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



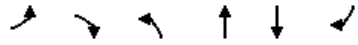
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (vph)	34	258	841	29	83	264
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	280	914	32	90	287
RTOR Reduction (vph)	0	250	0	5	0	0
Lane Group Flow (vph)	37	30	914	27	90	287
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2.5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.8	8.8	47.6	42.6	10.0	62.6
Effective Green, g (s)	8.8	8.8	47.6	42.6	10.0	62.6
Actuated g/C Ratio	0.11	0.11	0.58	0.52	0.12	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	122	188	897	495	139	918
v/s Ratio Prot	c0.03		c0.60	0.01	c0.08	0.24
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.30	0.16	1.02	0.06	0.65	0.31
Uniform Delay, d1	33.5	32.9	16.9	9.5	34.0	2.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.4	34.9	0.0	9.9	0.2
Delay (s)	34.9	33.4	51.8	9.6	44.0	3.1
Level of Service	C	C	D	A	D	A
Approach Delay (s)	33.5		50.4			12.8
Approach LOS	C		D			B

Intersection Summary

HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	81.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	19	43	13	174	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1711	1427		3150	3063	
Fit Permitted	0.95	1.00		0.93	1.00	
Satd. Flow (perm)	1711	1427		2948	3063	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	14	193	232	46
RTOR Reduction (vph)	0	45	0	0	16	0
Lane Group Flow (vph)	21	3	0	207	262	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10			30	
Parking (#/hr)				10	10	10
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.2	2.2		20.3	20.3	
Effective Green, g (s)	2.2	2.2		20.3	20.3	
Actuated g/C Ratio	0.07	0.07		0.62	0.62	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	96		1841	1913	
v/s Ratio Prot	c0.01				c0.09	
v/s Ratio Perm		0.00		0.07		
v/c Ratio	0.18	0.03		0.11	0.14	
Uniform Delay, d1	14.3	14.2		2.5	2.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.1		0.0	0.0	
Delay (s)	15.1	14.3		2.5	2.5	
Level of Service	B	B		A	A	
Approach Delay (s)	14.5			2.5	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	189	267	860	17	74	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3408		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3408		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	297	956	19	82	541
RTOR Reduction (vph)	0	168	2	0	0	0
Lane Group Flow (vph)	210	129	973	0	82	541
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1639		135	2090
v/s Ratio Prot			c0.29		c0.05	0.16
v/s Ratio Perm	c0.13	0.09				
v/c Ratio	0.46	0.31	0.59		0.61	0.26
Uniform Delay, d1	29.3	27.9	18.9		44.5	9.0
Progression Factor	1.00	1.00	1.91		1.07	1.32
Incremental Delay, d2	0.7	0.4	1.0		7.5	0.1
Delay (s)	30.1	28.3	37.0		55.1	11.9
Level of Service	C	C	D		E	B
Approach Delay (s)	29.0		37.0			17.6
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	20	177	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1520	1343		3060	2948	
Flt Permitted	0.95	1.00		0.89	1.00	
Satd. Flow (perm)	1520	1343		2733	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	12	24	208	226	71
RTOR Reduction (vph)	0	12	0	0	57	0
Lane Group Flow (vph)	12	0	0	232	240	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		9.1	9.1	
Effective Green, g (s)	0.6	0.6		9.1	9.1	
Actuated g/C Ratio	0.01	0.01		0.20	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	20	17		552	596	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.08		
v/c Ratio	0.60	0.01		0.42	0.40	
Uniform Delay, d1	22.1	21.9		15.7	15.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.2	0.2		0.5	0.4	
Delay (s)	62.3	22.1		16.2	16.0	
Level of Service	E	C		B	B	
Approach Delay (s)	42.2			16.2	16.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	136	8	67	49	28	5	130	48	9	5	274	193
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	148	9	77	56	32	5	149	52	10	5	298	210
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	148	86	56	38	212	303	210					
Volume Left (vph)	148	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	210					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.15	0.04	-0.67					
Departure Headway (s)	7.1	6.0	7.4	6.8	6.3	5.9	5.2					
Degree Utilization, x	0.29	0.14	0.12	0.07	0.37	0.50	0.30					
Capacity (veh/h)	474	557	443	480	546	589	666					
Control Delay (s)	11.8	8.8	10.2	9.1	13.0	13.4	9.2					
Approach Delay (s)	10.7		9.7		13.0	11.7						
Approach LOS	B		A		B	B						

Intersection Summary			
Delay	11.6		
Level of Service	B		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	134	156	266	3	301	47	264	696	38	18	472	186
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1271	1365	1126	1284	1365	1099	2515	2567		1296	2464	
Fit Permitted	0.41	1.00	1.00	0.62	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	549	1365	1126	843	1365	1099	2515	2567		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	147	171	292	3	331	52	290	765	42	20	519	204
RTOR Reduction (vph)	0	0	191	0	0	34	0	4	0	0	42	0
Lane Group Flow (vph)	147	171	101	3	331	18	290	803	0	20	681	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	189	470	388	290	470	379	352	970		155	882	
v/s Ratio Prot		0.13			0.24		0.12	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.27		0.09	0.00		0.02						
v/c Ratio	0.78	0.36	0.26	0.01	0.70	0.05	0.82	0.83		0.13	0.77	
Uniform Delay, d1	29.3	24.5	23.6	21.5	28.3	21.8	41.8	28.2		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.63	0.77		1.16	1.19	
Incremental Delay, d2	26.4	2.2	1.6	0.1	8.6	0.2	7.5	2.9		1.7	6.3	
Delay (s)	55.7	26.7	25.2	21.6	36.9	22.0	33.9	24.7		47.4	40.3	
Level of Service	E	C	C	C	D	C	C	C		D	D	
Approach Delay (s)		33.0			34.8			27.2			40.4	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		32.9										
HCM 2000 Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		100.0							15.7			
Intersection Capacity Utilization		116.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	89	481	8	6	715	30	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	523	9	7	777	33	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	18	0	28	0	0	85	0
Lane Group Flow (vph)	97	523	5	7	777	15	36	36	0	45	32	0
Confl. Peds. (#/hr)	50					50				50		50
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.06	c0.31		0.00	c0.46			0.02			0.02	
v/s Ratio Perm			0.00			0.01	0.03					
v/c Ratio	0.48	0.56	0.01	0.14	1.01	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.5	13.0	9.0	41.1	23.9	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	2.4	0.0	1.3	34.7	0.0	0.2	0.1		0.3	0.1	
Delay (s)	37.3	15.4	9.0	42.4	58.6	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	E	B	C	C		C	C	
Approach Delay (s)		18.7			56.6			25.3			25.3	
Approach LOS		B			E			C			C	
Intersection Summary												
HCM 2000 Control Delay		37.9										
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		87.2							15.0			
Intersection Capacity Utilization		89.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔			↔	↔
Volume (vph)	118	405	14	21	754	78	49	134	61	112	54	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1046	1540	2934			2978	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.69	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1046	1041	2934			2120	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	123	422	15	22	785	81	51	140	64	117	56	152
RTOR Reduction (vph)	0	0	5	0	0	23	0	54	0	0	0	130
Lane Group Flow (vph)	123	422	10	22	785	58	51	150	0	0	173	22
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	8.0	57.6	57.6	1.9	50.5	50.5	13.3	13.3			12.3	12.3
Effective Green, g (s)	8.0	57.6	57.6	1.9	50.5	50.5	13.3	13.3			12.3	12.3
Actuated g/C Ratio	0.09	0.67	0.67	0.02	0.59	0.59	0.16	0.16			0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	113	815	925	34	715	615	161	454			303	153
v/s Ratio Prot	c0.10	0.35		0.01	c0.65			0.05				
v/s Ratio Perm			0.01			0.06	0.05				c0.08	0.02
v/c Ratio	1.09	0.52	0.01	0.65	1.10	0.09	0.32	0.33			0.57	0.14
Uniform Delay, d1	38.9	7.1	4.7	41.6	17.6	7.7	32.2	32.3			34.3	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	110.5	2.3	0.0	35.3	63.6	0.1	1.1	0.4			2.6	0.4
Delay (s)	149.4	9.4	4.7	76.9	81.3	7.8	33.3	32.7			36.9	32.6
Level of Service	F	A	A	E	F	A	C	C			D	C
Approach Delay (s)		40.1			74.4			32.8			34.9	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔			↔	↔
Volume (vph)	47	386	70	33	491	425	61	249	30	120	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	929		1335	1126	861	1070	957	919	1070	1068	
Fit Permitted	0.14	1.00		0.29	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	196	929		414	1126	861	1070	957	919	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	411	74	35	522	452	65	265	32	128	147	46
RTOR Reduction (vph)	0	6	0	0	0	124	0	0	25	0	11	0
Lane Group Flow (vph)	50	479	0	35	522	328	65	265	7	128	182	0
Confl. Peds. (#/hr)				6	6			28		4		11
Confl. Bikes (#/hr)				9		50				7		15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	52.8	52.8		52.1	52.1	62.1	12.6	25.1	25.1	10.0	22.5	
Effective Green, g (s)	52.8	52.8		52.1	52.1	62.1	12.6	25.1	25.1	10.0	22.5	
Actuated g/C Ratio	0.48	0.48		0.47	0.47	0.56	0.11	0.23	0.23	0.09	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	125	444		215	531	523	122	217	209	97	217	
v/s Ratio Prot	0.01	c0.52		0.00	c0.46	0.06	0.06	c0.28		c0.12	0.17	
v/s Ratio Perm	0.18			0.07		0.32			0.01			
v/c Ratio	0.40	1.08		0.16	0.98	0.63	0.53	1.22	0.03	1.32	0.84	
Uniform Delay, d1	21.0	28.8		26.5	28.7	16.3	46.1	42.6	33.2	50.1	42.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	65.7		0.4	34.5	2.4	4.4	133.6	0.1	199.1	23.6	
Delay (s)	23.1	94.5		26.9	63.1	18.6	50.5	176.2	33.2	249.3	65.8	
Level of Service	C	F		C	E	B	D	F	C	F	E	
Approach Delay (s)		87.8			41.9			141.0			138.9	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	83.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	110.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	67	74	39	45	162	2	31	116	78	11	51	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.97		1.00	1.00			1.00	0.85		0.89	
Fit Protected		0.98		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1694		1689	1797			1780	1499		1561	
Fit Permitted		0.81		0.65	1.00			0.78	1.00		0.99	
Satd. Flow (perm)		1393		1159	1797			1395	1499		1547	
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)	74	82	43	50	180	2	34	129	87	12	57	361
RTOR Reduction (vph)	0	12	0	0	1	0	0	0	65	0	264	0
Lane Group Flow (vph)	0	187	0	50	181	0	0	163	22	0	166	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		13.3		13.3	13.3			13.4	13.4		13.4	
Effective Green, g (s)		13.3		13.3	13.3			13.4	13.4		13.4	
Actuated g/C Ratio		0.25		0.25	0.25			0.26	0.26		0.26	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		352		293	455			356	382		394	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.13		0.04				c0.12	0.01		0.11	
v/c Ratio		0.53		0.17	0.40			0.46	0.06		0.42	
Uniform Delay, d1		16.9		15.3	16.3			16.5	14.8		16.3	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.5		0.3	0.6			0.9	0.1		0.7	
Delay (s)		18.5		15.6	16.9			17.4	14.8		17.0	
Level of Service		B		B	B			B	B		B	
Approach Delay (s)		18.5			16.6			16.5			17.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	
Volume (vph)	146	129	51	69	426	23	40	829	35	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1683	3242		1679	3387		1260	2501		1260	2331	
Fit Permitted	0.41	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	720	3242		1116	3387		1260	2501		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	137	54	73	453	24	43	882	37	17	453	318
RTOR Reduction (vph)	0	35	0	0	4	0	0	3	0	0	127	0
Lane Group Flow (vph)	155	156	0	73	473	0	43	916	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	249	1124		387	1175		149	872		187	883	
v/s Ratio Prot		0.05			0.14		0.03	c0.37		0.01	c0.28	
v/s Ratio Perm	c0.22			0.07								
v/c Ratio	0.62	0.14		0.19	0.40		0.29	1.05		0.09	0.73	
Uniform Delay, d1	27.2	22.4		22.8	24.8		40.2	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.80		1.55	0.62	
Incremental Delay, d2	11.2	0.3		1.1	1.0		3.7	40.9		0.7	3.8	
Delay (s)	38.4	22.7		23.9	25.8		40.1	67.1		57.6	20.3	
Level of Service	D	C		C	C		D	E		E	C	
Approach Delay (s)		29.7			25.6			65.9			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



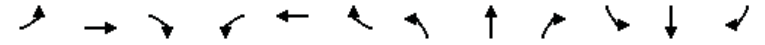
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	6	280	38	4	818	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3360		1711	3420			1678		1711	1531	
Flt Permitted	0.22	1.00		0.54	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	391	3360		981	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	304	41	4	889	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	17	0	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	328	0	4	891	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	156	1344		392	1368			635		563	663	
v/s Ratio Prot		0.10			0.26						0.00	
v/s Ratio Perm	0.02			0.00			0.02		0.01			
v/c Ratio	0.04	0.24		0.01	0.65			0.05		0.02	0.01	
Uniform Delay, d1	11.0	12.0		10.8	14.6			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		0.0	2.4			0.2		0.1	0.0	
Delay (s)	11.5	12.4		10.9	17.0			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.4			17.0			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



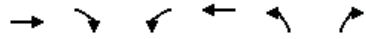
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	3	86	0	0	929	6	382	112	242	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	1.00				1.00
Flt Protected		1.00			1.00		1.00	1.00				1.00
Satd. Flow (prot)		3416			5127		1711	3070				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3242			5127		1711	3070				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	88	0	0	948	6	390	114	247	0	0	130
RTOR Reduction (vph)	0	0	0	0	1	0	0	128	0	0	0	121
Lane Group Flow (vph)	0	91	0	0	953	0	390	233	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1411			1701		824	1479				183
v/s Ratio Prot		0.00			0.19		0.23	0.08				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.56		0.47	0.16				0.05
Uniform Delay, d1		18.3			30.2		19.1	16.0				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.3		1.9	0.2				0.5
Delay (s)		18.4			31.5		21.1	16.2				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.4			31.5			18.7				48.4
Approach LOS		B			C			B				D

Intersection Summary

HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	89	566	889	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1501	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1501	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	584	916	566	0	0
RTOR Reduction (vph)	22	22	0	0	0	0
Lane Group Flow (vph)	321	311	916	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	35.6	35.6	24.4	70.0		
Effective Green, g (s)	35.6	35.6	24.4	70.0		
Actuated g/C Ratio	0.51	0.51	0.35	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	763	725	1156	1801		
v/s Ratio Prot	0.21		0.28	0.31		
v/s Ratio Perm		0.22				
v/c Ratio	0.42	0.43	0.79	0.31		
Uniform Delay, d1	10.8	10.8	20.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.4	0.4	3.8	0.1		
Delay (s)	11.1	11.2	24.3	0.1		
Level of Service	B	B	C	A		
Approach Delay (s)	11.2			15.1	0.0	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			13.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			57.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	200	135	181	7	204	13	176	575	16	17	572	170
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2413		1215	2289	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2413		1215	2289	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	208	141	189	7	212	14	183	599	17	18	596	177
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	208	203	0	7	224	0	183	614	0	18	745	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10				10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	32.9	32.9		21.9	21.9		17.3	46.7		4.1	33.5	
Effective Green, g (s)	32.9	32.9		21.9	21.9		17.3	46.7		4.1	33.5	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.47		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	639		144	275		210	1126		49	766	
v/s Ratio Prot	0.06	0.10		0.18			0.15	0.25		0.01	0.33	
v/s Ratio Perm	0.30			0.01								
v/c Ratio	1.09	0.32		0.05	0.81		0.87	0.55		0.37	0.97	
Uniform Delay, d1	34.2	25.1		30.8	37.1		40.3	19.1		46.7	32.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.04	0.81	
Incremental Delay, d2	90.9	0.3		0.1	16.6		30.2	1.9		3.8	23.4	
Delay (s)	125.1	25.4		31.0	53.7		70.5	21.0		52.2	49.9	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		63.9			53.0			32.3			50.0	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			47.5		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)			21.6				
Intersection Capacity Utilization			99.3%		ICU Level of Service			F				
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	889	733	12	170	907	36	53	1070	290	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5480	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5480	942			
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)	916	756	12	175	935	37	55	1103	299	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	201	0	0	0
Lane Group Flow (vph)	916	767	0	175	972	0	0	1158	98	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.3		13.2	36.8			36.1	36.1			
Effective Green, g (s)	18.2	40.3		13.2	36.8			36.1	36.1			
Actuated g/C Ratio	0.17	0.37		0.12	0.33			0.33	0.33			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1119		358	1011			1798	309			
v/s Ratio Prot	c0.20	0.25		0.06	c0.32							
v/s Ratio Perm								0.21	0.10			
v/c Ratio	1.24	0.69		0.49	0.96			0.64	0.32			
Uniform Delay, d1	45.9	29.5		45.2	35.9			31.5	27.7			
Progression Factor	1.38	1.60		1.53	1.02			0.90	2.83			
Incremental Delay, d2	111.8	1.6		0.3	8.9			0.7	0.6			
Delay (s)	175.4	48.9		69.4	45.5			29.1	79.0			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		117.7			49.1			39.4			0.0	
Approach LOS		F			D			D			A	

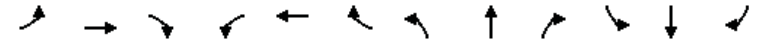
Intersection Summary

HCM 2000 Control Delay	72.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	318	304
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.86	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3693		1296	2553			1587	858	1044	2442	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1296	3693		1296	2553			1541	858	778	2442	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	324	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	30	126
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	409	69
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	169	1540		70	833			535	297	277	870	207
v/s Ratio Prot	0.12	c0.43		0.02	c0.37						c0.17	
v/s Ratio Perm								0.05	0.03	0.04		0.12
v/c Ratio	0.91	1.02		0.34	1.14			0.14	0.09	0.13	0.47	0.34
Uniform Delay, d1	47.2	32.0		50.1	37.0			24.6	24.2	23.9	27.4	25.9
Progression Factor	0.58	1.24		0.87	0.90			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	14.2		1.0	70.5			0.1	0.1	0.2	0.4	1.0
Delay (s)	34.6	53.9		44.8	104.0			24.8	24.4	24.1	27.8	26.8
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		52.2			102.5			24.6			27.3	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	60.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	69.5			0.9	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↖↑	↗↑			↖↖↖	↗↗↗
Volume (vph)	272	1171	161	52	302	537	219	226	788	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4090	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4090	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	246	847	285
RTOR Reduction (vph)	0	22	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	809	0	0	1122	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1227	293
v/s Ratio Prot						c0.33			c0.27	
v/s Ratio Perm		0.30			0.20					0.26
v/c Ratio		0.92			0.65	1.06			0.91	0.87
Uniform Delay, d1		29.4			26.7	31.0			30.4	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	48.2			12.0	28.4
Delay (s)		50.1			2.1	79.2			42.3	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	79.2			45.3	
Approach LOS		D			A	E			D	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	111.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



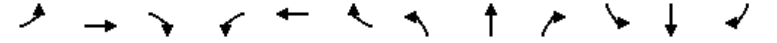
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↕↔
Volume (vph)	16	504	568	45	338	362	24	255	129	651
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1912		2130		1163		1327	2543
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.65
Satd. Flow (perm)		1313	1912		2130		1163		207	1667
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	542	611	48	363	389	26	274	139	700
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	478	733	0	755	0	6	0	314	799
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0			23.0	42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5			23.0	43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27			0.26	0.48	0.48
Clearance Time (s)		4.5	4.5		4.0			4.0	4.0	4.0
Lane Grp Cap (vph)		328	531		579			297	305	966
v/s Ratio Prot		0.36	c0.38		c0.35				c0.19	0.15
v/s Ratio Perm							0.01		0.31	0.25
v/c Ratio		1.46	1.38		1.42dr		0.02		1.03	0.83
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	20.0
Progression Factor		1.00	1.00		1.00		1.00		1.08	1.12
Incremental Delay, d2		222.0	182.5		149.0		0.1		33.5	2.1
Delay (s)		255.8	215.0		181.8		25.2		67.0	24.6
Level of Service		F	F		F		C		E	C
Approach Delay (s)			231.0		177.1					36.5
Approach LOS			F		F					D

Intersection Summary			
HCM 2000 Control Delay	147.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↔		↔	↕↔		↔	↕↔	
Volume (vph)	17	141	78	19	10	67	20	943	51	24	181	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	0.99		1.00	0.99	
Fit Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1610	1353		1426		1272	2509		1540	3036	
Fit Permitted		0.97	1.00		0.93		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1567	1353		1344		1272	2509		1540	3036	
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)	18	148	82	20	11	71	21	993	54	25	191	16
RTOR Reduction (vph)	0	0	56	0	48	0	0	4	0	0	6	0
Lane Group Flow (vph)	0	166	26	0	54	0	21	1043	0	25	201	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Effective Green, g (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.14	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		503	434		431		175	965		207	1168	
v/s Ratio Prot							0.02	c0.42		0.02	c0.07	
v/s Ratio Perm		c0.11	0.02		0.04							
v/c Ratio		0.33	0.06		0.12		0.12	1.08		0.12	0.17	
Uniform Delay, d1		25.8	23.5		24.0		37.8	30.8		38.0	20.3	
Progression Factor		1.00	1.00		1.00		1.21	0.25		1.00	1.00	
Incremental Delay, d2		1.8	0.3		0.6		1.1	50.1		1.2	0.3	
Delay (s)		27.5	23.8		24.6		46.8	57.9		39.2	20.6	
Level of Service		C	C		C		D	E		D	C	
Approach Delay (s)		26.3			24.6			57.6			22.6	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	46.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	120	10	3	12	30	7	84	6	110	129	18
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.99	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2699			1436	1217	1151	1432		1377	1385	
Fit Permitted		0.92			0.91	1.00	0.82	1.00		0.95	1.00	
Satd. Flow (perm)		2485			1318	1217	989	1432		1377	1385	
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)	20	129	11	3	13	32	8	90	6	118	139	19
RTOR Reduction (vph)	0	8	0	0	0	16	0	4	0	0	7	0
Lane Group Flow (vph)	0	152	0	0	16	16	8	92	0	118	151	0
Confl. Peds. (#/hr)	28		3	3		28	213		19		213	
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		6.7			6.7	20.4	4.9	4.9		13.7	23.6	
Effective Green, g (s)		6.7			6.7	20.4	4.9	4.9		13.7	23.6	
Actuated g/C Ratio		0.17			0.17	0.51	0.12	0.12		0.34	0.59	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		413			219	767	120	174		468	811	
v/s Ratio Prot						0.01		c0.06		c0.09	0.11	
v/s Ratio Perm	c0.06				0.01	0.01	0.01					
v/c Ratio	0.37				0.07	0.02	0.07	0.53		0.25	0.19	
Uniform Delay, d1	14.9				14.2	5.0	15.7	16.6		9.6	3.9	
Progression Factor	1.00				1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6				0.1	0.0	0.2	2.9		0.3	0.1	
Delay (s)	15.5				14.3	5.0	15.9	19.5		9.9	4.0	
Level of Service	B				B	A	B	B		A	A	
Approach Delay (s)	15.5				8.1			19.2			6.5	
Approach LOS	B				A			B			A	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	40.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



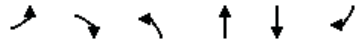
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	34	240	782	29	180	233
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1742	1535	847	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1742	1535	847	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	261	850	32	196	253
RTOR Reduction (vph)	0	236	0	6	0	0
Lane Group Flow (vph)	37	25	850	26	196	253
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2.5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.8	8.8	47.0	42.0	20.0	72.0
Effective Green, g (s)	8.8	8.8	47.0	42.0	20.0	72.0
Actuated g/C Ratio	0.10	0.10	0.52	0.46	0.22	0.79
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	109	168	794	438	249	946
v/s Ratio Prot	c0.03		c0.55	0.01	c0.17	0.21
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.34	0.15	1.07	0.06	0.79	0.27
Uniform Delay, d1	38.3	37.6	21.9	13.5	33.4	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.4	52.5	0.1	15.1	0.2
Delay (s)	40.1	38.0	74.4	13.5	48.5	2.6
Level of Service	D	D	E	B	D	A
Approach Delay (s)	38.3		72.2			22.6
Approach LOS	D		E			C

Intersection Summary

HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑↔	
Volume (vph)	19	43	57	192	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1539		1678	1531	3061	
Fit Permitted	0.99		0.58	1.00	1.00	
Satd. Flow (perm)	1539		1026	1531	3061	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	63	213	232	46
RTOR Reduction (vph)	43	0	0	0	16	0
Lane Group Flow (vph)	26	0	63	213	262	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	3.6		23.3	23.3	23.3	
Effective Green, g (s)	3.6		23.3	23.3	23.3	
Actuated g/C Ratio	0.10		0.63	0.63	0.63	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	150		647	966	1932	
v/s Ratio Prot	c0.02			c0.14	0.09	
v/s Ratio Perm			0.06			
v/c Ratio	0.17		0.10	0.22	0.14	
Uniform Delay, d1	15.3		2.7	2.9	2.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.1	0.1	0.0	
Delay (s)	15.8		2.7	3.0	2.8	
Level of Service	B		A	A	A	
Approach Delay (s)	15.8			3.0	2.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑↔		↔	↑↔
Volume (vph)	189	147	893	52	39	488
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3379		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3379		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	163	992	58	43	542
RTOR Reduction (vph)	0	116	4	0	0	0
Lane Group Flow (vph)	210	47	1046	0	43	542
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	50.1		5.9	61.1
Effective Green, g (s)	28.7	28.7	50.1		5.9	61.1
Actuated g/C Ratio	0.29	0.29	0.50		0.06	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1692		100	2090
v/s Ratio Prot			c0.31		c0.03	0.16
v/s Ratio Perm	c0.13	0.03				
v/c Ratio	0.46	0.11	0.62		0.43	0.26
Uniform Delay, d1	29.3	26.3	18.0		45.4	9.0
Progression Factor	1.00	1.00	1.82		1.07	1.34
Incremental Delay, d2	0.7	0.1	1.0		3.0	0.1
Delay (s)	30.1	26.4	33.9		51.4	12.1
Level of Service	C	C	C		D	B
Approach Delay (s)	28.4		33.9			15.0
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	12	22	239	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1346		3063	2948	
Flt Permitted	0.95	1.00		0.90	1.00	
Satd. Flow (perm)	1540	1346		2771	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	14	26	281	226	71
RTOR Reduction (vph)	0	14	0	0	56	0
Lane Group Flow (vph)	12	0	0	307	241	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	1.3	1.3		10.2	10.2	
Effective Green, g (s)	1.3	1.3		10.2	10.2	
Actuated g/C Ratio	0.03	0.03		0.22	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	42	37		601	639	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.11		
v/c Ratio	0.29	0.01		0.51	0.38	
Uniform Delay, d1	22.4	22.2		16.2	15.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.1		0.7	0.4	
Delay (s)	26.1	22.3		16.9	16.1	
Level of Service	C	C		B	B	
Approach Delay (s)	24.1			16.9	16.1	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	47.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	50	8	67	49	28	5	130	44	9	5	164	122
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	54	9	77	56	32	5	149	48	10	5	178	133
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	54	86	56	38	208	184	133					
Volume Left (vph)	54	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	133					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.15	0.05	-0.67					
Departure Headway (s)	6.5	5.4	6.6	6.0	5.7	5.5	4.8					
Degree Utilization, x	0.10	0.13	0.10	0.06	0.33	0.28	0.18					
Capacity (veh/h)	510	613	502	551	609	629	721					
Control Delay (s)	9.1	8.0	9.2	8.2	11.5	9.4	7.6					
Approach Delay (s)	8.4		8.8		11.5	8.6						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	190	89	266	3	230	47	269	708	17	18	472	187
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1266	1365	1126	1283	1365	1099	2515	2581		1296	2464	
Fit Permitted	0.51	1.00	1.00	0.69	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	682	1365	1126	936	1365	1099	2515	2581		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	209	98	292	3	253	52	296	778	19	20	519	205
RTOR Reduction (vph)	0	0	191	0	0	34	0	2	0	0	42	0
Lane Group Flow (vph)	209	98	101	3	253	18	296	795	0	20	682	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	235	470	388	322	470	379	352	975		155	882	
v/s Ratio Prot		0.07			0.19		0.12	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.31		0.09	0.00		0.02						
v/c Ratio	0.89	0.21	0.26	0.01	0.54	0.05	0.84	0.82		0.13	0.77	
Uniform Delay, d1	30.9	23.1	23.6	21.5	26.3	21.8	41.9	28.0		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.76		1.15	1.19	
Incremental Delay, d2	35.8	1.0	1.6	0.1	4.4	0.2	8.3	2.7		1.7	6.3	
Delay (s)	66.8	24.1	25.2	21.6	30.7	22.0	35.2	24.0		47.0	40.3	
Level of Service	E	C	C	C	C	C	D	C		D	D	
Approach Delay (s)		39.5			29.2			27.0			40.5	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay	33.6			HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)				15.7				
Intersection Capacity Utilization	116.7%			ICU Level of Service				H				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	102	471	8	6	647	32	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	512	9	7	703	35	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	19	0	28	0	0	85	0
Lane Group Flow (vph)	111	512	5	7	703	16	36	36	0	45	32	0
Confl. Peds. (#/hr)		50			50				10			50
Confl. Bikes (#/hr)			10		10				10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.07	c0.30		0.00	c0.41			0.02			0.02	
v/s Ratio Perm			0.00			0.01	0.03					
v/c Ratio	0.55	0.55	0.01	0.14	0.91	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.8	12.8	9.0	41.1	22.3	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	2.3	0.0	1.3	15.1	0.0	0.2	0.1		0.3	0.1	
Delay (s)	38.9	15.2	9.0	42.4	37.4	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	D	B	C	C		C	C	
Approach Delay (s)		19.3			36.4			25.3			25.3	
Approach LOS		B			D			C			C	
Intersection Summary												
HCM 2000 Control Delay	28.0			HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	87.2			Sum of lost time (s)				15.0				
Intersection Capacity Utilization	85.9%			ICU Level of Service				E				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	399	18	22	683	80	49	206	70	112	61	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	2962			2983	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.65	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	1033	2962			1992	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	128	416	19	23	711	83	51	215	73	117	64	152
RTOR Reduction (vph)	0	0	6	0	0	37	0	40	0	0	0	129
Lane Group Flow (vph)	128	416	13	23	711	46	51	248	0	0	181	23
Confl. Peds. (#/hr)											17	3
Confl. Bikes (#/hr)											36	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	11.0	57.2	57.2	2.3	47.5	47.5	14.1	14.1			13.1	13.1
Effective Green, g (s)	11.0	57.2	57.2	2.3	47.5	47.5	14.1	14.1			13.1	13.1
Actuated g/C Ratio	0.13	0.66	0.66	0.03	0.55	0.55	0.16	0.16			0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	154	802	910	40	666	574	168	482			301	162
v/s Ratio Prot	c0.11	0.34		0.01	c0.58			0.08				
v/s Ratio Perm			0.01			0.04	0.05				c0.09	0.02
v/c Ratio	0.83	0.52	0.01	0.57	1.07	0.08	0.30	0.51			1.02dl	0.14
Uniform Delay, d1	36.9	7.6	5.0	41.7	19.5	9.2	31.9	33.1			34.3	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	30.0	2.4	0.0	18.4	54.3	0.1	1.0	0.9			3.4	0.4
Delay (s)	66.9	10.0	5.1	60.1	73.9	9.3	32.9	34.0			37.7	32.3
Level of Service	E	A	A	E	E	A	C	C			D	C
Approach Delay (s)		22.8			66.9			33.9			35.2	
Approach LOS		C			E			C			D	

Intersection Summary

HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	420	70	33	478	366	61	249	30	89	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.89	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	931		1336	1126	856	1070	957	919	1070	1068	
Fit Permitted	0.18	1.00		0.28	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	251	931		389	1126	856	1070	957	919	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	447	74	35	509	389	65	265	32	95	147	46
RTOR Reduction (vph)	0	5	0	0	0	130	0	0	25	0	11	0
Lane Group Flow (vph)	50	516	0	35	509	259	65	265	7	95	182	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	55.4	55.4		54.5	54.5	61.5	9.9	25.0	25.0	7.0	22.1	
Effective Green, g (s)	55.4	55.4		54.5	54.5	61.5	9.9	25.0	25.0	7.0	22.1	
Actuated g/C Ratio	0.51	0.51		0.50	0.50	0.56	0.09	0.23	0.23	0.06	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	158	470		213	559	518	96	218	209	68	215	
v/s Ratio Prot	0.01	c0.55		0.00	c0.45	0.03	0.06	c0.28		c0.09	0.17	
v/s Ratio Perm	0.15			0.08		0.27			0.01			
v/c Ratio	0.32	1.10		0.16	0.91	0.50	0.68	1.22	0.03	1.40	0.85	
Uniform Delay, d1	18.5	27.2		25.7	25.4	14.7	48.4	42.4	33.0	51.4	42.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	70.5		0.4	19.0	0.8	17.3	131.4	0.1	246.3	25.1	
Delay (s)	19.6	97.6		26.0	44.4	15.5	65.6	173.7	33.0	297.6	67.2	
Level of Service	B	F		C	D	B	E	F	C	F	E	
Approach Delay (s)		90.8			31.7		141.9			143.2		
Approach LOS		F			C		F			F		

Intersection Summary

HCM 2000 Control Delay	80.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	109.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	63	136	39	45	162	2	31	116	78	11	51	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	1.00			1.00	0.85		0.90	
Fit Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1721		1691	1797			1779	1499		1578	
Fit Permitted		0.86		0.57	1.00			0.87	1.00		0.98	
Satd. Flow (perm)		1506		1014	1797			1562	1499		1557	
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)	70	151	43	50	180	2	34	129	87	12	57	239
RTOR Reduction (vph)	0	9	0	0	1	0	0	0	65	0	174	0
Lane Group Flow (vph)	0	255	0	50	181	0	0	163	22	0	134	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		15.5		15.5	15.5			13.3	13.3		13.3	
Effective Green, g (s)		15.5		15.5	15.5			13.3	13.3		13.3	
Actuated g/C Ratio		0.29		0.29	0.29			0.25	0.25		0.25	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		435		293	519			387	371		386	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.17		0.05				c0.10	0.01		0.09	
v/c Ratio		0.59		0.17	0.35			0.42	0.06		0.35	
Uniform Delay, d1		16.3		14.2	15.1			16.9	15.4		16.6	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		2.0		0.3	0.4			0.7	0.1		0.5	
Delay (s)		18.3		14.5	15.5			17.7	15.4		17.1	
Level of Service		B		B	B			B	B		B	
Approach Delay (s)		18.3			15.3			16.9			17.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔	↔		↔	↔
Volume (vph)	146	169	51	66	319	23	42	826	53	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3275		1681	3376		1260	2491		1260	2331	
Fit Permitted	0.50	1.00		0.61	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	878	3275		1072	3376		1260	2491		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	180	54	70	339	24	45	879	56	17	453	318
RTOR Reduction (vph)	0	28	0	0	5	0	0	5	0	0	127	0
Lane Group Flow (vph)	155	206	0	70	358	0	45	930	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	304	1136		371	1171		149	869		187	883	
v/s Ratio Prot		0.06			0.11		0.04	c0.37		0.01	c0.28	
v/s Ratio Perm	c0.18			0.07								
v/c Ratio	0.51	0.18		0.19	0.31		0.30	1.07		0.09	0.73	
Uniform Delay, d1	25.9	22.8		22.8	23.8		40.3	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.81		1.55	0.62	
Incremental Delay, d2	6.0	0.4		1.1	0.7		4.0	48.0		0.7	3.8	
Delay (s)	31.9	23.1		23.9	24.5		40.7	74.3		57.6	20.3	
Level of Service	C	C		C	C		D	E		E	C	
Approach Delay (s)		26.6			24.4			72.7			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↖	↗		↖	↗	↖	↗	↖	↗	↖	↗	↖
Volume (vph)	6	320	38	4	713	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3367		1711	3420			1678		1711	1531	
Flt Permitted	0.27	1.00		0.52	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	494	3367		940	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	348	41	4	775	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	15	0	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	374	0	4	777	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	197	1346		376	1368			635		563	663	
v/s Ratio Prot		0.11			c0.23						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.04	0.28		0.01	0.57			0.05		0.02	0.01	
Uniform Delay, d1	11.0	12.2		10.8	14.0			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.1	1.7			0.2		0.1	0.0	
Delay (s)	11.3	12.7		10.9	15.7			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.6			15.7			10.0			9.8	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay		14.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		60.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		37.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

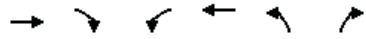
HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↖	↗		↖	↗		↖	↗		↖	↗
Volume (vph)	13	86	0	0	822	18	382	200	282	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	1.00				1.00
Flt Protected		1.00			1.00		1.00	1.00				1.00
Satd. Flow (prot)		3399			5116		1711	3121				2694
Flt Permitted		0.88			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3021			5116		1711	3121				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	13	88	0	0	839	18	390	204	288	0	0	130
RTOR Reduction (vph)	0	0	0	0	2	0	0	149	0	0	0	121
Lane Group Flow (vph)	0	101	0	0	855	0	390	343	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1330			1697		824	1503				183
v/s Ratio Prot		c0.01			c0.17		c0.23	0.11				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.50		0.47	0.23				0.05
Uniform Delay, d1		18.4			29.5		19.1	16.6				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.1		1.9	0.4				0.5
Delay (s)		18.5			30.6		21.1	16.9				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.5			30.6			18.8				48.4
Approach LOS		B			C			B				D
Intersection Summary												
HCM 2000 Control Delay		25.8			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			13.0				
Intersection Capacity Utilization		55.1%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	99	566	782	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1507	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1507	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	102	584	806	566	0	0
RTOR Reduction (vph)	31	31	0	0	0	0
Lane Group Flow (vph)	322	302	806	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	37.4	37.4	22.6	70.0		
Effective Green, g (s)	37.4	37.4	22.6	70.0		
Actuated g/C Ratio	0.53	0.53	0.32	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	805	761	1071	1801		
v/s Ratio Prot	c0.21		c0.24	0.31		
v/s Ratio Perm		0.21				
v/c Ratio	0.40	0.40	0.75	0.31		
Uniform Delay, d1	9.7	9.6	21.2	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.3	3.0	0.1		
Delay (s)	10.0	10.0	24.2	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	10.0			14.3	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			54.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	203	135	181	7	204	13	176	589	16	17	570	169
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2414		1215	2289	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2414		1215	2289	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	211	141	189	7	212	14	183	614	17	18	594	176
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	211	203	0	7	224	0	183	629	0	18	742	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Effective Green, g (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.47		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	639		144	275		210	1129		48	766	
v/s Ratio Prot	c0.06	0.10		0.18			c0.15	0.26		0.01	c0.32	
v/s Ratio Perm	c0.30			0.01								
v/c Ratio	1.10	0.32		0.05	0.81		0.87	0.56		0.38	0.97	
Uniform Delay, d1	34.2	25.1		30.8	37.1		40.3	19.1		46.8	32.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.81	
Incremental Delay, d2	95.9	0.3		0.1	16.6		30.2	2.0		3.9	22.6	
Delay (s)	130.1	25.4		31.0	53.7		70.5	21.1		52.3	49.0	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		66.3			53.0			32.2			49.1	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			47.6							HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			100.0							Sum of lost time (s)	21.6	
Intersection Capacity Utilization			99.4%							ICU Level of Service	F	
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	783	704	102	323	632	48	12	710	163	0	0	0
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.93		1.00	0.96			1.00	0.47			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.98		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	3656	2370		2515	2469			4651	547			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	3656	2370		2515	2469			4651	547			
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)	807	726	105	333	652	49	12	732	168	0	0	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	126	0	0	0
Lane Group Flow (vph)	807	821	0	333	701	0	0	744	42	0	0	0
Confl. Peds. (#/hr)			1700			1700	1700		1700			
Confl. Bikes (#/hr)		10				10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	20.7	40.2		21.7	42.7			27.7	27.7			
Effective Green, g (s)	20.7	40.2		21.7	42.7			27.7	27.7			
Actuated g/C Ratio	0.19	0.37		0.20	0.39			0.25	0.25			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	687	866		496	958			1171	137			
v/s Ratio Prot	c0.22	c0.35		0.13	c0.28							
v/s Ratio Perm								0.16	0.08			
v/c Ratio	1.17	0.95		0.67	0.73			0.64	0.31			
Uniform Delay, d1	44.6	33.9		40.9	28.8			36.7	33.4			
Progression Factor	1.21	1.34		1.58	1.19			0.84	2.42			
Incremental Delay, d2	84.1	9.1		1.1	0.9			1.0	1.1			
Delay (s)	138.1	54.5		65.5	35.1			31.9	81.9			
Level of Service	F	D		E	D			C	F			
Approach Delay (s)		95.7			44.9			41.1			0.0	
Approach LOS		F			D			D			A	

Intersection Summary

HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



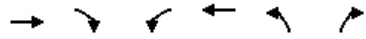
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕↕	↕↕	↔	↕↕	↕↕
Volume (vph)	128	1358	33	34	586			131	109	122	459	452
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	*0.80		1.00	*0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.64	1.00	0.86	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00	0.71	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3234		1296	2516			1602	858	1088	2423	581
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1296	3234		1296	2516			1545	858	764	2423	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1386	34	35	598	24	7	134	111	124	468	461
RTOR Reduction (vph)	0	2	0	0	3	0	0	0	72	0	32	184
Lane Group Flow (vph)	131	1418	0	35	619	0	0	141	39	124	611	102
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)		10				10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.39		0.08	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	169	1264		104	821			536	297	272	863	207
v/s Ratio Prot	0.10	c0.44		0.03	c0.25						c0.25	
v/s Ratio Perm								0.09	0.04	0.16		0.18
v/c Ratio	0.78	1.12		0.34	0.75			0.26	0.13	0.46	0.71	0.49
Uniform Delay, d1	46.2	33.5		47.8	33.1			25.8	24.5	27.2	30.5	27.6
Progression Factor	0.63	0.91		0.95	0.91			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	56.0		1.3	2.7			0.3	0.2	1.2	2.7	1.8
Delay (s)	31.2	86.5		46.6	32.7			26.1	24.7	28.4	33.1	29.5
Level of Service	C	F		D	C			C	C	C	C	C
Approach Delay (s)		81.8			33.5			25.5			31.6	
Approach LOS		F			C			C			C	

Intersection Summary

HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	134.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1494	151	3	1042	77	25
Ideal Flow (vphpl)	1700	1700	1400	1400	1700	1700
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2709			2269	1377	1214
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2709			2157	1377	1214
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1556	157	3	1085	80	26
RTOR Reduction (vph)	7	0	0	0	0	14
Lane Group Flow (vph)	1706	0	0	1088	80	12
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1529			1217	458	403
v/s Ratio Prot	c0.63				c0.06	
v/s Ratio Perm				0.50		0.01
v/c Ratio	1.12			0.89	0.17	0.03
Uniform Delay, d1	23.9			21.1	26.0	24.7
Progression Factor	1.00			0.84	1.00	1.00
Incremental Delay, d2	61.7			7.3	0.8	0.1
Delay (s)	85.6			24.9	26.8	24.9
Level of Service	F			C	C	C
Approach Delay (s)	85.6			24.9	26.3	
Approach LOS	F			C	C	

Intersection Summary

HCM 2000 Control Delay	60.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↔	↔			↔	↔
Volume (vph)	88	794	99	22	227	661	205	289	821	261
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.97			1.00	0.87
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5795			2871	2501			4094	978
Fit Permitted		1.00			0.74	1.00			0.95	1.00
Satd. Flow (perm)		5795			2124	2501			4094	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	96	854	106	24	244	711	220	314	883	281
RTOR Reduction (vph)	0	22	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1034	0	0	268	925	0	0	1225	253
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1867			660	778			1228	293
v/s Ratio Prot						c0.37			c0.30	
v/s Ratio Perm		0.18			0.13					0.26
v/c Ratio		0.55			0.41	1.19			1.00	0.86
Uniform Delay, d1		25.2			24.4	31.0			31.5	29.8
Progression Factor		1.66			0.15	1.00			1.00	1.00
Incremental Delay, d2		0.6			0.2	97.6			25.1	27.0
Delay (s)		42.3			3.9	128.6			56.6	56.8
Level of Service		D			A	F			E	E
Approach Delay (s)		42.3			3.9	128.6			56.6	
Approach LOS		D			A	F			E	

Intersection Summary

HCM 2000 Control Delay	66.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



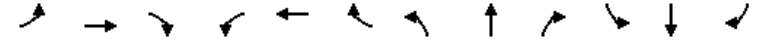
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	28	419	683	63	221	322	64	211	145	682
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.81		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.91		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1313	1910		2041		1163		1327	2550
Fit Permitted		0.95	1.00		1.00		1.00		0.23	0.89
Satd. Flow (perm)		1313	1910		2041		1163		326	2269
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	30	451	734	68	238	346	69	227	156	733
RTOR Reduction (vph)	0	0	9	0	1	0	46	0	0	0
Lane Group Flow (vph)	0	436	838	0	590	0	16	0	328	788
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)		22.5	22.5		23.0		23.0	42.0	42.0	
Effective Green, g (s)		22.5	25.0		24.5		23.0	43.5	43.5	
Actuated g/C Ratio		0.25	0.28		0.27		0.26	0.48	0.48	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		328	530		555		297	341	1148	
v/s Ratio Prot		0.33	c0.44		c0.29			c0.18	0.13	
v/s Ratio Perm						0.01		0.29	0.21	
v/c Ratio		1.33	1.58		1.32dr		0.05	0.96	0.69	
Uniform Delay, d1		33.8	32.5		32.8		25.3	27.9	18.0	
Progression Factor		1.00	1.00		1.00		1.00	1.03	1.10	
Incremental Delay, d2		167.7	270.1		56.2		0.3	8.1	0.3	
Delay (s)		201.5	302.6		89.0		25.6	36.8	20.2	
Level of Service		F	F		F		C	D	C	
Approach Delay (s)			268.3		82.9				25.0	
Approach LOS			F		F				C	

Intersection Summary			
HCM 2000 Control Delay	139.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↕	↕	↔	↕	↕
Volume (vph)	32	58	89	1	1	3	23	849	56	135	188	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	0.99		1.00	0.98	
Fit Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1584	1353		1450		1272	2502		1540	2994	
Fit Permitted		0.91	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1473	1353		1431		1272	2502		1540	2994	
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)	34	61	94	1	1	3	24	894	59	142	198	36
RTOR Reduction (vph)	0	0	64	0	2	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	95	30	0	3	0	24	948	0	142	219	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		14.8	38.5		13.5	37.5	
Effective Green, g (s)		32.1	32.1		32.1		14.8	38.5		13.5	37.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.15	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		472	434		459		188	963		207	1122	
v/s Ratio Prot						0.02	c0.38			c0.09	0.07	
v/s Ratio Perm		c0.06	0.02		0.00							
v/c Ratio		0.20	0.07		0.01		0.13	0.98		0.69	0.20	
Uniform Delay, d1		24.6	23.6		23.1		37.0	30.5		41.2	21.1	
Progression Factor		1.00	1.00		1.00		1.55	0.40		1.00	1.00	
Incremental Delay, d2		1.0	0.3		0.0		1.1	22.4		17.0	0.4	
Delay (s)		25.6	23.9		23.1		58.5	34.6		58.2	21.5	
Level of Service		C	C		C		E	C		E	C	
Approach Delay (s)		24.7			23.1			35.2			35.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	33	16	23	2	12	44	44	255	16	147	150	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.99	1.00	1.00		1.00	0.95	
Flpb, ped/bikes		0.99			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2811			1609	1364	1275	1603		1540	1500	
Fit Permitted		0.91			0.94	1.00	0.63	1.00		0.95	1.00	
Satd. Flow (perm)		2628			1519	1364	849	1603		1540	1500	
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)	35	17	25	2	13	47	47	274	17	158	161	38
RTOR Reduction (vph)	0	23	0	0	0	31	0	3	0	0	9	0
Lane Group Flow (vph)	0	54	0	0	15	16	47	288	0	158	190	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		3.7			3.7	15.0	14.7	14.7		11.3	31.0	
Effective Green, g (s)		3.7			3.7	15.0	14.7	14.7		11.3	31.0	
Actuated g/C Ratio		0.08			0.08	0.34	0.33	0.33		0.25	0.69	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grip Cap (vph)		217			125	610	279	527		389	1040	
v/s Ratio Prot						0.01		c0.18		c0.10	0.13	
v/s Ratio Perm	c0.02				0.01	0.01	0.06					
v/c Ratio	0.25				0.12	0.03	0.17	0.55		0.41	0.18	
Uniform Delay, d1	19.2				19.0	10.0	10.7	12.3		13.9	2.4	
Progression Factor	1.00				1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6				0.4	0.0	0.3	1.2		0.7	0.1	
Delay (s)	19.8				19.4	10.0	10.9	13.4		14.6	2.5	
Level of Service	B				B	A	B	B		B	A	
Approach Delay (s)	19.8				12.3			13.1			7.8	
Approach LOS	B				B			B			A	

Intersection Summary

HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	44.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



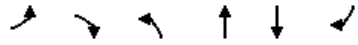
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	47	281	934	37	188	234
Ideal Flow (vphpl)	1900	1900	1400	1400	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2364	1791	988	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2364	1791	988	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	305	1015	40	204	254
RTOR Reduction (vph)	0	276	0	6	0	0
Lane Group Flow (vph)	51	29	1015	34	204	254
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.6	8.6	47.0	42.0	20.0	72.0
Effective Green, g (s)	8.6	8.6	47.0	42.0	20.0	72.0
Actuated g/C Ratio	0.09	0.09	0.52	0.46	0.22	0.79
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grip Cap (vph)	146	224	929	512	250	948
v/s Ratio Prot	c0.03		c0.57	0.01	c0.18	0.21
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.35	0.13	1.09	0.07	0.82	0.27
Uniform Delay, d1	38.4	37.6	21.8	13.5	33.6	2.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	58.1	0.1	18.2	0.2
Delay (s)	39.8	37.8	79.9	13.5	51.8	2.6
Level of Service	D	D	E	B	D	A
Approach Delay (s)	38.1		77.3			24.5
Approach LOS	D		E			C

Intersection Summary

HCM 2000 Control Delay	56.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	22	37	78	234	219	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.92		1.00	1.00	0.97	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1555		1679	1531	3054	
Fit Permitted	0.98		0.56	1.00	1.00	
Satd. Flow (perm)	1555		993	1531	3054	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	26	44	92	275	258	55
RTOR Reduction (vph)	40	0	0	0	18	0
Lane Group Flow (vph)	30	0	92	275	295	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	3.7		24.7	24.7	24.7	
Effective Green, g (s)	3.7		24.7	24.7	24.7	
Actuated g/C Ratio	0.10		0.64	0.64	0.64	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	149		638	984	1964	
v/s Ratio Prot	c0.02			c0.18	0.10	
v/s Ratio Perm			0.09			
v/c Ratio	0.20		0.14	0.28	0.15	
Uniform Delay, d1	16.0		2.7	3.0	2.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7		0.1	0.2	0.0	
Delay (s)	16.7		2.8	3.1	2.7	
Level of Service	B		A	A	A	
Approach Delay (s)	16.7			3.1	2.7	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	223	130	874	94	66	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	0.99		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3347		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3347		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	248	144	971	104	73	556
RTOR Reduction (vph)	0	103	8	0	0	0
Lane Group Flow (vph)	248	41	1067	0	73	556
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1609		135	2090
v/s Ratio Prot			c0.32		c0.04	0.16
v/s Ratio Perm	c0.16	0.03				
v/c Ratio	0.55	0.10	0.66		0.54	0.27
Uniform Delay, d1	30.1	26.2	19.8		44.3	9.0
Progression Factor	1.00	1.00	1.69		1.04	0.93
Incremental Delay, d2	1.3	0.1	1.3		4.4	0.1
Delay (s)	31.5	26.3	34.7		50.3	8.5
Level of Service	C	C	C		D	A
Approach Delay (s)	29.6		34.7			13.3
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	12	22	302	196	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1346		3066	2950	
Flt Permitted	0.95	1.00		0.91	1.00	
Satd. Flow (perm)	1540	1346		2806	2950	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	14	26	355	231	71
RTOR Reduction (vph)	0	14	0	0	50	0
Lane Group Flow (vph)	12	0	0	381	252	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	1.3	1.3		11.6	11.6	
Effective Green, g (s)	1.3	1.3		11.6	11.6	
Actuated g/C Ratio	0.03	0.03		0.24	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	41	36		672	707	
v/s Ratio Prot	c0.01				0.09	
v/s Ratio Perm		0.00		c0.14		
v/c Ratio	0.29	0.01		0.57	0.36	
Uniform Delay, d1	23.1	22.9		16.2	15.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	0.1		1.1	0.3	
Delay (s)	27.0	23.0		17.3	15.6	
Level of Service	C	C		B	B	
Approach Delay (s)	24.9			17.3	15.6	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th


4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	70	10	90	50	29	5	169	62	8	5	164	122
Peak Hour Factor	0.92	0.84	0.84	0.84	0.84	0.92	0.84	0.92	0.84	0.92	0.92	0.92
Hourly flow rate (vph)	76	12	107	60	35	5	201	67	10	5	178	133
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	76	119	60	40	278	184	133					
Volume Left (vph)	76	0	60	0	201	5	0					
Volume Right (vph)	0	107	0	5	10	0	133					
Hadj (s)	0.53	-0.60	0.53	-0.06	0.16	0.05	-0.67					
Departure Headway (s)	6.8	5.7	7.0	6.4	5.9	5.8	5.1					
Degree Utilization, x	0.14	0.19	0.12	0.07	0.46	0.30	0.19					
Capacity (veh/h)	489	584	471	512	587	591	671					
Control Delay (s)	9.8	8.8	9.7	8.7	13.8	10.0	8.1					
Approach Delay (s)	9.2		9.3		13.8	9.2						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	10.7		
Level of Service	B		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	208	116	271	6	243	71	328	688	34	19	428	276
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1267	1365	1126	1283	1365	1099	2515	2569		1296	2414	
Fit Permitted	0.49	1.00	1.00	0.68	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	657	1365	1126	913	1365	1099	2515	2569		1296	2414	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	229	127	298	7	267	78	360	756	37	21	470	303
RTOR Reduction (vph)	0	0	195	0	0	51	0	4	0	0	105	0
Lane Group Flow (vph)	229	127	103	7	267	27	360	789	0	21	668	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	226	470	388	314	470	379	352	971		155	864	
v/s Ratio Prot		0.09			0.20		c0.14	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.35		0.09	0.01		0.02						
v/c Ratio	1.01	0.27	0.26	0.02	0.57	0.07	1.02	0.81		0.14	0.77	
Uniform Delay, d1	32.8	23.7	23.6	21.6	26.7	22.0	43.0	27.9		39.4	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.77		1.13	1.19	
Incremental Delay, d2	63.3	1.4	1.7	0.1	4.9	0.4	29.3	1.9		1.7	6.4	
Delay (s)	96.1	25.1	25.3	21.7	31.6	22.4	62.9	23.3		46.0	40.2	
Level of Service	F	C	C	C	C	C	E	C		D	D	
Approach Delay (s)		50.0			29.3			35.6			40.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	117.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	129	524	7	6	789	52	26	24	24	48	4	132
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.84	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1224	1621	1578		1479	1351	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1224	1083	1578		1126	1351	
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)	139	563	8	6	848	56	28	26	26	52	4	142
RTOR Reduction (vph)	0	0	4	0	0	33	0	19	0	0	104	0
Lane Group Flow (vph)	139	563	4	6	848	23	28	33	0	52	42	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	15.0	51.0	51.0	3.0	39.0	39.0	25.0	25.0		25.0	25.0	
Effective Green, g (s)	15.0	51.0	51.0	3.0	39.0	39.0	25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.16	0.54	0.54	0.03	0.41	0.41	0.27	0.27		0.27	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	925	786	51	707	507	288	419		299	359	
v/s Ratio Prot	c0.09	c0.33		0.00	c0.50		0.02	0.03			0.03	
v/s Ratio Perm			0.00				0.02	0.03				
v/c Ratio	0.54	0.61	0.01	0.12	1.20	0.05	0.10	0.08		0.17	0.12	
Uniform Delay, d1	36.3	14.7	9.9	44.2	27.5	16.4	26.0	25.9		26.6	26.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	3.0	0.0	1.0	103.1	0.0	0.1	0.1		0.3	0.1	
Delay (s)	38.5	17.7	9.9	45.2	130.6	16.4	26.1	25.9		26.8	26.3	
Level of Service	D	B	A	D	F	B	C	C		C	C	
Approach Delay (s)		21.6			123.0			26.0			26.4	
Approach LOS		C			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	70.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



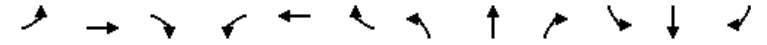
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	140	452	19	23	818	106	49	160	78	130	63	165
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	2928			2979	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.61	1.00			0.64	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	988	2928			1958	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	471	20	24	852	110	51	167	81	135	66	172
RTOR Reduction (vph)	0	0	6	0	0	21	0	58	0	0	0	146
Lane Group Flow (vph)	146	471	14	24	852	89	51	190	0	0	201	26
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	8.0	70.5	70.5	2.3	63.8	63.8	16.7	16.7			15.7	15.7
Effective Green, g (s)	8.0	70.5	70.5	2.3	63.8	63.8	16.7	16.7			15.7	15.7
Actuated g/C Ratio	0.08	0.69	0.69	0.02	0.62	0.62	0.16	0.16			0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	94	835	947	34	756	652	160	477			299	164
v/s Ratio Prot	c0.12	0.39		0.02	c0.70			0.06				
v/s Ratio Perm			0.01			0.08	0.05				c0.10	0.02
v/c Ratio	1.55	0.56	0.01	0.71	1.13	0.14	0.32	0.40			1.09dl	0.16
Uniform Delay, d1	47.2	8.2	5.0	49.8	19.4	8.0	37.9	38.4			41.0	37.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	294.4	0.9	0.0	49.8	73.6	0.1	1.2	0.5			5.8	0.5
Delay (s)	341.6	9.0	5.1	99.6	92.9	8.1	39.0	39.0			46.8	38.1
Level of Service	F	A	A	F	F	A	D	D			D	D
Approach Delay (s)		85.1			83.6			39.0			42.8	
Approach LOS		F			F			D			D	

Intersection Summary

HCM 2000 Control Delay	71.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	102.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



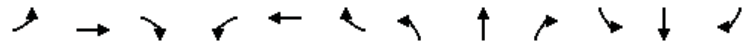
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	40	469	84	36	552	443	43	357	34	107	130	38
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	929		1337	1126	859	1070	957	922	1070	1072	
Fit Permitted	0.09	1.00		0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	125	929		192	1126	859	1070	957	922	1070	1072	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	499	89	38	587	471	46	380	36	114	138	40
RTOR Reduction (vph)	0	6	0	0	0	104	0	0	26	0	10	0
Lane Group Flow (vph)	43	582	0	38	587	367	46	380	10	114	168	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	48.1	48.1		48.1	48.1	57.1	10.7	29.2	29.2	9.0	27.5	
Effective Green, g (s)	48.1	48.1		48.1	48.1	57.1	10.7	29.2	29.2	9.0	27.5	
Actuated g/C Ratio	0.44	0.44		0.44	0.44	0.52	0.10	0.27	0.27	0.08	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	87	409		114	495	488	104	255	246	88	269	
v/s Ratio Prot	0.01	c0.63		0.01	c0.52	0.06	0.04	c0.40		c0.11	0.16	
v/s Ratio Perm	0.20			0.14		0.36			0.01			
v/c Ratio	0.49	1.42		0.33	1.19	0.75	0.44	1.49	0.04	1.30	0.63	
Uniform Delay, d1	25.7	30.6		40.2	30.6	20.5	46.4	40.0	29.6	50.1	36.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	204.6		1.7	102.6	6.4	3.0	240.3	0.1	194.3	4.5	
Delay (s)	30.0	235.1		41.9	133.1	26.9	49.4	280.3	29.7	244.4	40.8	
Level of Service	C	F		D	F	C	D	F	C	F	D	
Approach Delay (s)		221.1			84.3			237.8			120.3	
Approach LOS		F			F			F			F	

Intersection Summary

HCM 2000 Control Delay	151.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	109.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



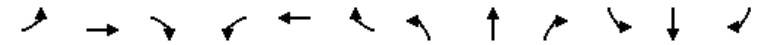
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	97	303	86	75	181	18	55	132	70	19	118	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	0.99			1.00	0.85		0.92	
Fit Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1720		1695	1769			1771	1493		1621	
Fit Permitted		0.88		0.38	1.00			0.69	1.00		0.98	
Satd. Flow (perm)		1531		671	1769			1237	1493		1585	
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)	108	337	96	83	201	20	61	147	78	21	131	224
RTOR Reduction (vph)	0	8	0	0	4	0	0	0	56	0	69	0
Lane Group Flow (vph)	0	533	0	83	217	0	0	208	22	0	307	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		32.0		32.0	32.0			21.9	21.9		21.9	
Effective Green, g (s)		32.0		32.0	32.0			21.9	21.9		21.9	
Actuated g/C Ratio		0.41		0.41	0.41			0.28	0.28		0.28	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		627		274	724			346	418		444	
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.35		0.12				0.17	0.01		c0.19	
v/c Ratio		0.85		0.30	0.30			0.60	0.05		0.69	
Uniform Delay, d1		20.9		15.5	15.5			24.3	20.5		25.1	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		10.7		0.6	0.2			2.9	0.1		4.6	
Delay (s)		31.6		16.2	15.7			27.3	20.6		29.7	
Level of Service		C		B	B			C	C		C	
Approach Delay (s)		31.6			15.9			25.4			29.7	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	78.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Volume (vph)	256	429	42	57	346	35	41	760	34	22	396	287
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1300	1300	1300	1300	1300	1300
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1502	3010		1514	3006		1170	2321		1170	2161	
Fit Permitted	0.46	1.00		0.39	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	731	3010		619	3006		1170	2321		1170	2161	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	272	456	45	61	368	37	44	809	36	23	421	305
RTOR Reduction (vph)	0	7	0	0	8	0	0	3	0	0	130	0
Lane Group Flow (vph)	272	494	0	61	397	0	44	842	0	23	596	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	253	1044		214	1043		139	810		174	819	
v/s Ratio Prot				0.16			0.04	c0.36		0.02	c0.28	
v/s Ratio Perm		c0.37			0.10							
v/c Ratio		1.08	0.47		0.29	0.38		0.32	1.04		0.13	0.73
Uniform Delay, d1		32.6	25.5		23.7	24.6		40.3	32.5		36.9	26.6
Progression Factor		1.00	1.00		1.00	1.00		0.91	0.80		1.45	0.72
Incremental Delay, d2		78.0	1.5		3.3	1.1		4.2	37.4		1.1	4.1
Delay (s)		110.6	27.0		27.0	25.6		41.0	63.5		54.9	23.2
Level of Service		F	C		C	C		D	E		D	C
Approach Delay (s)			56.4			25.8			62.4			24.2
Approach LOS			E			C			E			C

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1086	28	2	707	2	38	0	8	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes		1.00		1.00	1.00			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			0.99		0.98	1.00	
Frt		1.00		1.00	1.00			0.98		1.00	0.85	
Fit Protected		1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)		3404		1704	3419			1653		1682	1477	
Fit Permitted		1.00		0.15	1.00			0.83		0.72	1.00	
Satd. Flow (perm)		3404		266	3419			1421		1283	1477	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1180	30	2	768	2	41	0	9	14	0	14
RTOR Reduction (vph)	0	3	0	0	1	0	0	22	0	0	9	0
Lane Group Flow (vph)	0	1207	0	2	769	0	0	28	0	14	5	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)		27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio		0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)		1531		119	1538			544		491	566	
v/s Ratio Prot		c0.35			0.23						0.00	
v/s Ratio Perm				0.01				c0.02		0.01		
v/c Ratio		0.79		0.02	0.50			0.05		0.03	0.01	
Uniform Delay, d1		14.1		9.1	11.7			11.6		11.5	11.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		4.2		0.3	1.2			0.2		0.1	0.0	
Delay (s)		18.3		9.4	12.9			11.8		11.6	11.5	
Level of Service		B		A	B			B		B	B	
Approach Delay (s)		18.3			12.9			11.8			11.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		16.0										B
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		60.0						10.0				
Intersection Capacity Utilization		56.0%										B
Analysis Period (min)		15										
c Critical Lane Group												

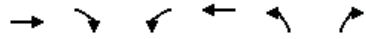
HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	93	0	0	877	18	467	165	785	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frbp, ped/bikes		1.00			1.00		1.00	0.98				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			1.00		1.00	0.88				0.85
Fit Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3398			5113		1711	2941				2694
Fit Permitted		0.87			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2980			5113		1711	2941				2694
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	14	97	0	0	914	19	486	172	818	0	0	132
RTOR Reduction (vph)	0	0	0	0	3	0	0	436	0	0	0	126
Lane Group Flow (vph)	0	111	0	0	930	0	486	554	0	0	0	6
Confl. Peds. (#/hr)	20					20	1		10			
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		38.5			29.5		42.0	42.0				4.0
Effective Green, g (s)		38.5			29.5		42.0	42.0				4.0
Actuated g/C Ratio		0.43			0.33		0.47	0.47				0.04
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1293			1675		798	1372				119
v/s Ratio Prot		c0.00			c0.18		c0.28	0.19				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.09			0.56		0.61	0.40				0.05
Uniform Delay, d1		15.3			24.9		17.9	15.8				41.2
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.3		3.4	0.9				0.8
Delay (s)		15.4			26.2		21.3	16.7				42.0
Level of Service		B			C		C	B				D
Approach Delay (s)		15.4			26.2			18.2				42.0
Approach LOS		B			C			B				D
Intersection Summary												
HCM 2000 Control Delay					22.1							C
HCM 2000 Volume to Capacity ratio		0.56										
Actuated Cycle Length (s)		90.0						Sum of lost time (s)		14.5		
Intersection Capacity Utilization		63.2%						ICU Level of Service				B
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

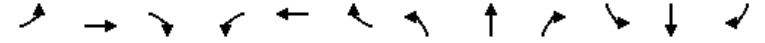
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	106	616	773	698	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.98	0.97	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1499	1417	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1499	1417	3319	1801		
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	108	629	789	712	0	0
RTOR Reduction (vph)	25	25	0	0	0	0
Lane Group Flow (vph)	353	334	789	712	0	0
Confl. Peds. (#/hr)		4	5			
Confl. Bikes (#/hr)		24				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	31.2	31.2	18.8	60.0		
Effective Green, g (s)	31.2	31.2	18.8	60.0		
Actuated g/C Ratio	0.52	0.52	0.31	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	779	736	1039	1801		
v/s Ratio Prot	0.24		c0.24	c0.40		
v/s Ratio Perm		0.24				
v/c Ratio	0.45	0.45	0.76	0.40		
Uniform Delay, d1	9.0	9.0	18.6	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.4	0.4	3.2	0.1		
Delay (s)	9.5	9.5	21.8	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	9.5			11.5	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			56.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	218	159	178	8	222	16	199	663	5	25	458	160
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1191	1972		1141	1254		1215	2426		1215	2270	
Fit Permitted	0.34	1.00		0.54	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	431	1972		650	1254		1215	2426		1215	2270	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	227	166	185	8	231	17	207	691	5	26	477	167
RTOR Reduction (vph)	0	117	0	0	3	0	0	1	0	0	37	0
Lane Group Flow (vph)	227	234	0	8	245	0	207	695	0	26	607	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.7	36.7		23.1	23.1		16.1	43.2		3.8	30.9	
Effective Green, g (s)	36.7	36.7		23.1	23.1		16.1	43.2		3.8	30.9	
Actuated g/C Ratio	0.37	0.37		0.23	0.23		0.16	0.43		0.04	0.31	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	723		150	289		195	1048		46	701	
v/s Ratio Prot	c0.09	0.12			0.20		c0.17	0.29		0.02	c0.27	
v/s Ratio Perm	c0.29			0.01								
v/c Ratio	1.03	0.32		0.05	0.85		1.06	0.66		0.57	0.87	
Uniform Delay, d1	31.0	22.7		29.9	36.8		42.0	22.6		47.3	32.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.86	
Incremental Delay, d2	67.8	0.3		0.1	20.0		81.7	3.3		10.9	10.2	
Delay (s)	98.7	23.0		30.1	56.7		123.6	25.9		58.0	38.2	
Level of Service	F	C		C	E		F	C		E	D	
Approach Delay (s)		52.7			55.9			48.3			39.0	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			47.6							HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			100.0							Sum of lost time (s)	21.6	
Intersection Capacity Utilization			97.9%							ICU Level of Service	F	
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	808	695	17	392	920	53	44	860	253	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3046		2987	2999			5478	941			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3046		2987	2999			5478	941			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	878	755	18	426	1000	58	48	935	275	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	195	0	0	0
Lane Group Flow (vph)	878	772	0	426	1057	0	0	983	81	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	38.7		20.2	40.7			32.2	32.2			
Effective Green, g (s)	18.2	38.7		20.2	40.7			32.2	32.2			
Actuated g/C Ratio	0.17	0.35		0.18	0.37			0.29	0.29			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1071		548	1109			1603	275			
v/s Ratio Prot	c0.20	0.25		0.14	c0.35							
v/s Ratio Perm								0.18	0.09			
v/c Ratio	1.18	0.72		0.78	0.95			0.61	0.29			
Uniform Delay, d1	45.9	31.0		42.8	33.7			33.5	30.1			
Progression Factor	0.93	0.93		0.77	0.56			1.45	5.41			
Incremental Delay, d2	90.8	2.3		4.6	12.6			0.6	0.5			
Delay (s)	133.6	31.0		37.6	31.7			49.2	163.2			
Level of Service	F	C		D	C			D	F			
Approach Delay (s)		85.5			33.4			74.1			0.0	
Approach LOS		F			C			E			A	

Intersection Summary

HCM 2000 Control Delay	64.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



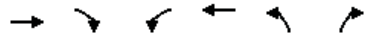
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	187	1389	24	31	902	31	26	87	80	51	619	458
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.64	1.00	0.91	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00	0.70	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.97	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3692		1296	2527			1555	858	1077	2613	581
Fit Permitted	0.95	1.00		0.95	1.00			0.60	1.00	0.68	1.00	1.00
Satd. Flow (perm)	1296	3692		1296	2527			937	858	768	2613	581
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	1526	26	34	991	34	29	96	88	56	680	503
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	58	0	15	183
Lane Group Flow (vph)	205	1550	0	34	1023	0	0	125	30	56	806	179
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	12.4	49.5		3.4	38.9			37.2	37.2	38.2	38.2	38.2
Effective Green, g (s)	12.4	49.5		3.4	38.9			37.2	37.2	38.2	38.2	38.2
Actuated g/C Ratio	0.11	0.45		0.03	0.35			0.34	0.34	0.35	0.35	0.35
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	146	1661		40	893			316	290	266	907	201
v/s Ratio Prot	c0.16	0.42		0.03	c0.40						c0.31	
v/s Ratio Perm								0.13	0.03	0.07		0.31
v/c Ratio	1.40	0.93		0.85	1.15			0.40	0.10	0.21	0.89	0.89
Uniform Delay, d1	48.8	28.7		53.0	35.5			27.8	25.0	25.3	33.9	33.9
Progression Factor	0.70	1.11		0.67	0.60			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	185.6	1.3		43.3	71.0			0.8	0.2	0.4	10.6	34.3
Delay (s)	219.8	33.1		78.7	92.4			28.6	25.1	25.7	44.5	68.1
Level of Service	F	C		E	F			C	C	C	D	E
Approach Delay (s)		54.9			91.9			27.2			50.5	
Approach LOS		D			F			C			D	

Intersection Summary

HCM 2000 Control Delay	61.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	118.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1581	199	2	1384	74	19
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2937			2998	1540	1357
Fit Permitted	1.00			0.93	0.95	1.00
Satd. Flow (perm)	2937			2789	1540	1357
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1664	209	2	1457	78	20
RTOR Reduction (vph)	9	0	0	0	0	11
Lane Group Flow (vph)	1864	0	0	1459	78	9
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1658			1574	512	451
v/s Ratio Prot	c0.63				c0.05	
v/s Ratio Perm				0.52		0.01
v/c Ratio	1.12			0.93	0.15	0.02
Uniform Delay, d1	23.9			21.9	25.8	24.7
Progression Factor	1.00			0.79	1.00	1.00
Incremental Delay, d2	64.5			1.3	0.6	0.1
Delay (s)	88.5			18.5	26.4	24.7
Level of Service	F			B	C	C
Approach Delay (s)	88.5			18.5	26.1	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	56.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	122	1129	155	29	278	527	260	393	1151	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.95			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5773			2869	2440			4101	1122
Fit Permitted		1.00			0.75	1.00			0.95	1.00
Satd. Flow (perm)		5773			2150	2440			4101	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	139	1283	176	33	316	599	295	447	1308	293
RTOR Reduction (vph)	0	29	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1569	0	0	349	893	0	0	1784	264
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		20.5			22.0	22.0			15.0	15.0
Effective Green, g (s)		22.5			25.0	25.0			18.0	18.0
Actuated g/C Ratio		0.30			0.33	0.33			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1731			716	813			984	269
v/s Ratio Prot						c0.37			c0.44	0.24
v/s Ratio Perm		0.27			0.16					
v/c Ratio		0.91			0.49	1.10			1.81	0.98
Uniform Delay, d1		25.2			19.9	25.0			28.5	28.3
Progression Factor		1.00			1.00	1.00			1.00	1.00
Incremental Delay, d2		7.2			0.5	62.1			369.9	49.5
Delay (s)		32.4			20.4	87.1			398.4	77.8
Level of Service		C			C	F			F	E
Approach Delay (s)		32.4			20.4	87.1			357.1	
Approach LOS		C			C	F			F	

Intersection Summary			
HCM 2000 Control Delay	177.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



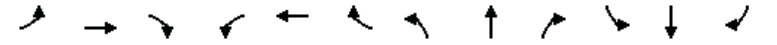
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	29	481	654	48	278	283	30	212	105	725
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0	4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor	1.00	0.81	0.81		0.91		0.91		0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.99		0.85		0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00
Frt	1.00	1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected	0.95	0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)	810	1313	1911		2182		1161		1327	2556
Fit Permitted	0.95	0.95	1.00		1.00		1.00		0.20	0.95
Satd. Flow (perm)	810	1313	1911		2182		1161		279	2428
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	506	688	51	293	298	32	223	111	763
RTOR Reduction (vph)	0	0	9	0	1	0	23	0	0	0
Lane Group Flow (vph)	31	455	781	0	593	0	6	0	314	783
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)	18.5	18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)	21.0	18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio	0.27	0.24	0.27		0.23		0.21	0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	220	315	521		495		241	287	1045	
v/s Ratio Prot	0.04	0.35	c0.41		c0.27			c0.18	0.12	
v/s Ratio Perm						0.01		0.28	0.19	
v/c Ratio	0.14	1.44	1.50		1.28dr		0.03	1.09	0.75	
Uniform Delay, d1	21.2	29.2	28.0		29.8		24.3	26.8	18.8	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3	217.1	234.7		107.5		0.2	80.6	4.9	
Delay (s)	22.5	246.4	262.7		137.3		24.5	107.4	23.7	
Level of Service	C	F	F		F		C	F	C	
Approach Delay (s)			251.1		132.0				47.7	
Approach LOS			F		F				D	

Intersection Summary			
HCM 2000 Control Delay	151.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	31	756	184	12	2	26	20	811	72	88	294	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	0.99		1.00	0.98	
Fit Protected		1.00	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1616	1352		1428		1272	2483		1540	3018	
Fit Permitted		0.99	1.00		0.48		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1599	1352		698		1272	2483		1540	3018	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	38	933	227	15	2	32	25	1001	89	109	363	44
RTOR Reduction (vph)	0	0	74	0	18	0	0	6	0	0	7	0
Lane Group Flow (vph)	0	971	153	0	31	0	25	1084	0	109	400	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases		4		8		5	2		1	6		
Permitted Phases	4		4	8								
Actuated Green, G (s)		55.1	55.1		55.1	6.1	35.5		15.3	45.0		
Effective Green, g (s)		55.1	55.1		55.1	6.1	35.5		15.3	45.0		
Actuated g/C Ratio		0.45	0.45		0.45	0.05	0.29		0.13	0.37		
Clearance Time (s)		4.9	4.9		4.9	5.2	5.5		5.5	5.5		
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		723	611		315	63	723		193	1115		
v/s Ratio Prot						0.02	c0.44		c0.07	0.13		
v/s Ratio Perm	c0.61	0.11		0.05								
v/c Ratio	1.34	0.25		0.10		0.40	1.50		0.56	0.36		
Uniform Delay, d1	33.3	20.6		19.1		56.1	43.1		50.1	27.9		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	163.6	0.2		0.1		4.1	232.1		3.8	0.2		
Delay (s)	196.9	20.8		19.3		60.1	275.3		53.9	28.1		
Level of Service	F	C		B		E	F		D	C		
Approach Delay (s)	163.5			19.3		270.5			33.6			
Approach LOS	F			B		F			C			

Intersection Summary			
HCM 2000 Control Delay	179.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	121.8	Sum of lost time (s)	15.9
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	9	622	8	4	21	33	13	54	4	345	221	54
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	0.95	
Flpb, ped/bikes		1.00			1.00	1.00	0.85	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2596			1439	1198	1169	1430		1377	1339	
Fit Permitted		0.95			0.91	1.00	0.83	1.00		0.95	1.00	
Satd. Flow (perm)		2474			1318	1198	1025	1430		1377	1339	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	9	648	8	4	22	34	14	56	4	359	230	56
RTOR Reduction (vph)	0	1	0	0	0	15	0	4	0	0	13	0
Lane Group Flow (vph)	0	664	0	0	26	19	14	56	0	359	273	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		16.8			16.8	24.7	4.8	4.8		7.9	17.7	
Effective Green, g (s)		16.8			16.8	24.7	4.8	4.8		7.9	17.7	
Actuated g/C Ratio		0.38			0.38	0.56	0.11	0.11		0.18	0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		934			497	799	110	154		244	532	
v/s Ratio Prot						0.00		0.04		c0.26	c0.20	
v/s Ratio Perm		c0.27			0.02	0.01	0.01					
v/c Ratio		0.71			0.05	0.02	0.13	0.37		1.47	0.51	
Uniform Delay, d1		11.8			8.8	4.5	18.0	18.4		18.3	10.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.6			0.0	0.0	0.5	1.5		233.0	0.8	
Delay (s)		14.4			8.8	4.5	18.5	19.9		251.3	11.0	
Level of Service		B			A	A	B	B		F	B	
Approach Delay (s)		14.4			6.4			19.6			144.8	
Approach LOS		B			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	72.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	44.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



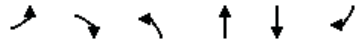
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	53	236	505	19	828	314
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	847	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	847	1134	1194
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	57	254	543	20	890	338
RTOR Reduction (vph)	0	226	0	6	0	0
Lane Group Flow (vph)	57	28	543	14	890	338
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.1	10.1	45.6	40.6	20.0	70.6
Effective Green, g (s)	10.1	10.1	45.6	40.6	20.0	70.6
Actuated g/C Ratio	0.11	0.11	0.50	0.45	0.22	0.78
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	126	194	771	425	250	929
v/s Ratio Prot	c0.05		c0.35	0.01	c0.78	0.28
v/s Ratio Perm		0.02		0.01		
v/c Ratio	0.45	0.15	0.70	0.03	3.56	0.36
Uniform Delay, d1	37.7	36.4	17.4	14.0	35.4	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	0.3	2.9	0.0	1161.9	0.2
Delay (s)	40.3	36.8	20.3	14.1	1197.3	3.4
Level of Service	D	D	C	B	F	A
Approach Delay (s)	37.4		20.1			868.7
Approach LOS	D		C			F

Intersection Summary			
HCM 2000 Control Delay	518.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	113.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	
Volume (vph)	20	24	234	120	126	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.93		1.00	1.00	0.98	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1563		1670	1531	3077	
Fit Permitted	0.98		0.64	1.00	1.00	
Satd. Flow (perm)	1563		1131	1531	3077	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	28	275	141	148	24
RTOR Reduction (vph)	26	0	0	0	7	0
Lane Group Flow (vph)	26	0	275	141	165	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.3		27.9	27.9	27.9	
Effective Green, g (s)	2.3		27.9	27.9	27.9	
Actuated g/C Ratio	0.06		0.69	0.69	0.69	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	89		784	1062	2135	
v/s Ratio Prot	c0.02			0.09	0.05	
v/s Ratio Perm			c0.24			
v/c Ratio	0.29		0.35	0.13	0.08	
Uniform Delay, d1	18.2		2.5	2.1	2.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.8		0.3	0.1	0.0	
Delay (s)	20.0		2.8	2.1	2.0	
Level of Service	B		A	A	A	
Approach Delay (s)	20.0			2.5	2.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	40.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Volume (vph)	132	113	863	101	274	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.95	0.99		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1558	1457	3338		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1558	1457	3338		1711	3421
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	148	127	970	113	308	453
RTOR Reduction (vph)	0	97	7	0	0	0
Lane Group Flow (vph)	148	30	1076	0	308	453
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	58.1		17.9	81.1
Effective Green, g (s)	28.7	28.7	58.1		17.9	81.1
Actuated g/C Ratio	0.24	0.24	0.48		0.15	0.68
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	372	348	1616		255	2312
v/s Ratio Prot			c0.32		c0.18	0.13
v/s Ratio Perm	c0.09	0.02				
v/c Ratio	0.40	0.09	0.67		1.21	0.20
Uniform Delay, d1	38.4	35.5	23.6		51.0	7.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.1	2.2		124.4	0.0
Delay (s)	39.1	35.6	25.7		175.4	7.3
Level of Service	D	D	C		F	A
Approach Delay (s)	37.5		25.7			75.4
Approach LOS	D		C			E

Intersection Summary			
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	7	12	344	120	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1518	1341		2880	2969	
Flt Permitted	0.95	1.00		0.94	1.00	
Satd. Flow (perm)	1518	1341		2718	2969	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	14	405	141	35
RTOR Reduction (vph)	0	8	0	0	26	0
Lane Group Flow (vph)	12	0	0	419	150	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5		
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		12.8	12.8	
Effective Green, g (s)	0.6	0.6		12.8	12.8	
Actuated g/C Ratio	0.01	0.01		0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	18	16		711	777	
v/s Ratio Prot	c0.01				0.05	
v/s Ratio Perm		0.00		c0.15		
v/c Ratio	0.67	0.01		0.59	0.19	
Uniform Delay, d1	24.1	23.9		15.8	14.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.1	0.2		1.3	0.1	
Delay (s)	90.1	24.0		17.0	14.2	
Level of Service	F	C		B	B	
Approach Delay (s)	63.7			17.0	14.2	
Approach LOS	E			B	B	
Intersection Summary						
HCM 2000 Control Delay			17.7	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.23			
Actuated Cycle Length (s)			48.9	Sum of lost time (s)		15.0
Intersection Capacity Utilization			31.9%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	138	3	61	23	16	5	86	232	7	5	70	55
Peak Hour Factor	0.92	0.81	0.81	0.81	0.81	0.92	0.81	0.92	0.81	0.92	0.92	0.92
Hourly flow rate (vph)	150	4	75	28	20	5	106	252	9	5	76	60
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	150	79	28	25	367	82	60					
Volume Left (vph)	150	0	28	0	106	5	0					
Volume Right (vph)	0	75	0	5	9	0	60					
Hadj (s)	0.53	-0.63	0.53	-0.12	0.08	0.07	-0.67					
Departure Headway (s)	6.5	5.4	6.8	6.2	5.6	5.9	5.1					
Degree Utilization, x	0.27	0.12	0.05	0.04	0.57	0.13	0.09					
Capacity (veh/h)	517	625	479	527	619	576	655					
Control Delay (s)	10.8	7.9	9.0	8.3	15.7	8.6	7.4					
Approach Delay (s)	9.8		8.7		15.7	8.1						
Approach LOS	A		A		C	A						
Intersection Summary												
Delay			12.2									
Level of Service			B									
Intersection Capacity Utilization			45.1%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	256	170	219	2	122	33	209	674	22	10	337	187
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1258	1365	1126	1285	1365	1099	2515	2577		1296	2430	
Fit Permitted	0.67	1.00	1.00	0.59	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	884	1365	1126	798	1365	1099	2515	2577		1296	2430	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	294	195	252	2	140	38	240	775	25	11	387	215
RTOR Reduction (vph)	0	0	165	0	0	25	0	2	0	0	76	0
Lane Group Flow (vph)	294	195	87	2	140	13	240	798	0	11	526	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	304	470	388	275	470	379	352	974		155	869	
v/s Ratio Prot		0.14			0.10		0.10	c0.31		0.01	c0.22	
v/s Ratio Perm	c0.33		0.08	0.00		0.01						
v/c Ratio	0.97	0.41	0.22	0.01	0.30	0.03	0.68	0.82		0.07	0.61	
Uniform Delay, d1	32.2	25.0	23.2	21.5	23.9	21.7	40.9	28.0		39.1	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.80		1.00	1.00	
Incremental Delay, d2	43.9	2.7	1.3	0.0	1.6	0.2	6.0	4.5		0.9	3.1	
Delay (s)	76.1	27.7	24.6	21.6	25.5	21.9	41.4	26.8		39.9	29.4	
Level of Service	E	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		45.8			24.7			30.2			29.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	151	585	9	19	457	42	23	14	13	46	10	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.84	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1225	1621	1582		1477	1373	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00		0.74	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1225	1115	1582		1146	1373	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	176	680	10	22	531	49	27	16	15	53	12	133
RTOR Reduction (vph)	0	0	6	0	0	32	0	10	0	0	90	0
Lane Group Flow (vph)	176	680	4	22	531	17	27	21	0	53	55	0
Confl. Peds. (#/hr)						50				50		50
Confl. Bikes (#/hr)						10						10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8				4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	15.0	41.6	41.6	6.0	32.6	32.6	30.0	30.0		30.0	30.0	
Effective Green, g (s)	15.0	41.6	41.6	6.0	32.6	32.6	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.16	0.45	0.45	0.06	0.35	0.35	0.32	0.32		0.32	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	766	651	105	600	431	361	512		371	444	
v/s Ratio Prot	c0.11	c0.40		0.01	0.31		0.01				0.04	
v/s Ratio Perm			0.00			0.01	0.02				c0.05	
v/c Ratio	0.67	0.89	0.01	0.21	0.89	0.04	0.07	0.04		0.14	0.12	
Uniform Delay, d1	36.5	23.4	14.1	41.1	28.2	19.7	21.7	21.4		22.2	22.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.6	14.4	0.0	1.0	14.6	0.0	0.1	0.0		0.2	0.1	
Delay (s)	43.1	37.8	14.1	42.0	42.8	19.8	21.8	21.5		22.4	22.2	
Level of Service	D	D	B	D	D	B	C	C		C	C	
Approach Delay (s)		38.6			40.9			21.6			22.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔			↔	↔
Volume (vph)	79	568	40	64	480	50	31	483	83	94	169	106
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1500	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1045	1540	3012			3025	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.53	1.00			0.55	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1045	864	3012			1678	1072
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	617	43	70	522	54	34	525	90	102	184	115
RTOR Reduction (vph)	0	0	19	0	0	26	0	13	0	0	0	86
Lane Group Flow (vph)	86	617	24	70	522	28	34	602	0	0	286	29
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	58.2	58.2	5.0	53.2	53.2	27.2	27.2			26.2	26.2
Effective Green, g (s)	9.0	58.2	58.2	5.0	53.2	53.2	27.2	27.2			26.2	26.2
Actuated g/C Ratio	0.09	0.56	0.56	0.05	0.51	0.51	0.26	0.26			0.25	0.25
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	105	683	775	74	625	537	227	792			425	271
v/s Ratio Prot	c0.07	c0.51		0.05	0.43			c0.20				
v/s Ratio Perm			0.02			0.03	0.04				0.17	0.03
v/c Ratio	0.82	0.90	0.03	0.95	0.84	0.05	0.15	0.76			1.16dl	0.11
Uniform Delay, d1	46.4	20.1	10.1	49.1	21.4	12.5	29.2	35.1			34.7	29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	37.1	15.3	0.0	85.3	9.4	0.0	0.3	4.2			4.2	0.2
Delay (s)	83.5	35.4	10.1	134.4	30.8	12.6	29.5	39.3			38.9	29.8
Level of Service	F	D	B	F	C	B	C	D			D	C
Approach Delay (s)		39.5			40.5			38.8			36.3	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	103.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



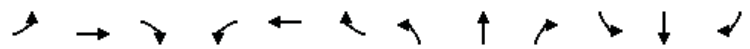
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔			↔	↔
Volume (vph)	23	516		38	350	229	69	230	17	155	109	36
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.90		1.00	*0.80	*0.80	*0.80	*0.90	*0.80	*0.80	*0.80	*0.90
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1329	1050		1337	1126	866	1070	1077	916	1070	1197	
Fit Permitted	0.30	1.00		0.20	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	419	1050		288	1126	866	1070	1077	916	1070	1197	
Peak-hour factor, PHF	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	561		41	380	249	75	250	18	168	118	39
RTOR Reduction (vph)	0	5		0	0	100	0	0	14	0	12	0
Lane Group Flow (vph)	25	640		41	380	149	75	250	4	168	145	0
Confl. Peds. (#/hr)				6	6		28		4			11
Confl. Bikes (#/hr)				9		50			7			15
Parking (#/hr)			10									
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	53.1	53.1		53.1	53.1	65.1	15.0	21.1	21.1	12.0	18.1	
Effective Green, g (s)	53.1	53.1		53.1	53.1	65.1	15.0	21.1	21.1	12.0	18.1	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.60	0.14	0.19	0.19	0.11	0.17	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	224	513		163	551	559	147	209	178	118	199	
v/s Ratio Prot	0.00	c0.61		0.01	c0.34	0.03	0.07	c0.23		c0.16	0.12	
v/s Ratio Perm	0.05			0.12		0.14			0.00			
v/c Ratio	0.11	1.25		0.25	0.69	0.27	0.51	1.20	0.02	1.42	0.73	
Uniform Delay, d1	16.3	27.7		31.7	21.3	10.3	43.3	43.7	35.3	48.2	42.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	127.2		0.8	3.6	0.3	3.0	125.3	0.0	232.7	12.9	
Delay (s)	16.5	154.9		32.5	24.9	10.6	46.3	169.0	35.4	280.9	55.8	
Level of Service	B	F		C	C	B	D	F	D	F	E	
Approach Delay (s)		149.8			20.1			135.1			172.2	
Approach LOS		F			C			F			F	

Intersection Summary

HCM 2000 Control Delay	107.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	108.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

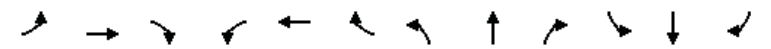


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	244	319	59	47	105	6	39	74	53	8	29	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		0.99		0.99	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	0.99			1.00	0.85		0.90	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1467		1699	1781			1763	1497		1351	
Fit Permitted		0.82		0.42	1.00			0.86	1.00		0.98	
Satd. Flow (perm)		1224		746	1781			1534	1497		1329	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	268	351	65	52	115	7	43	81	58	9	32	105
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	44	0	79	0
Lane Group Flow (vph)	0	681	0	52	120	0	0	124	14	0	67	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4			4	8		
Actuated Green, G (s)		35.4		35.4	35.4			15.1	15.1		15.1	
Effective Green, g (s)		35.4		35.4	35.4			15.1	15.1		15.1	
Actuated g/C Ratio		0.59		0.59	0.59			0.25	0.25		0.25	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		716		436	1042			382	373		331	
v/s Ratio Prot					0.07							
v/s Ratio Perm	c0.56			0.07				c0.08	0.01		0.05	
v/c Ratio	0.95			0.12	0.12			0.32	0.04		0.20	
Uniform Delay, d1	11.7			5.6	5.6			18.5	17.2		17.9	
Progression Factor	1.00			1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	22.3			0.1	0.0			0.5	0.0		0.3	
Delay (s)	34.0			5.7	5.6			19.0	17.2		18.2	
Level of Service	C			A	A			B	B		B	
Approach Delay (s)	34.0				5.7			18.5			18.2	
Approach LOS	C			A				B			B	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Volume (vph)	308	555	48	18	210	11	35	588	44	25	362	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1669	3371		1698	3388		1260	2487		1260	2373	
Fit Permitted	0.60	1.00		0.24	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1049	3371		427	3388		1260	2487		1260	2373	
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)	342	617	53	20	233	12	39	653	49	28	402	190
RTOR Reduction (vph)	0	6	0	0	4	0	0	5	0	0	56	0
Lane Group Flow (vph)	342	664	0	20	241	0	39	697	0	28	536	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	311	1001		126	1006		212	992		187	899	
v/s Ratio Prot		0.20			0.07		0.03	c0.28		0.02	c0.23	
v/s Ratio Perm	c0.33			0.05								
v/c Ratio	1.10	0.66		0.16	0.24		0.18	0.70		0.15	0.60	
Uniform Delay, d1	35.1	30.8		25.9	26.6		35.6	25.1		37.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00		0.84	0.73		1.50	0.63	
Incremental Delay, d2	80.5	3.5		2.7	0.6		1.2	2.7		1.4	2.4	
Delay (s)	115.6	34.2		28.6	27.2		31.2	21.0		56.8	18.1	
Level of Service	F	C		C	C		C	C		E	B	
Approach Delay (s)		61.7			27.3			21.6			19.8	
Approach LOS		E			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	20	801	55	6	440	9	36	0	5	17	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3388		1711	3411			1698		1711	1541	
Flt Permitted	0.47	1.00		0.22	1.00			0.81		0.73	1.00	
Satd. Flow (perm)	838	3388		402	3411			1441		1312	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	871	60	7	478	10	39	0	5	18	1	24
RTOR Reduction (vph)	0	8	0	0	2	0	0	22	0	0	15	0
Lane Group Flow (vph)	22	923	0	7	486	0	0	22	0	18	10	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	377	1524		180	1534			552		502	590	
v/s Ratio Prot		c0.27			0.14						0.01	
v/s Ratio Perm	0.03			0.02			c0.02			0.01		
v/c Ratio	0.06	0.61		0.04	0.32			0.04		0.04	0.02	
Uniform Delay, d1	9.3	12.5		9.2	10.6			11.6		11.6	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.8		0.4	0.5			0.1		0.1	0.1	
Delay (s)	9.6	14.3		9.6	11.1			11.7		11.7	11.5	
Level of Service	A	B		A	B			B		B	B	
Approach Delay (s)		14.2			11.1			11.7			11.6	
Approach LOS		B			B			B			B	

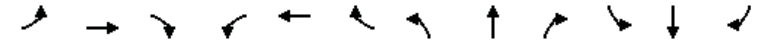
Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	20	92	0	0	527	32	308	594	686	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.92				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3391			5088		1711	3146				2694
Flt Permitted		0.86			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2943			5088		1711	3146				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	23	107	0	0	613	37	358	691	798	0	0	86
RTOR Reduction (vph)	0	0	0	0	8	0	0	245	0	0	0	80
Lane Group Flow (vph)	0	130	0	0	642	0	358	1244	0	0	0	6
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		40.5			29.5		35.0	35.0				6.0
Effective Green, g (s)		40.5			29.5		35.0	35.0				6.0
Actuated g/C Ratio		0.48			0.35		0.41	0.41				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1433			1765		704	1295				190
v/s Ratio Prot		c0.01			c0.13		0.21	c0.40				0.00
v/s Ratio Perm		0.04										
v/c Ratio		0.09			0.36		0.51	0.96				0.03
Uniform Delay, d1		12.2			20.7		18.6	24.3				36.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.6		2.6	17.2				0.3
Delay (s)		12.3			21.3		21.2	41.6				37.1
Level of Service		B			C		C	D				D
Approach Delay (s)		12.3			21.3			37.6				37.1
Approach LOS		B			C			D				D

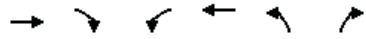
Intersection Summary

HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔	0	0
Volume (vph)	112	444	447	461	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.91	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1537	1427	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1537	1427	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	133	529	532	549	0	0
RTOR Reduction (vph)	61	61	0	0	0	0
Lane Group Flow (vph)	278	262	532	549	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	35.0	35.0	15.0	60.0		
Effective Green, g (s)	35.0	35.0	15.0	60.0		
Actuated g/C Ratio	0.58	0.58	0.25	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	896	832	829	1801		
v/s Ratio Prot	0.18		c0.16	c0.30		
v/s Ratio Perm		0.18				
v/c Ratio	0.31	0.31	0.64	0.30		
Uniform Delay, d1	6.4	6.4	20.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	1.7	0.1		
Delay (s)	6.6	6.6	21.8	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	6.6			10.8	0.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔↔	
Volume (vph)	214	121	165	6	127	10	122	454	13	17	336	143
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1175	1943		1137	1253		1215	2414		1215	2246	
Fit Permitted	0.43	1.00		0.56	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	538	1943		670	1253		1215	2414		1215	2246	
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)	238	134	183	7	141	11	136	504	14	19	373	159
RTOR Reduction (vph)	0	119	0	0	3	0	0	2	0	0	48	0
Lane Group Flow (vph)	238	198	0	7	149	0	136	516	0	19	484	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	35.0	35.0		17.1	17.1		16.4	43.3		5.4	32.3	
Effective Green, g (s)	35.0	35.0		17.1	17.1		16.4	43.3		5.4	32.3	
Actuated g/C Ratio	0.35	0.35		0.17	0.17		0.16	0.43		0.05	0.32	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	680		114	214		199	1045		65	725	
v/s Ratio Prot	c0.11	0.10			0.12		c0.11	0.21		0.02	c0.22	
v/s Ratio Perm	c0.20			0.01								
v/c Ratio	0.89	0.29		0.06	0.69		0.68	0.49		0.29	0.67	
Uniform Delay, d1	28.8	23.5		34.7	39.0		39.4	20.4		45.5	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.08	1.00	
Incremental Delay, d2	27.8	0.2		0.2	9.4		9.3	1.7		1.8	3.5	
Delay (s)	56.5	23.8		35.0	48.4		48.7	22.1		50.7	32.7	
Level of Service	E	C		C	D		D	C		D	C	
Approach Delay (s)		37.8			47.8			27.6			33.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.6
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←↑	←	←←←	←↑	←	←←←	←↑	←	0	0	0
Volume (vph)	618	425	167	546	481	52	26	538	88	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.91		1.00	0.97			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.96		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2683		2987	2938			5482	938			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2683		2987	2938			5482	938			
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	702	483	190	620	547	59	30	611	100	0	0	0
RTOR Reduction (vph)	0	38	0	0	2	0	0	0	81	0	0	0
Lane Group Flow (vph)	702	635	0	620	604	0	0	641	19	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	28.2	38.7		31.5	42.0			20.9	20.9			
Effective Green, g (s)	28.2	38.7		31.5	42.0			20.9	20.9			
Actuated g/C Ratio	0.26	0.35		0.29	0.38			0.19	0.19			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1148	943		855	1121			1041	178			
v/s Ratio Prot	0.16	c0.24		c0.21	0.21							
v/s Ratio Perm								0.12	0.02			
v/c Ratio	0.61	0.67		0.73	0.54			0.62	0.11			
Uniform Delay, d1	36.1	30.3		35.4	26.5			40.9	36.8			
Progression Factor	1.00	1.00		0.70	0.32			1.14	10.34			
Incremental Delay, d2	1.0	3.8		1.4	0.2			1.0	0.2			
Delay (s)	37.0	34.1		26.2	8.7			47.7	381.2			
Level of Service	D	C		C	A			D	F			
Approach Delay (s)		35.6			17.5			92.7			0.0	
Approach LOS		D			B			F			A	

Intersection Summary

HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



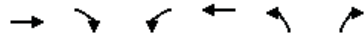
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←↑	←	←	←↑	←	←	←	←	←	←	←
Volume (vph)	126	1004	22	33	431	43	10	140	76	131	936	357
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.94			1.00	0.65	1.00	0.98	0.51
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00	0.73	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4374		1296	2407			1606	879	1119	2880	627
Fit Permitted	0.95	1.00		0.95	1.00			0.91	1.00	0.66	1.00	1.00
Satd. Flow (perm)	1540	4374		1296	2407			1462	879	772	2880	627
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	134	1068	23	35	459	46	11	149	81	139	996	380
RTOR Reduction (vph)	0	2	0	0	6	0	0	0	47	0	2	91
Lane Group Flow (vph)	134	1089	0	35	499	0	0	160	34	139	1032	251
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	13.4	41.6		7.5	34.1			51.0	51.0	52.0	52.0	52.0
Effective Green, g (s)	13.4	41.6		7.5	34.1			51.0	51.0	52.0	52.0	52.0
Actuated g/C Ratio	0.11	0.35		0.06	0.28			0.42	0.42	0.43	0.43	0.43
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	171	1516		81	683			621	373	334	1248	271
v/s Ratio Prot	0.09	c0.25		0.03	c0.21							0.36
v/s Ratio Perm								0.11	0.04	0.18		c0.40
v/c Ratio	0.78	0.72		0.43	0.73			0.26	0.09	0.42	0.83	0.93
Uniform Delay, d1	51.9	34.1		54.2	38.8			22.3	20.6	23.5	30.0	32.2
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.5	3.0		3.7	3.9			0.2	0.1	0.8	4.6	35.1
Delay (s)	72.4	37.1		57.9	42.7			22.5	20.8	24.3	34.6	67.3
Level of Service	E	D		E	D			C	C	C	C	E
Approach Delay (s)		40.9			43.7			21.9			41.1	
Approach LOS		D			D			C			D	

Intersection Summary

HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	140.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1130	131	2	796	87	22
Ideal Flow (vphpl)	1200	1200	1200	1200	1200	1200
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1908			1944	972	857
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	1908			1853	972	857
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1165	135	2	821	90	23
RTOR Reduction (vph)	8	0	0	0	0	15
Lane Group Flow (vph)	1292	0	0	823	90	8
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1077			1046	323	285
v/s Ratio Prot	c0.68				c0.09	
v/s Ratio Perm				0.44		0.01
v/c Ratio	1.20			0.79	0.28	0.03
Uniform Delay, d1	23.9			18.8	27.0	24.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	99.0			6.0	2.1	0.2
Delay (s)	123.0			24.7	29.1	24.9
Level of Service	F			C	C	C
Approach Delay (s)	123.0			24.7	28.3	
Approach LOS	F			C	C	

Intersection Summary

HCM 2000 Control Delay	82.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↔
Volume (vph)	114	935	103	43	245	586	279	505	1154	218
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			1.00	1.00
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.99			1.00	0.95			1.00	0.85
Fit Protected		1.00			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5800			2858	2445			4105	1122
Fit Permitted		1.00			0.68	1.00			0.95	1.00
Satd. Flow (perm)		5800			1962	2445			4105	1122
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	119	974	107	45	255	610	291	526	1202	227
RTOR Reduction (vph)	0	24	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1176	0	0	300	899	0	0	1751	204
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		20.0			22.0	22.0			15.5	15.5
Effective Green, g (s)		22.0			25.0	25.0			18.5	18.5
Actuated g/C Ratio		0.29			0.33	0.33			0.25	0.25
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1701			654	815			1012	276
v/s Ratio Prot						c0.37			c0.43	0.18
v/s Ratio Perm		0.20			0.15					
v/c Ratio		0.69			0.46	1.10			1.73	0.74
Uniform Delay, d1		23.5			19.7	25.0			28.2	26.0
Progression Factor		1.00			1.00	1.00			1.00	1.00
Incremental Delay, d2		1.2			0.5	63.6			332.8	9.9
Delay (s)		24.7			20.2	88.6			361.0	35.9
Level of Service		C			C	F			F	D
Approach Delay (s)		24.7			20.2	88.6			327.1	
Approach LOS		C			C	F			F	

Intersection Summary

HCM 2000 Control Delay	173.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



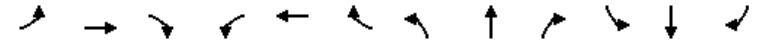
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↔	↔↔	↔↔↔		↕	↕	↕	↕	↕	↕↕
Volume (vph)	39	445	673	91	249	240	54	174	124	907
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0	4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor	1.00	0.81	0.81		0.91		0.91		0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.99		0.86		0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00
Frt	1.00	1.00	0.98		0.93		0.85		1.00	1.00
Fit Protected	0.95	0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)	810	1313	1889		2193		1161		1327	2557
Fit Permitted	0.95	0.95	1.00		1.00		1.00		0.23	0.95
Satd. Flow (perm)	810	1313	1889		2193		1161		326	2441
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	43	489	740	100	274	264	59	191	136	997
RTOR Reduction (vph)	0	0	17	0	1	0	42	0	0	0
Lane Group Flow (vph)	43	440	872	0	543	0	11	0	313	1011
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)	18.5	18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)	21.0	18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio	0.27	0.24	0.27		0.23		0.21	0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	220	315	515		498		241	300	1049	
v/s Ratio Prot	0.05	0.34	c0.46		c0.25			0.17	c0.16	
v/s Ratio Perm						0.01		0.27	0.25	
v/c Ratio	0.20	1.40	1.69		1.14dr		0.05	1.04	0.96	
Uniform Delay, d1	21.5	29.2	28.0		29.8		24.4	26.1	21.7	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.0	196.8	319.9		67.3		0.4	63.7	20.3	
Delay (s)	23.5	226.1	347.9		97.0		24.8	89.8	42.0	
Level of Service	C	F	F		F		C	F	D	
Approach Delay (s)			298.6		90.6				53.3	
Approach LOS			F		F				D	

Intersection Summary			
HCM 2000 Control Delay	162.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕		↕	↕	
Volume (vph)	36	137	151	1	2	1	71	495	162	204	321	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		0.99		1.00	0.97		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	0.96		1.00	0.96	
Fit Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1599	1352		1535		1377	2568		1540	2943	
Fit Permitted		0.94	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1524	1352		1500		1377	2568		1540	2943	
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)	39	147	162	1	2	1	76	532	174	219	345	113
RTOR Reduction (vph)	0	0	113	0	1	0	0	26	0	0	28	0
Lane Group Flow (vph)	0	186	49	0	3	0	76	680	0	219	430	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.2	32.2		32.2		11.7	36.7		22.1	47.4	
Effective Green, g (s)		32.2	32.2		32.2		11.7	36.7		22.1	47.4	
Actuated g/C Ratio		0.30	0.30		0.30		0.11	0.34		0.21	0.44	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		459	407		451		150	881		318	1304	
v/s Ratio Prot							0.06	c0.26		c0.14	0.15	
v/s Ratio Perm		c0.12	0.04		0.00							
v/c Ratio		0.41	0.12		0.01		0.51	0.77		0.69	0.33	
Uniform Delay, d1		29.7	27.1		26.2		44.9	31.4		39.2	19.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6	0.1		0.0		2.7	4.2		6.1	0.1	
Delay (s)		30.3	27.2		26.2		47.6	35.6		45.3	19.5	
Level of Service		C	C		C		D	D		D	B	
Approach Delay (s)		28.9			26.2			36.8			27.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	106.9	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	12	21	13	7	78	93	21	106	16	287	273	169
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.99	1.00	0.99		1.00	0.90	
Flpb, ped/bikes		0.99			1.00	1.00	0.87	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.98		1.00	0.94	
Fit Protected		0.99			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2431			1443	1218	1201	1412		1377	1225	
Fit Permitted		0.86			0.97	1.00	0.50	1.00		0.95	1.00	
Satd. Flow (perm)		2129			1401	1218	632	1412		1377	1225	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	13	23	14	8	86	102	23	116	18	315	300	186
RTOR Reduction (vph)	0	12	0	0	0	47	0	9	0	0	26	0
Lane Group Flow (vph)	0	38	0	0	94	55	23	125	0	315	460	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		7.1			7.1	26.5	8.0	8.0		19.4	32.4	
Effective Green, g (s)		7.1			7.1	26.5	8.0	8.0		19.4	32.4	
Actuated g/C Ratio		0.14			0.14	0.54	0.16	0.16		0.39	0.65	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		305			200	775	102	228		539	801	
v/s Ratio Prot						0.03		0.09		0.23	c0.38	
v/s Ratio Perm		0.02			c0.07	0.02	0.04					
v/c Ratio		0.12			0.47	0.07	0.23	0.55		0.58	0.57	
Uniform Delay, d1		18.5			19.5	5.6	18.1	19.1		11.9	4.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			1.7	0.0	1.1	2.7		1.6	1.0	
Delay (s)		18.7			21.2	5.6	19.2	21.8		13.5	5.7	
Level of Service		B			C	A	B	C		B	A	
Approach Delay (s)		18.7			13.1			21.4			8.8	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	42	244	522	28	791	321
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	846	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	846	1134	1194
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	54	313	669	36	1014	412
RTOR Reduction (vph)	0	279	0	8	0	0
Lane Group Flow (vph)	54	34	669	28	1014	412
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.0	10.0	47.1	42.1	20.0	72.1
Effective Green, g (s)	10.0	10.0	47.1	42.1	20.0	72.1
Actuated g/C Ratio	0.11	0.11	0.51	0.46	0.22	0.78
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	123	189	785	432	246	934
v/s Ratio Prot	c0.05		c0.44	0.01	c0.89	0.35
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.44	0.18	0.85	0.06	4.12	0.44
Uniform Delay, d1	38.4	37.3	19.5	14.0	36.0	3.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	8.9	0.1	1414.5	0.3
Delay (s)	40.9	37.8	28.4	14.0	1450.5	3.7
Level of Service	D	D	C	B	F	A
Approach Delay (s)	38.2		27.6			1032.5
Approach LOS	D		C			F

Intersection Summary			
HCM 2000 Control Delay	602.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	37	33	261	297	112	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.97		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.97	1.00	1.00	
Frt	0.94		1.00	1.00	0.96	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1591		1667	1531	2988	
Flt Permitted	0.97		0.64	1.00	1.00	
Satd. Flow (perm)	1591		1116	1531	2988	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	44	39	311	354	133	51
RTOR Reduction (vph)	35	0	0	0	16	0
Lane Group Flow (vph)	48	0	311	354	168	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	4.1		30.1	30.1	30.1	
Effective Green, g (s)	4.1		30.1	30.1	30.1	
Actuated g/C Ratio	0.09		0.68	0.68	0.68	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	147		759	1042	2034	
v/s Ratio Prot	c0.03			0.23	0.06	
v/s Ratio Perm			c0.28			
v/c Ratio	0.32		0.41	0.34	0.08	
Uniform Delay, d1	18.8		3.1	2.9	2.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3		0.4	0.2	0.0	
Delay (s)	20.0		3.5	3.1	2.4	
Level of Service	C		A	A	A	
Approach Delay (s)	20.0			3.3	2.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	123	124	801	151	309	394
Ideal Flow (vphpl)	1200	1200	1200	1200	1200	1200
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.95	0.99		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	984	920	2085		1080	2161
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	984	920	2085		1080	2161
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	137	138	890	168	343	438
RTOR Reduction (vph)	0	105	13	0	0	0
Lane Group Flow (vph)	137	33	1045	0	343	438
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	61.1		14.9	81.1
Effective Green, g (s)	28.7	28.7	61.1		14.9	81.1
Actuated g/C Ratio	0.24	0.24	0.51		0.12	0.68
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	235	220	1061		134	1460
v/s Ratio Prot			c0.50		c0.32	0.20
v/s Ratio Perm	c0.14	0.04				
v/c Ratio	0.58	0.15	0.99		2.56	0.30
Uniform Delay, d1	40.4	36.0	29.0		52.5	7.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	0.3	24.3		723.3	0.1
Delay (s)	44.0	36.3	53.3		775.8	8.0
Level of Service	D	D	D		F	A
Approach Delay (s)	40.2		53.3			345.2
Approach LOS	D		D			F

Intersection Summary			
HCM 2000 Control Delay	159.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕	↕	
Volume (vph)	10	7	12	548	115	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1345		2883	2964	
Flt Permitted	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1540	1345		2735	2964	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	14	645	135	35
RTOR Reduction (vph)	0	8	0	0	24	0
Lane Group Flow (vph)	12	0	0	659	146	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5		
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	1.4	1.4		17.0	17.0	
Effective Green, g (s)	1.4	1.4		17.0	17.0	
Actuated g/C Ratio	0.03	0.03		0.32	0.32	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	34		862	934	
v/s Ratio Prot	c0.01				0.05	
v/s Ratio Perm		0.00		c0.24		
v/c Ratio	0.30	0.01		0.76	0.16	
Uniform Delay, d1	25.8	25.6		16.6	13.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.1		4.1	0.1	
Delay (s)	30.0	25.6		20.7	13.4	
Level of Service	C	C		C	B	
Approach Delay (s)	28.2			20.7	13.4	
Approach LOS	C			C	B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	150	9	70	22	18	5	108	251	8	5	70	55
Peak Hour Factor	0.92	0.77	0.77	0.77	0.77	0.92	0.77	0.92	0.77	0.92	0.92	0.92
Hourly flow rate (vph)	163	12	91	29	23	5	140	273	10	5	76	60
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	163	103	29	29	423	82	60					
Volume Left (vph)	163	0	29	0	140	5	0					
Volume Right (vph)	0	91	0	5	10	0	60					
Hadj (s)	0.53	-0.59	0.53	-0.10	0.09	0.07	-0.67					
Departure Headway (s)	6.8	5.6	7.1	6.5	5.7	6.1	5.4					
Degree Utilization, x	0.31	0.16	0.06	0.05	0.67	0.14	0.09					
Capacity (veh/h)	501	596	455	496	610	551	621					
Control Delay (s)	11.5	8.5	9.4	8.7	19.7	8.9	7.7					
Approach Delay (s)	10.4		9.0		19.7	8.4						
Approach LOS	B		A		C	A						

Intersection Summary			
Delay	14.4		
Level of Service	B		
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	238	177	260	4	137	40	199	675	41	11	308	197
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1258	1365	1126	1285	1365	1099	2515	2564		1296	2415	
Fit Permitted	0.67	1.00	1.00	0.61	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	884	1365	1126	824	1365	1099	2515	2564		1296	2415	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	243	181	265	4	140	41	203	689	42	11	314	201
RTOR Reduction (vph)	0	0	174	0	0	27	0	4	0	0	103	0
Lane Group Flow (vph)	243	181	91	4	140	14	203	727	0	11	412	0
Confl. Peds. (#/hr)	41	14	14	4	41				39			8
Confl. Bikes (#/hr)		9			10				4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	304	470	388	284	470	379	352	969		155	864	
v/s Ratio Prot		0.13			0.10		0.08	c0.28		0.01	c0.17	
v/s Ratio Perm	c0.27		0.08	0.00		0.01						
v/c Ratio	0.80	0.39	0.24	0.01	0.30	0.04	0.58	0.75		0.07	0.48	
Uniform Delay, d1	29.6	24.7	23.3	21.6	23.9	21.7	40.2	27.0		39.1	24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.77		1.00	1.00	
Incremental Delay, d2	19.4	2.4	1.4	0.1	1.6	0.2	3.7	3.0		0.9	1.9	
Delay (s)	49.0	27.1	24.8	21.6	25.5	21.9	38.8	23.7		39.9	26.7	
Level of Service	D	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		33.9			24.6			27.0			27.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	172	606	10	17	466	50	20	13		41	11	117
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1237	1621	1531		1487	1375	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.67	1.00		0.73	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1237	1138	1531		1143	1375	
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)	177	625	10	18	480	52	21	13		28	42	121
RTOR Reduction (vph)	0	0	5	0	0	31	0	21		0	0	91
Lane Group Flow (vph)	177	625	5	18	480	21	21	20		0	42	41
Confl. Peds. (#/hr)		50			50					50		50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8				4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	15.7	47.6	47.6	2.7	34.6	34.6	22.0	22.0		22.0	22.0	
Effective Green, g (s)	15.7	47.6	47.6	2.7	34.6	34.6	22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.18	0.55	0.55	0.03	0.40	0.40	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	930	790	50	676	490	286	385		288	346	
v/s Ratio Prot	c0.11	c0.37		0.01	0.28			0.01			0.03	
v/s Ratio Perm			0.00			0.02	0.02					
v/c Ratio	0.61	0.67	0.01	0.36	0.71	0.04	0.07	0.05		0.15	0.12	
Uniform Delay, d1	33.0	14.2	9.1	41.5	22.1	16.2	24.9	24.7		25.4	25.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	3.9	0.0	4.4	3.5	0.0	0.1	0.1		0.2	0.2	
Delay (s)	36.5	18.1	9.1	45.8	25.7	16.2	25.0	24.8		25.6	25.3	
Level of Service	D	B	A	D	C	B	C	C		C	C	
Approach Delay (s)		22.0			25.4			24.9			25.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	119	605	52	78	464	62	31	381	83	100	236	116
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1045	1540	2997			3034	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.45	1.00			0.59	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1045	722	2997			1816	1072
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	135	688	59	89	527	70	35	433	94	114	268	132
RTOR Reduction (vph)	0	0	26	0	0	29	0	19	0	0	0	98
Lane Group Flow (vph)	135	688	33	89	527	41	35	508	0	0	382	34
Confl. Peds. (#/hr)											17	3
Confl. Bikes (#/hr)											36	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	10.0	50.2	50.2	7.0	46.2	46.2	25.9	25.9			24.9	24.9
Effective Green, g (s)	10.0	50.2	50.2	7.0	46.2	46.2	25.9	25.9			24.9	24.9
Actuated g/C Ratio	0.10	0.52	0.52	0.07	0.48	0.48	0.27	0.27			0.26	0.26
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	126	634	719	112	584	502	194	807			470	277
v/s Ratio Prot	c0.11	c0.57		0.06	0.43			0.17				
v/s Ratio Perm			0.02			0.04	0.05				c0.21	0.03
v/c Ratio	1.07	1.09	0.05	0.79	0.90	0.08	0.18	0.63			0.93dl	0.12
Uniform Delay, d1	43.0	22.9	11.2	43.8	22.9	13.5	27.0	30.9			33.4	27.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	100.6	61.0	0.0	31.0	17.2	0.1	0.4	1.5			10.3	0.2
Delay (s)	143.7	84.0	11.3	74.9	40.1	13.6	27.4	32.4			43.7	27.4
Level of Service	F	F	B	E	D	B	C	C			D	C
Approach Delay (s)		88.3			41.9			32.1			39.5	
Approach LOS		F			D			C			D	

Intersection Summary

HCM 2000 Control Delay	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	30	546	68	42	343	226	64	198	40	191	122	32
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1331	937		1337	1126	869	1070	957	915	1070	1075	
Fit Permitted	0.26	1.00		0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	364	937		119	1126	869	1070	957	915	1070	1075	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	34	628	78	48	394	260	74	228	46	220	140	37
RTOR Reduction (vph)	0	4	0	0	0	104	0	0	37	0	10	0
Lane Group Flow (vph)	34	702	0	48	394	156	74	228	9	220	167	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	50.1	50.1		52.0	52.0	66.0	14.0	21.1	21.1	14.0	21.1	
Effective Green, g (s)	50.1	50.1		52.0	52.0	66.0	14.0	21.1	21.1	14.0	21.1	
Actuated g/C Ratio	0.46	0.46		0.47	0.47	0.60	0.13	0.19	0.19	0.13	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	191	426		109	532	560	136	183	175	136	206	
v/s Ratio Prot	0.00	c0.75		0.02	c0.35	0.04	0.07	c0.24		c0.21	0.16	
v/s Ratio Perm	0.08			0.19		0.14			0.01			
v/c Ratio	0.18	1.65		0.44	0.74	0.28	0.54	1.25	0.05	1.62	0.81	
Uniform Delay, d1	19.0	29.9		47.7	23.5	10.6	45.0	44.4	36.3	48.0	42.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	302.1		2.8	5.5	0.3	4.4	147.9	0.1	309.1	21.1	
Delay (s)	19.5	332.1		50.5	29.0	10.8	49.4	192.4	36.4	357.1	63.6	
Level of Service	B	F		D	C	B	D	F	D	F	E	
Approach Delay (s)		317.7			23.8			141.4			226.3	
Approach LOS		F			C			F			F	

Intersection Summary

HCM 2000 Control Delay	178.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop			Stop	Stop		Stop	
Volume (vph)	264	537	27	35	141	7	35	100	69	5	48	94
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	272	554	28	36	145	7	36	103	71	5	49	97

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	854	36	153	139	71	152
Volume Left (vph)	272	36	0	36	0	5
Volume Right (vph)	28	0	7	0	71	97
Hadj (s)	0.08	0.53	0.00	0.16	-0.67	-0.34
Departure Headway (s)	6.2	7.2	6.7	7.4	6.5	7.0
Degree Utilization, x	1.0	0.07	0.28	0.28	0.13	0.29
Capacity (veh/h)	577	479	517	474	530	493
Control Delay (s)	236.6	9.6	11.1	12.1	9.3	12.9
Approach Delay (s)	236.6	10.8		11.1		12.9
Approach LOS	F	B		B		B

Intersection Summary						
Delay		148.4				
Level of Service		F				
Intersection Capacity Utilization		86.6%		ICU Level of Service		E
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	286	782	46	22	202	45	58	585	20	26	344	202
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1300	1300	1300	1300	1300	1300
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	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	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1495	3030		1523	2951		1170	2325		1170	2183	
Flt Permitted	0.58	1.00		0.13	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	907	3030		216	2951		1170	2325		1170	2183	
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)	308	841	49	24	217	48	62	629	22	28	370	217
RTOR Reduction (vph)	0	4	0	0	19	0	0	2	0	0	85	0
Lane Group Flow (vph)	308	886	0	24	246	0	62	649	0	28	502	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	269	899		64	876		197	927		174	827	
v/s Ratio Prot		0.29			0.08		0.05	c0.28		0.02	c0.23	
v/s Ratio Perm	c0.34			0.11								
v/c Ratio	1.14	0.99		0.38	0.28		0.31	0.70		0.16	0.61	
Uniform Delay, d1	35.1	34.9		27.8	27.0		36.5	25.1		37.1	25.0	
Progression Factor	1.00	1.00		1.00	1.00		0.83	0.74		1.40	0.68	
Incremental Delay, d2	99.8	26.7		16.0	0.8		2.7	2.9		1.8	3.0	
Delay (s)	134.9	61.6		43.8	27.8		33.0	21.3		53.8	20.0	
Level of Service	F	E		D	C		C	C		D	B	
Approach Delay (s)		80.5			29.1			22.3			21.5	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	20	1128	55	6	484	9	36	0	5	17	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3397		1711	3412			1698		1711	1541	
Flt Permitted	0.43	1.00		0.15	1.00			0.81		0.73	1.00	
Satd. Flow (perm)	781	3397		267	3412			1441		1312	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1226	60	7	526	10	39	0	5	18	1	24
RTOR Reduction (vph)	0	6	0	0	2	0	0	22	0	0	15	0
Lane Group Flow (vph)	22	1280	0	7	534	0	0	22	0	18	10	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	351	1528		120	1535			552		502	590	
v/s Ratio Prot		c0.38			0.16						0.01	
v/s Ratio Perm	0.03			0.03			c0.02			0.01		
v/c Ratio	0.06	0.84		0.06	0.35			0.04		0.04	0.02	
Uniform Delay, d1	9.3	14.6		9.3	10.8			11.6		11.6	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	5.6		0.9	0.6			0.1		0.1	0.1	
Delay (s)	9.7	20.2		10.2	11.4			11.7		11.7	11.5	
Level of Service	A	C		B	B			B		B	B	
Approach Delay (s)		20.0			11.4			11.7			11.6	
Approach LOS		C			B			B			B	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



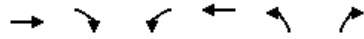
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	↔
Volume (vph)	20	102	0	0	567	36	253	547	1107	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.90				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3393			5086		1711	3078				2694
Flt Permitted		0.86			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2952			5086		1711	3078				2694
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	111	0	0	616	39	275	595	1203	0	0	80
RTOR Reduction (vph)	0	0	0	0	8	0	0	405	0	0	0	75
Lane Group Flow (vph)	0	133	0	0	647	0	275	1393	0	0	0	5
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		43.5			32.5		37.0	37.0				6.0
Effective Green, g (s)		43.5			32.5		37.0	37.0				6.0
Actuated g/C Ratio		0.48			0.36		0.41	0.41				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1456			1836		703	1265				179
v/s Ratio Prot		c0.01			c0.13		0.16	c0.45				0.00
v/s Ratio Perm		0.04										
v/c Ratio		0.09			0.35		0.39	1.16dr				0.03
Uniform Delay, d1		12.6			21.0		18.6	26.5				39.3
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.5		1.6	57.9				0.3
Delay (s)		12.7			21.6		20.2	84.4				39.6
Level of Service		B			C		C	F				D
Approach Delay (s)		12.7			21.6			75.9				39.6
Approach LOS		B			C			E				D

Intersection Summary

HCM 2000 Control Delay	59.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	122	498	465	428	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.91	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1534	1427	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1534	1427	3319	1801		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	139	566	528	486	0	0
RTOR Reduction (vph)	62	62	0	0	0	0
Lane Group Flow (vph)	303	278	528	486	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	35.1	35.1	14.9	60.0		
Effective Green, g (s)	35.1	35.1	14.9	60.0		
Actuated g/C Ratio	0.59	0.59	0.25	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	897	834	824	1801		
v/s Ratio Prot	c0.20		c0.16	0.27		
v/s Ratio Perm		0.19				
v/c Ratio	0.34	0.33	0.64	0.27		
Uniform Delay, d1	6.4	6.4	20.2	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	1.7	0.1		
Delay (s)	6.7	6.7	21.9	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	6.7			11.4	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			9.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			42.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔	↔	↔	↔	↔
Volume (vph)	220	154	144	3	120		9	127	392	9	8	314
Ideal Flow (vphpl)	1500	1500	1500	1500	1500		1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1173	1996		1139	1254		1215	2417		1215	2278	
Fit Permitted	0.44	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	545	1996		659	1254		1215	2417		1215	2278	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	247	173	162	3	135		10	143	440	10	9	353
RTOR Reduction (vph)	0	103	0	0	3	0	0	1	0	0	34	0
Lane Group Flow (vph)	247	232	0	3	142	0	143	449	0	9	434	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10				10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.4	36.4		16.5	16.5		17.5	44.4		2.9	29.8	
Effective Green, g (s)	36.4	36.4		16.5	16.5		17.5	44.4		2.9	29.8	
Actuated g/C Ratio	0.36	0.36		0.16	0.16		0.18	0.44		0.03	0.30	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	726		108	206		212	1073		35	678	
v/s Ratio Prot	c0.12	0.12			0.11		c0.12	0.19		0.01	c0.19	
v/s Ratio Perm	c0.19			0.00								
v/c Ratio	0.85	0.32		0.03	0.69		0.67	0.42		0.26	0.64	
Uniform Delay, d1	27.0	22.9		35.0	39.3		38.6	19.0		47.5	30.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.17	1.05	
Incremental Delay, d2	20.7	0.3		0.1	9.2		8.2	1.2		2.8	3.3	
Delay (s)	47.7	23.1		35.1	48.5		46.8	20.2		58.5	35.2	
Level of Service	D	C		D	D		D	C		E	D	
Approach Delay (s)		33.6			48.2			26.6			35.6	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.0									C
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			92.2%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO SF GIANTS GAME AT AT&T PARK
WEEKDAY LATE EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	478	420	8	94	764	52	37	491	385	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3064		2987	3028			5522	1237			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3064		2987	3028			5522	1237			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	576	506	10	113	920	63	45	592	464	0	0	0
RTOR Reduction (vph)	0	1	0	0	4	0	0	0	281	0	0	0
Lane Group Flow (vph)	576	515	0	113	979	0	0	637	183	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	54.8		9.5	46.1			26.8	26.8			
Effective Green, g (s)	18.2	54.8		9.5	46.1			26.8	26.8			
Actuated g/C Ratio	0.17	0.50		0.09	0.42			0.24	0.24			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1526		257	1269			1345	301			
v/s Ratio Prot	c0.13	0.17		0.04	c0.32							
v/s Ratio Perm								0.12	c0.15			
v/c Ratio	0.78	0.34		0.44	0.77			0.47	0.61			
Uniform Delay, d1	44.0	16.6		47.7	27.4			35.6	36.9			
Progression Factor	0.55	0.26		1.13	0.37			1.00	1.00			
Incremental Delay, d2	4.5	0.5		0.4	0.9			0.3	3.4			
Delay (s)	28.8	4.9		54.1	11.0			35.8	40.4			
Level of Service	C	A		D	B			D	D			
Approach Delay (s)		17.5			15.5			37.7			0.0	
Approach LOS		B			B			D			A	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015

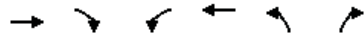


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	78	837	21	40	725	36	12	30	30	39	181	171
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.63	1.00	0.86	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.91	1.00	0.67	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1134	3218		1134	2186			1448	853	1027	2448	580
Fit Permitted	0.95	1.00		0.95	1.00			0.83	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1134	3218		1134	2186			1224	853	783	2448	580
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	93	996	25	48	863	43	14	36	36	46	215	204
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	31	0	38	108
Lane Group Flow (vph)	93	1019	0	48	904	0	0	50	5	46	252	21
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.5	61.7		11.9	57.5			16.5	16.5	17.5	17.5	17.5
Effective Green, g (s)	14.5	61.7		11.9	57.5			16.5	16.5	17.5	17.5	17.5
Actuated g/C Ratio	0.13	0.56		0.11	0.52			0.15	0.15	0.16	0.16	0.16
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	149	1805		122	1142			183	127	124	389	92
v/s Ratio Prot	0.08	c0.32		0.04	c0.41						c0.10	
v/s Ratio Perm								0.04	0.01	0.06		0.04
v/c Ratio	0.62	0.56		0.39	0.79			0.27	0.04	0.37	0.65	0.22
Uniform Delay, d1	45.2	15.5		45.7	21.4			41.4	40.0	41.3	43.4	40.3
Progression Factor	0.86	1.09		0.67	0.44			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.8		1.3	2.5			0.8	0.1	1.9	3.7	1.2
Delay (s)	44.0	17.7		31.9	11.8			42.2	40.1	43.2	47.1	41.6
Level of Service	D	B		C	B			D	D	D	D	D
Approach Delay (s)		19.9			12.8			41.4			45.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	925	62	0	908	28	11
Ideal Flow (vphpl)	1100	1100	1000	1000	1000	1000
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1764			1621	810	714
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1764			1621	810	714
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1101	74	0	1081	33	13
RTOR Reduction (vph)	2	0	0	0	0	12
Lane Group Flow (vph)	1173	0	0	1081	33	1
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1462			1343	55	48
v/s Ratio Prot	0.67			c0.67	c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.80			0.80	0.60	0.02
Uniform Delay, d1	4.8			4.8	49.8	47.8
Progression Factor	1.00			1.53	1.00	1.00
Incremental Delay, d2	4.7			2.5	16.4	0.2
Delay (s)	9.6			9.9	66.2	48.0
Level of Service	A			A	E	D
Approach Delay (s)	9.6			9.9	61.0	
Approach LOS	A			A	E	
Intersection Summary						
HCM 2000 Control Delay		10.8		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.79				
Actuated Cycle Length (s)		110.0		Sum of lost time (s)		11.3
Intersection Capacity Utilization		70.6%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑	↑
Volume (vph)	143	771	99	35	123	323	194	89	208	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.94			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5762			2834	2410			4076	1122
Fit Permitted		0.99			0.77	1.00			0.95	1.00
Satd. Flow (perm)		5762			2212	2410			4076	1122
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	168	907	116	41	145	380	228	105	245	108
RTOR Reduction (vph)	0	24	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	1167	0	0	186	584	0	0	361	97
Confl. Peds. (#/hr)		50		100	100		100	50	100	100
Confl. Bikes (#/hr)				10			10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		24.1			21.3	21.3			12.1	12.1
Effective Green, g (s)		26.1			24.3	24.3			15.1	15.1
Actuated g/C Ratio		0.35			0.32	0.32			0.20	0.20
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		2005			716	780			820	225
v/s Ratio Prot						c0.24			c0.09	0.09
v/s Ratio Perm		0.20			0.08					
v/c Ratio		0.58			0.26	0.75			0.44	0.43
Uniform Delay, d1		20.0			18.7	22.6			26.2	26.2
Progression Factor		1.00			0.49	1.00			1.00	1.00
Incremental Delay, d2		0.4			0.1	4.0			0.4	1.3
Delay (s)		20.4			9.4	26.6			26.6	27.5
Level of Service		C			A	C			C	C
Approach Delay (s)		20.4			9.4	26.6			26.8	
Approach LOS		C			A	C			C	
Intersection Summary										
HCM 2000 Control Delay			22.3		HCM 2000 Level of Service					C
HCM 2000 Volume to Capacity ratio			0.64							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)				12.5	
Intersection Capacity Utilization			69.4%		ICU Level of Service				C	
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↕	↕	↔	↔	↕
Volume (vph)	27	776	210	22	131	112	14	170	20	365
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	1.00		0.87		1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	0.97		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1214	1877		2248		1188		1327	2553
Fit Permitted		0.95	0.97		1.00		1.00		0.52	0.95
Satd. Flow (perm)		1214	1877		2248		1188		720	2431
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	817	221	23	138	118	15	179	21	384
RTOR Reduction (vph)	0	0	6	0	1	0	10	0	0	0
Lane Group Flow (vph)	0	567	516	0	257	0	3	0	181	403
Confl. Peds. (#/hr)	25			60		200				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		299	525		524		253		413	1073
v/s Ratio Prot		c0.47	0.27		c0.11				c0.07	0.06
v/s Ratio Perm							0.00		0.12	0.10
v/c Ratio		1.90	1.60dl		0.49		0.01		0.44	0.38
Uniform Delay, d1		28.2	26.8		24.9		23.3		17.3	14.4
Progression Factor		1.00	1.00		1.00		1.00		1.04	1.03
Incremental Delay, d2		415.7	35.4		3.3		0.1		2.6	0.8
Delay (s)		444.0	62.2		28.2		23.3		20.6	15.7
Level of Service		F	E		C		C		C	B
Approach Delay (s)			261.0		27.9					17.2
Approach LOS			F		C					B

Intersection Summary			
HCM 2000 Control Delay	155.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↕	↕	↔	↕	↕
Volume (vph)	125	10	37	66	711	253	5	362	4	1	61	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1570	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	5.5
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95		1.00	0.95	0.95
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00		1.00	0.99	0.99
Fit Protected		0.96	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1547	1356		2938		1272	2536		1540	3036	3036
Fit Permitted		0.16	1.00		0.92		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		263	1356		2713		1272	2536		1540	3036	3036
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	152	12	45	80	867	309	6	441	5	1	74	6
RTOR Reduction (vph)	0	0	23	0	26	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	164	22	0	1230	0	6	445	0	1	76	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.6	32.6		32.6		1.0	16.4		0.8	16.5	
Effective Green, g (s)		32.6	32.6		32.6		1.0	16.4		0.8	16.5	
Actuated g/C Ratio		0.50	0.50		0.50		0.02	0.25		0.01	0.25	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		130	672		1346		19	633		18	762	
v/s Ratio Prot							0.00	c0.18		0.00	c0.02	
v/s Ratio Perm		c0.62	0.02		0.45							
v/c Ratio		1.26	0.03		0.91		0.32	0.70		0.06	0.10	
Uniform Delay, d1		16.6	8.5		15.3		32.0	22.4		32.1	18.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		165.3	0.0		9.7		3.5	3.5		0.5	0.1	
Delay (s)		181.8	8.5		24.9		35.5	26.0		32.5	18.9	
Level of Service		F	A		C		D	C		C	B	
Approach Delay (s)		144.5			24.9			26.1			19.1	
Approach LOS		F			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	15.9
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	5	62	3	1	711	9	2	20	61	48	47	8
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.96	1.00	0.95		1.00	0.95	
Flpb, ped/bikes		1.00			1.00	1.00	0.73	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.89		1.00	0.98	
Fit Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2573			1450	1186	1007	1227		1377	1353	
Fit Permitted		0.86			1.00	1.00	0.71	1.00		0.95	1.00	
Satd. Flow (perm)		2222			1450	1186	755	1227		1377	1353	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	6	78	4	1	900	11	3	25	77	61	59	10
RTOR Reduction (vph)	0	2	0	0	0	4	0	69	0	0	7	0
Lane Group Flow (vph)	0	86	0	0	901	7	3	33	0	61	62	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		29.4			29.4	37.0	6.4	6.4		7.6	19.0	
Effective Green, g (s)		29.4			29.4	37.0	6.4	6.4		7.6	19.0	
Actuated g/C Ratio		0.50			0.50	0.63	0.11	0.11		0.13	0.33	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		1118			729	852	82	134		179	440	
v/s Ratio Prot						0.00		c0.03		c0.04	0.05	
v/s Ratio Perm		0.04			0.62	0.00	0.00					
v/c Ratio		0.08			1.24	0.01	0.04	0.25		0.34	0.14	
Uniform Delay, d1		7.5			14.5	3.9	23.2	23.8		23.1	13.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			117.8	0.0	0.2	1.0		0.4	0.1	
Delay (s)		7.5			132.3	3.9	23.4	24.8		23.5	14.1	
Level of Service		A			F	A	C	C		C	B	
Approach Delay (s)		7.5			130.8			24.7			18.5	
Approach LOS		A			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	101.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	6	911	356	11	65	68
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1747	1535	846	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1747	1535	846	1134	1194
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	7	1085	424	13	77	81
RTOR Reduction (vph)	0	556	0	6	0	0
Lane Group Flow (vph)	7	529	424	7	77	81
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	34.8	34.8	40.2	35.2	10.5	55.7
Effective Green, g (s)	34.8	34.8	40.2	35.2	10.5	55.7
Actuated g/C Ratio	0.35	0.35	0.40	0.35	0.10	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	392	604	614	338	118	661
v/s Ratio Prot	0.01		c0.28	0.00	c0.07	0.07
v/s Ratio Perm		c0.30		0.00		
v/c Ratio	0.02	0.88	0.69	0.02	0.65	0.12
Uniform Delay, d1	21.6	30.8	25.0	21.4	43.2	10.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	13.4	3.3	0.0	12.2	0.1
Delay (s)	21.6	44.2	28.3	21.4	55.5	10.8
Level of Service	C	D	C	C	E	B
Approach Delay (s)	44.0		28.1			32.6
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑↔	
Volume (vph)	308	281	2	46	68	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.97		1.00	1.00	0.96	
Flpb, ped/bikes	1.00		0.97	1.00	1.00	
Frt	0.94		1.00	1.00	0.93	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1599		1657	1531	2818	
Flt Permitted	0.97		0.63	1.00	1.00	
Satd. Flow (perm)	1599		1104	1531	2818	
Peak-hour factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Adj. Flow (vph)	460	419	3	69	101	88
RTOR Reduction (vph)	31	0	0	0	74	0
Lane Group Flow (vph)	848	0	3	69	115	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	35.9		8.6	8.6	8.6	
Effective Green, g (s)	35.9		8.6	8.6	8.6	
Actuated g/C Ratio	0.66		0.16	0.16	0.16	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1053		174	241	444	
v/s Ratio Prot	c0.53			c0.05	0.04	
v/s Ratio Perm			0.00			
v/c Ratio	0.81		0.02	0.29	0.26	
Uniform Delay, d1	6.8		19.4	20.2	20.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	4.6		0.0	0.7	0.3	
Delay (s)	11.3		19.4	20.9	20.5	
Level of Service	B		B	C	C	
Approach Delay (s)	11.3			20.8	20.5	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	54.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑↔		↔	↑↔
Volume (vph)	0	0	0	0	0	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.9
Lane Util. Factor						0.95
Frbp, ped/bikes						1.00
Flpb, ped/bikes						1.00
Frt						1.00
Flt Protected						1.00
Satd. Flow (prot)						3421
Flt Permitted						1.00
Satd. Flow (perm)						3421
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	0	0	359
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	359
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm			Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)						49.9
Effective Green, g (s)						49.9
Actuated g/C Ratio						1.00
Clearance Time (s)						4.9
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)						3421
v/s Ratio Prot						c0.10
v/s Ratio Perm						
v/c Ratio						0.10
Uniform Delay, d1						0.0
Progression Factor						1.00
Incremental Delay, d2						0.1
Delay (s)						0.1
Level of Service						A
Approach Delay (s)	0.0		0.0			0.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	0.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	15.3
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕↕	↕↕	
Volume (vph)	0	15	0	48	350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	
Lane Util. Factor		1.00		0.95	0.95	
Frbp, ped/bikes		0.97		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Fit Protected		1.00		1.00	1.00	
Satd. Flow (prot)		1342		2887	2887	
Fit Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		1342		2887	2887	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	18	0	56	412	0
RTOR Reduction (vph)	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	56	412	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)		0.6		11.8	11.8	
Effective Green, g (s)		0.6		11.8	11.8	
Actuated g/C Ratio		0.01		0.25	0.25	
Clearance Time (s)		5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0	
Lane Grp Cap (vph)		16		712	712	
v/s Ratio Prot				0.02	0.14	
v/s Ratio Perm		c0.00				
v/c Ratio		0.01		0.08	0.58	
Uniform Delay, d1		23.3		13.8	15.8	
Progression Factor		1.00		1.00	1.00	
Incremental Delay, d2		0.4		0.0	1.1	
Delay (s)		23.7		13.9	17.0	
Level of Service		C		B	B	
Approach Delay (s)	23.7			13.9	17.0	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↕↕	↕↕	↕↕	↕↕	↕↕	↕↕
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	0	0	0	0	0	0	29	74	0	0	278	132
Peak Hour Factor	0.92	0.83	0.83	0.83	0.83	0.92	0.83	0.92	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	35	80	0	0	302	143
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	0	0	0	0	115	302	143					
Volume Left (vph)	0	0	0	0	35	0	0					
Volume Right (vph)	0	0	0	0	0	0	143					
Hadj (s)	0.00	0.00	0.00	0.00	0.09	0.03	-0.67					
Departure Headway (s)	5.7	5.7	5.7	5.7	5.0	4.6	3.9					
Degree Utilization, x	0.00	0.00	0.00	0.00	0.16	0.39	0.16					
Capacity (veh/h)	587	587	587	587	710	768	905					
Control Delay (s)	7.5	7.5	7.5	7.5	8.9	9.3	6.4					
Approach Delay (s)	0.0	0.0	0.0	0.0	8.9	8.4						
Approach LOS	A		A		A	A						

Intersection Summary			
Delay	8.5		
Level of Service	A		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	0	100	0	161	0	121	0	0	0	192	120
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			5.5		5.5		5.0				5.2	
Lane Util. Factor			1.00		1.00		0.97				0.95	
Frbp, ped/bikes			0.97		1.00		1.00				0.99	
Flpb, ped/bikes			1.00		1.00		1.00				1.00	
Frt			0.85		1.00		1.00				0.94	
Fit Protected			1.00		1.00		0.95				1.00	
Satd. Flow (prot)			1130		1365		2515				2417	
Fit Permitted			1.00		1.00		0.95				1.00	
Satd. Flow (perm)			1130		1365		2515				2417	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	118	0	189	0	142	0	0	0	226	141
RTOR Reduction (vph)	0	0	86	0	0	0	0	0	0	0	104	0
Lane Group Flow (vph)	0	0	32	0	189	0	142	0	0	0	263	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm		Perm	Perm	NA	Perm	Prot			Prot	NA	
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8						4
Actuated Green, G (s)			12.7		12.7		6.7				12.4	
Effective Green, g (s)			12.7		12.7		6.7				12.4	
Actuated g/C Ratio			0.27		0.27		0.14				0.26	
Clearance Time (s)			5.5		5.5		5.0				5.2	
Vehicle Extension (s)			3.0		3.0		3.0				3.0	
Lane Grp Cap (vph)			302		364		354				630	
v/s Ratio Prot					c0.14		c0.06				c0.11	
v/s Ratio Perm			0.03									c0.01
v/c Ratio			0.10		0.52		0.40				0.42	
Uniform Delay, d1			13.1		14.8		18.6				14.6	
Progression Factor			1.00		1.00		1.00				1.00	
Incremental Delay, d2			0.2		1.3		0.7				0.4	
Delay (s)			13.3		16.1		19.3				15.0	
Level of Service			B		B		B				B	
Approach Delay (s)		13.3			16.1			19.3			15.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.7									
HCM 2000 Level of Service									B			
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			47.5			Sum of lost time (s)		15.7				
Intersection Capacity Utilization			57.4%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	98	88	3	4	387	10	5	6	1	11	2	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1252	1621	1674		1491	1360	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1252	1230	1674		1181	1360	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	110	99	3	4	435	11	6	7	1	12	2	53
RTOR Reduction (vph)	0	0	1	0	0	6	0	1	0	0	43	0
Lane Group Flow (vph)	110	99	2	4	435	5	6	7	0	12	12	0
Confl. Peds. (#/hr)	50					50				50		50
Confl. Bikes (#/hr)						10						10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8					4
Actuated Green, G (s)	11.7	48.1	48.1	2.5	38.9	38.9	15.0	15.0		15.0	15.0	
Effective Green, g (s)	11.7	48.1	48.1	2.5	38.9	38.9	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.15	0.60	0.60	0.03	0.48	0.48	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	235	1018	865	50	823	604	228	311		219	253	
v/s Ratio Prot	c0.07	0.06		0.00	c0.26			0.00				0.01
v/s Ratio Perm			0.00			0.00	0.00					c0.01
v/c Ratio	0.47	0.10	0.00	0.08	0.53	0.01	0.03	0.02		0.05	0.05	
Uniform Delay, d1	31.6	7.0	6.6	37.9	14.5	10.8	26.8	26.8		27.0	26.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.2	0.0	0.7	0.6	0.0	0.0	0.0		0.1	0.1	
Delay (s)	33.1	7.1	6.6	38.6	15.1	10.8	26.9	26.8		27.1	27.0	
Level of Service	C	A	A	D	B	B	C	C		C	C	
Approach Delay (s)		20.6			15.2			26.9			27.0	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay					18.0							
HCM 2000 Level of Service									B			
HCM 2000 Volume to Capacity ratio					0.41							
Actuated Cycle Length (s)					80.6					15.0		
Intersection Capacity Utilization					73.3%					D		
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	23	141	6	11	414	13	19	97	14	32	455	101
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1047	1540	3021			3069	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.30	1.00			0.93	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1047	485	3021			2848	1072
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	28	172	7	13	505	16	23	118	17	39	555	123
RTOR Reduction (vph)	0	0	3	0	0	8	0	11	0	0	0	86
Lane Group Flow (vph)	28	172	4	13	505	8	23	124	0	0	594	37
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	2.1	49.2	49.2	0.8	46.9	46.9	28.2	28.2			27.2	27.2
Effective Green, g (s)	2.1	49.2	49.2	0.8	46.9	46.9	28.2	28.2			27.2	27.2
Actuated g/C Ratio	0.02	0.54	0.54	0.01	0.51	0.51	0.31	0.31			0.30	0.30
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	27	655	743	13	624	538	149	934			849	319
v/s Ratio Prot	c0.02	0.14		0.01	c0.42			0.04				
v/s Ratio Perm			0.00			0.01	0.05				c0.21	0.03
v/c Ratio	1.04	0.26	0.01	1.00	0.81	0.02	0.15	0.13			0.70	0.11
Uniform Delay, d1	44.6	11.3	9.7	45.2	18.4	10.8	22.9	22.7			28.4	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	184.9	0.2	0.0	249.6	7.6	0.0	0.5	0.1			2.5	0.2
Delay (s)	229.5	11.5	9.7	294.8	26.1	10.9	23.3	22.8			30.9	23.4
Level of Service	F	B	A	F	C	B	C	C			C	C
Approach Delay (s)		40.9			32.2			22.8			29.6	
Approach LOS		D			C			C			C	

Intersection Summary

HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	121	56	14	296	224	15	99	12	37	23	6
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.93	1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1332	901		1331	1126	886	1070	957	916	1070	1080	
Fit Permitted	0.24	1.00		0.60	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	331	901		834	1126	886	1070	957	916	1070	1080	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	24	146	67	17	357	270	18	119	14	45	28	7
RTOR Reduction (vph)	0	17	0	0	0	124	0	0	11	0	5	0
Lane Group Flow (vph)	24	196	0	17	357	146	18	119	3	45	30	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)		10	10					10				
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	30.9	30.9		31.3	31.3	42.8	3.0	15.5	15.5	11.5	24.0	
Effective Green, g (s)	30.9	30.9		31.3	31.3	42.8	3.0	15.5	15.5	11.5	24.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39	0.54	0.04	0.20	0.20	0.14	0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	142	350		338	443	533	40	186	178	154	326	
v/s Ratio Prot	0.00	c0.22		0.00	c0.32	c0.04	0.02	c0.12		0.04	0.03	
v/s Ratio Perm	0.06			0.02		0.12			0.00			
v/c Ratio	0.17	0.56		0.05	0.81	0.27	0.45	0.64	0.02	0.29	0.09	
Uniform Delay, d1	16.7	18.9		14.9	21.4	9.9	37.4	29.4	25.8	30.3	19.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	1.9		0.1	10.3	0.3	7.9	7.0	0.0	1.1	0.1	
Delay (s)	17.3	20.9		14.9	31.6	10.2	45.2	36.4	25.8	31.4	20.0	
Level of Service	B	C		B	C	B	D	D	C	C	C	
Approach Delay (s)		20.5			22.2			36.5			26.4	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop			Stop	Stop		Stop	
Volume (vph)	77	25	19	341	47	1	5	17	9	0	11	284
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	99	32	24	437	60	1	6	22	12	0	14	364
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	155	437	62	28	12	378						
Volume Left (vph)	99	437	0	6	0	0						
Volume Right (vph)	24	0	1	0	12	364						
Hadj (s)	0.07	0.53	0.02	0.15	-0.67	-0.54						
Departure Headway (s)	6.8	6.7	6.2	7.6	6.7	6.0						
Degree Utilization, x	0.30	0.81	0.11	0.06	0.02	0.64						
Capacity (veh/h)	488	530	569	428	472	570						
Control Delay (s)	12.7	31.0	8.7	9.8	8.7	19.0						
Approach Delay (s)	12.7	28.2		9.5		19.0						
Approach LOS	B	D		A		C						

Intersection Summary						
Delay			22.0			
Level of Service			C			
Intersection Capacity Utilization		51.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕		↕	↕	
Volume (vph)	35	80	25	23	299	14	82	72		34	133	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1680	3272		1679	3391		1260	2485		1260	2301	
Flt Permitted	0.49	1.00		0.67	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	866	3272		1188	3391		1260	2485		1260	2301	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	42	96	30	28	360	17	99	87	7	41	160	148
RTOR Reduction (vph)	0	20	0	0	4	0	0	4	0	0	96	0
Lane Group Flow (vph)	42	106	0	28	373	0	99	90	0	41	212	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		12.9	35.9		8.9	31.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		12.9	35.9		8.9	31.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.14	0.40		0.10	0.35	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	285	1079		392	1119		180	991		124	815	
v/s Ratio Prot		0.03			c0.11		c0.08	0.04		0.03	c0.09	
v/s Ratio Perm	0.05			0.02								
v/c Ratio	0.15	0.10		0.07	0.33		0.55	0.09		0.33	0.26	
Uniform Delay, d1	21.2	20.9		20.7	22.7		35.9	16.9		37.8	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		0.1	0.2		3.6	0.2		1.6	0.2	
Delay (s)	21.5	20.9		20.8	22.9		39.5	17.1		39.3	20.8	
Level of Service	C	C		C	C		D	B		D	C	
Approach Delay (s)		21.1			22.7			28.5			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



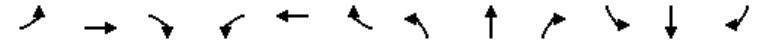
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	6	143	11	3	589	3	13	0	4	6	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3384		1711	3419			1681		1711	1531	
Flt Permitted	0.41	1.00		0.65	1.00			0.80		0.75	1.00	
Satd. Flow (perm)	734	3384		1164	3419			1403		1343	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	155	12	3	640	3	14	0	4	7	0	11
RTOR Reduction (vph)	0	7	0	0	1	0	0	13	0	0	8	0
Lane Group Flow (vph)	7	160	0	3	642	0	0	5	0	7	3	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.7	12.7		12.7	12.7			7.8		7.8	7.8	
Effective Green, g (s)	12.7	12.7		12.7	12.7			7.8		7.8	7.8	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.26		0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	305	1409		484	1423			358		343	391	
v/s Ratio Prot		0.05			c0.19						0.00	
v/s Ratio Perm	0.01			0.00				0.00		c0.01		
v/c Ratio	0.02	0.11		0.01	0.45			0.01		0.02	0.01	
Uniform Delay, d1	5.2	5.5		5.2	6.4			8.5		8.5	8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.0	0.2			0.0		0.0	0.0	
Delay (s)	5.3	5.5		5.2	6.6			8.5		8.5	8.5	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		5.5			6.6			8.5			8.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



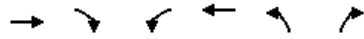
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Volume (vph)	12	75	0	0	530	14	65	31	121	0	0	502
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.88				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3398			5112		1711	3012				2694
Flt Permitted		0.89			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3061			5112		1711	3012				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	14	87	0	0	616	16	76	36	141	0	0	584
RTOR Reduction (vph)	0	0	0	0	4	0	0	83	0	0	0	553
Lane Group Flow (vph)	0	101	0	0	628	0	76	94	0	0	0	31
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1447			1782		697	1228				141
v/s Ratio Prot		0.00			c0.12		c0.04	0.03				c0.01
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.35		0.11	0.08				0.22
Uniform Delay, d1		11.2			18.4		13.9	13.7				34.5
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.5		0.3	0.1				3.5
Delay (s)		11.2			18.9		14.3	13.9				38.0
Level of Service		B			B		B	B				D
Approach Delay (s)		11.2			18.9			14.0				38.0
Approach LOS		B			B			B				D

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	87	144	912	184	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.96	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1629	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1629	1426	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	104	171	1086	219	0	0
RTOR Reduction (vph)	9	9	0	0	0	0
Lane Group Flow (vph)	136	121	1086	219	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	24.8	24.8	25.2	60.0		
Effective Green, g (s)	24.8	24.8	25.2	60.0		
Actuated g/C Ratio	0.41	0.41	0.42	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	673	589	1393	1801		
v/s Ratio Prot	0.08		c0.33	0.12		
v/s Ratio Perm		c0.08				
v/c Ratio	0.20	0.20	0.78	0.12		
Uniform Delay, d1	11.3	11.3	15.0	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.2	2.8	0.0		
Delay (s)	11.4	11.5	17.8	0.0		
Level of Service	B	B	B	A		
Approach Delay (s)	11.4			14.9	0.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	39	69	111	4	66	3	120	113	2	5	197	82
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1183	1960		1152	1267		1215	2422		1215	2268	
Fit Permitted	0.44	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	550	1960		759	1267		1215	2422		1215	2268	
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)	43	77	123	4	73	3	133	126	2	6	219	91
RTOR Reduction (vph)	0	83	0	0	2	0	0	1	0	0	38	0
Lane Group Flow (vph)	43	117	0	4	74	0	133	127	0	6	272	0
Confl. Peds. (#/hr)			100	100		100			100			100
Confl. Bikes (#/hr)			10	100		10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.5	22.5		11.1	11.1		10.8	26.0		4.0	19.2	
Effective Green, g (s)	22.5	22.5		11.1	11.1		10.8	26.0		4.0	19.2	
Actuated g/C Ratio	0.33	0.33		0.16	0.16		0.16	0.38		0.06	0.28	
Clearance Time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	640		122	204		190	915		70	632	
v/s Ratio Prot	0.01	c0.06			c0.06		c0.11	0.05		0.00	c0.12	
v/s Ratio Perm	0.05			0.01								
v/c Ratio	0.19	0.18		0.03	0.36		0.70	0.14		0.09	0.43	
Uniform Delay, d1	16.5	16.6		24.3	25.7		27.5	14.1		30.7	20.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	1.1		10.7	0.1		0.5	0.5	
Delay (s)	16.9	16.7		24.4	26.8		38.2	14.1		31.2	20.8	
Level of Service	B	B		C	C		D	B		C	C	
Approach Delay (s)		16.7			26.7		26.4				21.0	
Approach LOS		B			C		C				C	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WITH SF GIANTS GAME AT AT&T PARK
WEEKDAY LATE EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔	↕↔			↔↔↔	↕			
Volume (vph)	425	146	8	40	439	109	107	776	373	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.97			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (prot)	4480	3037		2987	2920			5485	1239			
Fit Permitted	0.95	1.00		0.95	1.00			0.99	1.00			
Satd. Flow (perm)	4480	3037		2987	2920			5485	1239			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	512	176	10	48	529	131	129	935	449	0	0	0
RTOR Reduction (vph)	0	3	0	0	11	0	0	0	303	0	0	0
Lane Group Flow (vph)	512	183	0	48	649	0	0	1064	146	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	24.3	49.3		6.1	31.1			35.7	35.7			
Effective Green, g (s)	24.3	49.3		6.1	31.1			35.7	35.7			
Actuated g/C Ratio	0.22	0.45		0.06	0.28			0.32	0.32			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	989	1361		165	825			1780	402			
v/s Ratio Prot	c0.11	0.06		0.02	c0.22							
v/s Ratio Perm								0.19	0.12			
v/c Ratio	0.52	0.13		0.29	0.79			0.60	0.36			
Uniform Delay, d1	37.7	17.8		49.9	36.4			31.1	28.4			
Progression Factor	1.00	1.00		0.96	0.40			1.46	5.78			
Incremental Delay, d2	0.5	0.2		0.3	1.6			0.5	0.5			
Delay (s)	38.2	18.0		48.2	16.2			46.1	164.8			
Level of Service	D	B		D	B			D	F			
Approach Delay (s)		32.8			18.3			81.3			0.0	
Approach LOS		C			B			F			A	

Intersection Summary

HCM 2000 Control Delay	54.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/22/2015



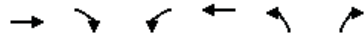
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔↔		↔	↕↔			↕	↕	↕	↕↔	↕
Volume (vph)	87	489	41	56	473	17	34	102	47	43	197	436
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.62	1.00	0.72	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.94	1.00	0.72	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.92	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4239		1296	2523			1508	842	1101	1943	562
Fit Permitted	0.95	1.00		0.95	1.00			0.55	1.00	0.60	1.00	1.00
Satd. Flow (perm)	1540	4239		1296	2523			837	842	694	1943	562
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	104	582	49	67	563	20	40	121	56	51	235	519
RTOR Reduction (vph)	0	6	0	0	2	0	0	0	44	0	200	199
Lane Group Flow (vph)	104	625	0	67	581	0	0	161	12	51	295	60
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	12.5	63.5		9.9	59.3			26.7	26.7	27.7	27.7	27.7
Effective Green, g (s)	12.5	63.5		9.9	59.3			26.7	26.7	27.7	27.7	27.7
Actuated g/C Ratio	0.10	0.53		0.08	0.49			0.22	0.22	0.23	0.23	0.23
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	160	2243		106	1246			186	187	160	448	129
v/s Ratio Prot	c0.07	0.15		c0.05	c0.23							0.15
v/s Ratio Perm								c0.19	0.01	0.07		0.11
v/c Ratio	0.65	0.28		0.63	0.47			0.87	0.07	0.32	0.66	0.46
Uniform Delay, d1	51.6	15.6		53.3	20.0			44.9	36.8	38.3	41.9	39.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.3		11.7	0.3			31.7	0.2	1.2	3.5	2.6
Delay (s)	60.7	15.9		65.0	20.2			76.6	37.0	39.5	45.3	42.4
Level of Service	E	B		E	C			E	D	D	D	D
Approach Delay (s)		22.3			24.8			66.4			44.0	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

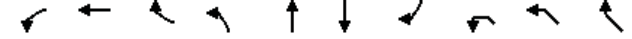
4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	597	80	2	941	99	20
Ideal Flow (vphpl)	1400	1400	1000	1000	1400	1400
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2224			1620	1134	1000
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2224			1547	1134	1000
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	711	95	2	1120	118	24
RTOR Reduction (vph)	6	0	0	0	0	20
Lane Group Flow (vph)	800	0	0	1122	118	4
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	81.8			81.8	16.9	16.9
Effective Green, g (s)	81.8			81.8	16.9	16.9
Actuated g/C Ratio	0.74			0.74	0.15	0.15
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1653			1150	174	153
v/s Ratio Prot	0.36				c0.10	
v/s Ratio Perm				c0.73		0.00
v/c Ratio	0.48			0.98	0.68	0.02
Uniform Delay, d1	5.6			13.2	44.0	39.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			20.7	10.0	0.1
Delay (s)	6.7			33.8	54.0	39.6
Level of Service	A			C	D	D
Approach Delay (s)	6.7			33.8	51.6	
Approach LOS	A			C	D	
Intersection Summary						
HCM 2000 Control Delay			24.5		HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio			0.92			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			77.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	19	302	53	13	179	395	159	98	235	116
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.98			1.00	0.97			0.99	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			0.99	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5745			2872	2470			4071	1122
Fit Permitted		1.00			0.90	1.00			0.95	1.00
Satd. Flow (perm)		5745			2600	2470			4071	1122
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	355	62	15	211	465	187	115	276	136
RTOR Reduction (vph)	0	40	0	0	0	50	0	0	0	0
Lane Group Flow (vph)	0	399	0	0	226	602	0	0	406	121
Confl. Peds. (#/hr)		50		100	100		100	50	100	100
Confl. Bikes (#/hr)				10			10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		20.8			22.4	22.4			14.3	14.3
Effective Green, g (s)		22.8			25.4	25.4			17.3	17.3
Actuated g/C Ratio		0.30			0.34	0.34			0.23	0.23
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1746			880	836			939	258
v/s Ratio Prot						c0.24			0.10	c0.11
v/s Ratio Perm		0.07			0.09					
v/c Ratio		0.23			0.26	0.72			0.43	0.47
Uniform Delay, d1		19.5			18.0	21.7			24.7	24.9
Progression Factor		1.00			0.72	1.00			1.00	1.00
Incremental Delay, d2		0.1			0.1	3.1			0.3	1.3
Delay (s)		19.6			12.9	24.8			25.0	26.2
Level of Service		B			B	C			C	C
Approach Delay (s)		19.6			12.9	24.8			25.3	
Approach LOS		B			B	C			C	
Intersection Summary										
HCM 2000 Control Delay					22.2				HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio					0.51					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					56.5%				ICU Level of Service	B
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015

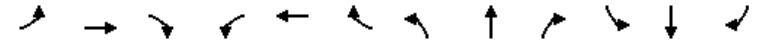


Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↕		↔		↔	↕↕
Volume (vph)	37	831	196	35	155	125	25	166	48	298
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.87		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	0.97		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1214	1864		2249		1161		1327	2543
Fit Permitted		0.95	0.97		1.00		1.00		0.47	0.91
Satd. Flow (perm)		1214	1864		2249		1161		658	2328
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	39	875	206	37	163	132	26	175	51	314
RTOR Reduction (vph)	0	0	9	0	1	0	18	0	0	0
Lane Group Flow (vph)	0	608	540	0	297	0	5	0	180	360
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		299	521		524		247		396	1044
v/s Ratio Prot		c0.50	0.29		c0.13				c0.08	0.06
v/s Ratio Perm							0.00		0.12	0.09
v/c Ratio		2.03	1.72dl		0.57		0.02		0.45	0.34
Uniform Delay, d1		28.2	27.0		25.4		23.3		18.1	14.2
Progression Factor		1.00	1.00		1.00		1.00		0.74	0.74
Incremental Delay, d2		476.6	49.0		4.4		0.1		2.9	0.7
Delay (s)		504.9	76.0		29.8		23.5		16.4	11.2
Level of Service		F	E		C		C		B	B
Approach Delay (s)			301.4		29.4				12.9	
Approach LOS			F		C				B	
Intersection Summary										
HCM 2000 Control Delay			180.9							F
HCM 2000 Volume to Capacity ratio			0.87							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)				13.5	
Intersection Capacity Utilization			83.4%		ICU Level of Service				E	
Analysis Period (min)			15							

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↕		↔	↕↕		↔	↕↕	
Volume (vph)	335	1	76	181	19	319	10	531	4	4	437	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1534	1354		2698		1377	2748		1540	3041	
Fit Permitted		0.33	1.00		0.65		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		535	1354		1776		1377	2748		1540	3041	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	409	1	93	221	23	389	12	648	5	5	533	38
RTOR Reduction (vph)	0	0	44	0	183	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	410	49	0	450	0	12	652	0	5	566	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		49.6	49.6		49.6		1.2	27.0		1.0	27.1	
Effective Green, g (s)		49.6	49.6		49.6		1.2	27.0		1.0	27.1	
Actuated g/C Ratio		0.53	0.53		0.53		0.01	0.29		0.01	0.29	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		283	718		942		17	793		16	881	
v/s Ratio Prot							0.01	c0.24		0.00	c0.19	
v/s Ratio Perm		c0.77	0.04		0.25							
v/c Ratio		1.45	0.07		0.48		0.71	0.82		0.31	0.64	
Uniform Delay, d1		21.9	10.7		13.8		46.0	31.0		45.9	29.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		220.7	0.0		0.4		72.3	6.9		4.0	1.6	
Delay (s)		242.7	10.7		14.2		118.3	37.9		49.9	30.6	
Level of Service		F	B		B		F	D		D	C	
Approach Delay (s)		199.8			14.2			39.4			30.8	
Approach LOS		F			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			64.5				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			93.5		Sum of lost time (s)				15.9			
Intersection Capacity Utilization			73.4%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	17	282	20	5	11	44	4	28	64	65	71	23
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	0.97		1.00	0.94	
Flpb, ped/bikes		1.00			1.00	1.00	0.82	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.90		1.00	0.96	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2566			1428	1202	1127	1254		1377	1316	
Fit Permitted		0.94			0.86	1.00	0.68	1.00		0.95	1.00	
Satd. Flow (perm)		2422			1251	1202	807	1254		1377	1316	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	22	357	25	6	14	56	5	35	81	82	90	29
RTOR Reduction (vph)	0	6	0	0	0	28	0	69	0	0	16	0
Lane Group Flow (vph)	0	398	0	0	20	28	5	47	0	82	103	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		12.9			12.9	21.2	6.1	6.1		8.3	19.4	
Effective Green, g (s)		12.9			12.9	21.2	6.1	6.1		8.3	19.4	
Actuated g/C Ratio		0.30			0.30	0.50	0.14	0.14		0.20	0.46	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		738			381	744	116	180		270	603	
v/s Ratio Prot						0.01		c0.04		c0.06	0.08	
v/s Ratio Perm		c0.16			0.02	0.02	0.01					
v/c Ratio		0.54			0.05	0.04	0.04	0.26		0.30	0.17	
Uniform Delay, d1		12.2			10.4	5.4	15.6	16.1		14.5	6.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.1	0.0	0.2	0.8		0.2	0.1	
Delay (s)		13.0			10.4	5.4	15.7	16.9		14.8	6.9	
Level of Service		B			B	A	B	B		B	A	
Approach Delay (s)		13.0			6.7			16.8			10.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	15	907	759	12	64	111
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1746	1535	842	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1746	1535	842	1134	1194
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	18	1080	904	14	76	132
RTOR Reduction (vph)	0	378	0	3	0	0
Lane Group Flow (vph)	18	702	904	11	76	132
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	47.3	47.3	47.2	42.2	11.6	63.8
Effective Green, g (s)	47.3	47.3	47.2	42.2	11.6	63.8
Actuated g/C Ratio	0.39	0.39	0.39	0.35	0.10	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	442	681	598	328	108	629
v/s Ratio Prot	0.02		c0.59	0.01	c0.07	0.11
v/s Ratio Perm		c0.40		0.01		
v/c Ratio	0.04	1.03	1.51	0.03	0.70	0.21
Uniform Delay, d1	22.9	36.9	36.9	26.0	53.1	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	42.7	238.8	0.0	18.7	0.2
Delay (s)	22.9	79.6	275.8	26.1	71.8	15.4
Level of Service	C	E	F	C	E	B
Approach Delay (s)	78.7		272.0			36.0
Approach LOS	E		F			D

Intersection Summary			
HCM 2000 Control Delay	154.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	121.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑↔	
Volume (vph)	332	293	4	21	432	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.94		1.00	1.00	0.98	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1585		1682	1531	3077	
Flt Permitted	0.97		0.23	1.00	1.00	
Satd. Flow (perm)	1585		404	1531	3077	
Peak-hour factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Adj. Flow (vph)	496	437	6	31	645	85
RTOR Reduction (vph)	31	0	0	0	13	0
Lane Group Flow (vph)	902	0	6	31	717	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	45.2		25.6	25.6	25.6	
Effective Green, g (s)	45.2		25.6	25.6	25.6	
Actuated g/C Ratio	0.56		0.32	0.32	0.32	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	886		128	485	974	
v/s Ratio Prot	c0.57			0.02	c0.23	
v/s Ratio Perm			0.01			
v/c Ratio	1.02		0.05	0.06	0.74	
Uniform Delay, d1	17.8		19.1	19.2	24.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	34.9		0.2	0.1	2.9	
Delay (s)	52.7		19.3	19.3	27.5	
Level of Service	D		B	B	C	
Approach Delay (s)	52.7			19.3	27.5	
Approach LOS	D			B	C	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑↔		↔	↑↔
Volume (vph)	0	0	0	0	0	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.9
Lane Util. Factor						0.95
Frbp, ped/bikes						1.00
Flpb, ped/bikes						1.00
Frt						1.00
Flt Protected						1.00
Satd. Flow (prot)						3421
Flt Permitted						1.00
Satd. Flow (perm)						3421
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	0	0	511
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	511
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm			Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)						120.0
Effective Green, g (s)						120.0
Actuated g/C Ratio						1.00
Clearance Time (s)						4.9
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)						3421
v/s Ratio Prot						c0.15
v/s Ratio Perm						
v/c Ratio						0.15
Uniform Delay, d1						0.0
Progression Factor						1.00
Incremental Delay, d2						0.1
Delay (s)						0.1
Level of Service						A
Approach Delay (s)	0.0		0.0			0.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	0.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015

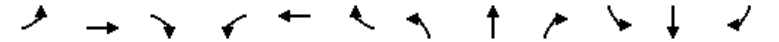


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↕↕	↕↕	
Volume (vph)	0	15	0	25	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	
Lane Util. Factor		1.00		0.95	0.95	
Frbp, ped/bikes		0.97		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Fit Protected		1.00		1.00	1.00	
Satd. Flow (prot)		1338		2887	2887	
Fit Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		1338		2887	2887	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	18	0	29	853	0
RTOR Reduction (vph)	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	29	853	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)		0.7		19.7	19.7	
Effective Green, g (s)		0.7		19.7	19.7	
Actuated g/C Ratio		0.01		0.35	0.35	
Clearance Time (s)		5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0	
Lane Grp Cap (vph)		16		1022	1022	
v/s Ratio Prot				0.01	0.30	
v/s Ratio Perm		c0.00				
v/c Ratio		0.01		0.03	0.83	
Uniform Delay, d1		27.1		11.7	16.5	
Progression Factor		1.00		1.00	1.00	
Incremental Delay, d2		0.4		0.0	6.0	
Delay (s)		27.5		11.7	22.4	
Level of Service		C		B	C	
Approach Delay (s)	27.5			11.7	22.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↕↕			↕↕	↕↕
Sign Control		Stop			Stop			Stop			Stop	Stop
Volume (vph)	0	0	0	0	0	0	33	74	0	0	301	142
Peak Hour Factor	0.92	0.83	0.83	0.83	0.83	0.92	0.83	0.92	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	40	80	0	0	327	154
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	0	0	0	0	120	327	154					
Volume Left (vph)	0	0	0	0	40	0	0					
Volume Right (vph)	0	0	0	0	0	0	154					
Hadj (s)	0.00	0.00	0.00	0.00	0.10	0.03	-0.67					
Departure Headway (s)	5.8	5.8	5.8	5.8	5.0	4.6	3.9					
Degree Utilization, x	0.00	0.00	0.00	0.00	0.17	0.42	0.17					
Capacity (veh/h)	577	577	577	577	705	768	905					
Control Delay (s)	7.6	7.6	7.6	7.6	9.0	9.7	6.5					
Approach Delay (s)	0.0	0.0	0.0	0.0	9.0	8.7						
Approach LOS	A		A		A	A						

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	0	0	120	0	175	0	149	0	0	0	304	141
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			5.5		5.5		5.0				5.2	
Lane Util. Factor			1.00		1.00		0.97				0.95	
Frbp, ped/bikes			0.96		1.00		1.00				0.99	
Flpb, ped/bikes			1.00		1.00		1.00				1.00	
Frt			0.85		1.00		1.00				0.95	
Fit Protected			1.00		1.00		0.95				1.00	
Satd. Flow (prot)			1118		1365		2515				2452	
Fit Permitted			1.00		1.00		0.95				1.00	
Satd. Flow (perm)			1118		1365		2515				2452	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	141	0	206	0	175	0	0	0	358	166
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	34	0
Lane Group Flow (vph)	0	0	27	0	206	0	175	0	0	0	490	0
Confl. Peds. (#/hr)	41		14	14		41		39			8	
Confl. Bikes (#/hr)			9			10		4			14	
Turn Type	Perm		Perm	Perm	NA	Perm	Prot			Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)			23.4		23.4		13.6				67.3	
Effective Green, g (s)			23.4		23.4		13.6				67.3	
Actuated g/C Ratio			0.19		0.19		0.11				0.56	
Clearance Time (s)			5.5		5.5		5.0				5.2	
Vehicle Extension (s)			3.0		3.0		3.0				3.0	
Lane Grp Cap (vph)			218		266		285				1375	
v/s Ratio Prot					c0.15		c0.07				c0.20	
v/s Ratio Perm			0.02									
v/c Ratio			0.13		0.77		0.61				0.36	
Uniform Delay, d1			39.9		45.8		50.7				14.5	
Progression Factor			1.00		1.00		1.00				1.00	
Incremental Delay, d2			0.3		13.1		3.9				0.2	
Delay (s)			40.1		58.9		54.6				14.6	
Level of Service			D		E		D				B	
Approach Delay (s)		40.1			58.9			54.6			14.6	
Approach LOS		D			E			D			B	
Intersection Summary												
HCM 2000 Control Delay			33.5									
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)		15.7					
Intersection Capacity Utilization			89.9%		ICU Level of Service		E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	102	94	2	3	447	14	4	6	1	25	2	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	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	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1621	1706	1450	1621	1706	1239	1621	1674	1481	1355	1621	1800
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.70	1.00	0.75	1.00	1.00	1.00
Satd. Flow (perm)	1621	1706	1450	1621	1706	1239	1198	1674	1173	1355	1621	1800
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	115	106	2	3	502	16	4	7	1	28	2	82
RTOR Reduction (vph)	0	0	1	0	0	9	0	1	0	0	61	0
Lane Group Flow (vph)	115	106	1	3	502	7	4	7	0	28	23	0
Confl. Peds. (#/hr)	50					50				50		50
Confl. Bikes (#/hr)						10				10		10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.4	47.4	2.7	39.2	39.2	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.4	47.4	2.7	39.2	39.2	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.13	0.54	0.54	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	929	790	50	768	558	301	421		295	341	
v/s Ratio Prot	c0.07	0.06		0.00	c0.29			0.00			0.02	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.57	0.11	0.00	0.06	0.65	0.01	0.01	0.02		0.09	0.07	
Uniform Delay, d1	35.8	9.6	9.0	40.9	18.6	13.2	24.4	24.5		25.0	24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	0.2	0.0	0.5	2.0	0.0	0.0	0.0		0.1	0.1	
Delay (s)	39.4	9.9	9.0	41.4	20.6	13.2	24.5	24.5		25.1	24.9	
Level of Service	D	A	A	D	C	B	C	C		C	C	
Approach Delay (s)		25.1			20.5			24.5			24.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.3									
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			87.0		Sum of lost time (s)		15.0					
Intersection Capacity Utilization			74.8%		ICU Level of Service		D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	12	147	6	11	504	8	29	193	14	35	339	141
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1049	1540	3048			3065	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.37	1.00			0.89	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1049	595	3048			2752	1072
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	15	179	7	13	615	10	35	235	17	43	413	172
RTOR Reduction (vph)	0	0	3	0	0	4	0	6	0	0	0	132
Lane Group Flow (vph)	15	179	4	13	615	6	35	246	0	0	456	40
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.7	53.4	53.4	0.8	52.5	52.5	22.0	22.0			21.0	21.0
Effective Green, g (s)	0.7	53.4	53.4	0.8	52.5	52.5	22.0	22.0			21.0	21.0
Actuated g/C Ratio	0.01	0.60	0.60	0.01	0.59	0.59	0.25	0.25			0.24	0.24
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	9	727	824	13	715	617	146	751			647	252
v/s Ratio Prot	c0.01	0.15		0.01	c0.51			0.08			c0.17	0.04
v/s Ratio Perm			0.00			0.01	0.06					
v/c Ratio	1.67	0.25	0.01	1.00	0.86	0.01	0.24	0.33			0.70	0.16
Uniform Delay, d1	44.2	8.4	7.2	44.2	15.3	7.6	26.9	27.5			31.3	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	565.3	0.2	0.0	249.6	10.3	0.0	0.9	0.3			3.5	0.3
Delay (s)	609.6	8.6	7.2	293.8	25.6	7.6	27.8	27.8			34.8	27.4
Level of Service	F	A	A	F	C	A	C	C			C	C
Approach Delay (s)		53.4			30.8			27.8			32.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	15	118	59	25	334	315	19	123	9	38	51	13
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1334	897		1330	1126	875	1070	957	921	1070	1078	
Fit Permitted	0.16	1.00		0.60	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	218	897		833	1126	875	1070	957	921	1070	1078	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	18	142	71	30	402	380	23	148	11	46	61	16
RTOR Reduction (vph)	0	19	0	0	0	188	0	0	8	0	8	0
Lane Group Flow (vph)	18	194	0	30	402	192	23	148	3	46	69	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	31.4	31.4		34.5	34.5	44.0	5.5	22.0	22.0	9.5	26.0	
Effective Green, g (s)	31.4	31.4		34.5	34.5	44.0	5.5	22.0	22.0	9.5	26.0	
Actuated g/C Ratio	0.36	0.36		0.40	0.40	0.50	0.06	0.25	0.25	0.11	0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	323		354	445	491	67	241	232	116	321	
v/s Ratio Prot	0.00	c0.22		0.00	c0.36	c0.04	0.02	c0.15		0.04	0.06	
v/s Ratio Perm	0.07			0.03		0.18			0.00			
v/c Ratio	0.19	0.60		0.08	0.90	0.39	0.34	0.61	0.01	0.40	0.21	
Uniform Delay, d1	20.6	22.8		16.5	24.8	13.3	39.1	28.8	24.4	36.2	22.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	3.1		0.1	21.3	0.5	3.1	4.6	0.0	2.2	0.3	
Delay (s)	21.6	25.9		16.6	46.1	13.8	42.2	33.4	24.5	38.4	23.3	
Level of Service	C	C		B	D	B	D	C	C	D	C	
Approach Delay (s)		25.6			29.9			34.0			28.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop	Stop		Stop	
Volume (vph)	76	36	10	602	154	12	5	17	13	2	10	307
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	97	46	13	772	197	15	6	22	17	3	13	394

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	156	772	213	28	17	409
Volume Left (vph)	97	772	0	6	0	3
Volume Right (vph)	13	0	15	0	17	394
Hadj (s)	0.11	0.53	-0.02	0.15	-0.67	-0.54
Departure Headway (s)	7.2	6.9	6.3	8.0	7.2	6.3
Degree Utilization, x	0.31	1.0	0.37	0.06	0.03	0.72
Capacity (veh/h)	475	530	562	418	461	560
Control Delay (s)	13.5	242.8	11.9	10.4	9.3	23.7
Approach Delay (s)	13.5	192.9		10.0		23.7
Approach LOS	B	F		A		C

Intersection Summary						
Delay		126.7				
Level of Service		F				
Intersection Capacity Utilization		75.8%		ICU Level of Service		D
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	37	78	23	31	428	1900	100	105	1400	34	134	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3275		1676	3411		1260	2482		1260	2221	
Flt Permitted	0.34	1.00		0.67	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	609	3275		1190	3411		1260	2482		1260	2221	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	45	94	28	37	516	8	120	127	11	41	161	307
RTOR Reduction (vph)	0	20	0	0	1	0	0	7	0	0	130	0
Lane Group Flow (vph)	45	102	0	37	523	0	120	131	0	41	338	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	180	972		353	1013		212	990		187	841	
v/s Ratio Prot		0.03			c0.15		c0.10	0.05		0.03	c0.15	
v/s Ratio Perm	0.07			0.03								
v/c Ratio	0.25	0.11		0.10	0.52		0.57	0.13		0.22	0.40	
Uniform Delay, d1	26.7	25.5		25.5	29.2		38.2	19.1		37.4	22.7	
Progression Factor	1.00	1.00		1.00	1.00		0.84	0.76		1.00	1.00	
Incremental Delay, d2	3.3	0.2		0.6	1.9		6.9	0.2		2.7	1.4	
Delay (s)	30.0	25.7		26.1	31.1		38.8	14.7		40.1	24.2	
Level of Service	C	C		C	C		D	B		D	C	
Approach Delay (s)		26.9			30.7			25.9			25.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



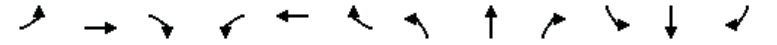
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	6	128	11	3	869	3	13	0	4	9	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3380		1711	3420			1681		1711	1531	
Flt Permitted	0.27	1.00		0.66	1.00			0.80		0.75	1.00	
Satd. Flow (perm)	487	3380		1182	3420			1399		1343	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	139	12	3	945	3	14	0	4	10	0	11
RTOR Reduction (vph)	0	6	0	0	0	0	0	14	0	0	9	0
Lane Group Flow (vph)	7	145	0	3	948	0	0	4	0	10	2	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1			7.9		7.9	7.9	
Effective Green, g (s)	18.1	18.1		18.1	18.1			7.9		7.9	7.9	
Actuated g/C Ratio	0.50	0.50		0.50	0.50			0.22		0.22	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	244	1699		594	1719			307		294	335	
v/s Ratio Prot		0.04			c0.28						0.00	
v/s Ratio Perm	0.01			0.00				0.00		c0.01		
v/c Ratio	0.03	0.09		0.01	0.55			0.01		0.03	0.01	
Uniform Delay, d1	4.5	4.6		4.5	6.2			11.0		11.0	11.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.0	0.4			0.0		0.0	0.0	
Delay (s)	4.6	4.7		4.5	6.5			11.0		11.1	11.0	
Level of Service	A	A		A	A			B		B	B	
Approach Delay (s)		4.7			6.5			11.0			11.0	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.39	A
Actuated Cycle Length (s)	36.0	Sum of lost time (s)
Intersection Capacity Utilization	40.1%	10.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



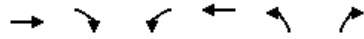
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	↔
Volume (vph)	12	43	0	0	809	14	70	31	126	0	0	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.88				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3384			5119		1711	3009				2694
Flt Permitted		0.85			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2917			5119		1711	3009				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	14	50	0	0	941	16	81	36	147	0	0	522
RTOR Reduction (vph)	0	0	0	0	3	0	0	87	0	0	0	495
Lane Group Flow (vph)	0	64	0	0	954	0	81	96	0	0	0	27
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1387			1784		697	1227				141
v/s Ratio Prot		0.00			c0.19		c0.05	0.03				c0.01
v/s Ratio Perm		0.02										
v/c Ratio		0.05			0.53		0.12	0.08				0.19
Uniform Delay, d1		11.0			19.8		14.0	13.8				34.5
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.2		0.3	0.1				3.1
Delay (s)		11.1			21.0		14.3	13.9				37.5
Level of Service		B			C		B	B				D
Approach Delay (s)		11.1			21.0			14.0				37.5
Approach LOS		B			C		B	B				D

Intersection Summary		
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.30	C
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	52.1%	14.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

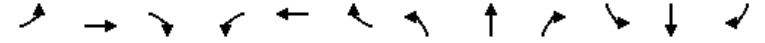
4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	55	196	1121	207	0	0
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	*0.85	*0.85	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.91	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1091	1007	2620	1422		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1091	1007	2620	1422		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	65	233	1335	246	0	0
RTOR Reduction (vph)	4	4	0	0	0	0
Lane Group Flow (vph)	150	140	1335	246	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	18.4	18.4	31.6	60.0		
Effective Green, g (s)	18.4	18.4	31.6	60.0		
Actuated g/C Ratio	0.31	0.31	0.53	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	334	308	1379	1422		
v/s Ratio Prot	0.14		c0.51	0.17		
v/s Ratio Perm		c0.14				
v/c Ratio	0.45	0.45	0.97	0.17		
Uniform Delay, d1	16.7	16.8	13.7	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.0	1.1	17.0	0.1		
Delay (s)	17.7	17.8	30.7	0.1		
Level of Service	B	B	C	A		
Approach Delay (s)	17.7			25.9	0.0	
Approach LOS	B			C	A	
Intersection Summary						
HCM 2000 Control Delay			24.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			60.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	24	42	85	6	191	1	105	87	5	0	178	276
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5			5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95			0.95	
Frbp, ped/bikes	1.00	0.91		1.00	1.00		1.00	0.99			0.92	
Flpb, ped/bikes	0.97	1.00		0.90	1.00		1.00	1.00			1.00	
Frt	1.00	0.90		1.00	1.00		1.00	0.99			0.91	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1183	1866		1096	1278		1215	2391			2039	
Fit Permitted	0.36	1.00		0.66	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	452	1866		764	1278		1215	2391			2039	
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)	27	47	94	7	212	1	117	97	6	0	198	307
RTOR Reduction (vph)	0	66	0	0	0	0	0	2	0	0	176	0
Lane Group Flow (vph)	27	75	0	7	213	0	117	101	0	0	329	0
Confl. Peds. (#/hr)			100	100			100			100		100
Confl. Bikes (#/hr)			10	100			10			10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.2	36.2		25.1	25.1		16.3	73.0			51.2	
Effective Green, g (s)	36.2	36.2		25.1	25.1		16.3	73.0			51.2	
Actuated g/C Ratio	0.30	0.30		0.21	0.21		0.14	0.61			0.43	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	171	562		159	267		165	1454			869	
v/s Ratio Prot	0.01	c0.04			c0.17		c0.10	0.04			c0.16	
v/s Ratio Perm	0.04			0.01								
v/c Ratio	0.16	0.13		0.04	0.80		0.71	0.07			0.38	
Uniform Delay, d1	30.6	30.5		37.9	45.0		49.6	9.6			23.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	0.1		0.1	15.2		13.1	0.1			1.3	
Delay (s)	31.1	30.6		38.0	60.2		62.6	9.7			24.8	
Level of Service	C	C		D	E		E	A			C	
Approach Delay (s)			30.7		59.5			37.9			24.8	
Approach LOS			C		E			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.1								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			120.0					21.6				
Intersection Capacity Utilization			76.5%								D	
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO SF GIANTS GAME AT AT&T PARK
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	422	569	78	43	497	162	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3017		2987	2982			5515	1233			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3017		2987	2982			5515	1233			
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)	708	744	64	469	632	87	48	552	180	0	0	0
RTOR Reduction (vph)	0	6	0	0	8	0	0	0	147	0	0	0
Lane Group Flow (vph)	708	802	0	469	711	0	0	600	33	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.5	41.4		29.5	45.4			20.2	20.2			
Effective Green, g (s)	25.5	41.4		29.5	45.4			20.2	20.2			
Actuated g/C Ratio	0.23	0.38		0.27	0.41			0.18	0.18			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1038	1135		801	1230			1012	226			
v/s Ratio Prot	0.16	c0.27		0.16	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.68	0.71		0.59	0.58			0.59	0.15			
Uniform Delay, d1	38.6	29.1		34.9	24.9			41.1	37.7			
Progression Factor	0.58	0.50		0.81	0.28			1.13	3.39			
Incremental Delay, d2	1.4	2.9		0.4	0.3			0.8	0.3			
Delay (s)	23.8	17.4		28.7	7.2			47.3	128.1			
Level of Service	C	B		C	A			D	F			
Approach Delay (s)		20.4			15.7			65.9			0.0	
Approach LOS		C			B			E			A	

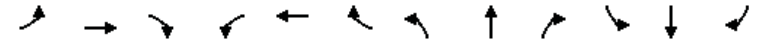
Intersection Summary

HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	555	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.99	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2436			1574	857	1033	2916	581
Fit Permitted	0.95	1.00		0.95	1.00			0.91	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2436			1449	857	781	2916	581
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	590	103
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	22	0	1	67
Lane Group Flow (vph)	162	1438	0	54	592	0	0	59	8	64	599	26
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	16.0	51.2		9.5	43.1			29.4	29.4	30.4	30.4	30.4
Effective Green, g (s)	16.0	51.2		9.5	43.1			29.4	29.4	30.4	30.4	30.4
Actuated g/C Ratio	0.15	0.47		0.09	0.39			0.27	0.27	0.28	0.28	0.28
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	224	1995		111	954			387	229	215	805	160
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						c0.21	
v/s Ratio Perm								0.04	0.01	0.08		0.04
v/c Ratio	0.72	0.72		0.49	0.62			0.15	0.04	0.30	0.74	0.16
Uniform Delay, d1	44.9	23.7		47.9	26.9			30.8	29.8	31.4	36.2	30.1
Progression Factor	0.92	1.24		0.85	0.69			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.6	1.8		2.8	1.1			0.2	0.1	0.8	3.7	0.5
Delay (s)	49.7	31.1		43.7	19.7			31.0	29.9	32.2	40.0	30.6
Level of Service	D	C		D	B			C	C	C	D	C
Approach Delay (s)		33.0			21.7			30.6			38.2	
Approach LOS		C			C			C			D	

Intersection Summary

HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.15	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			0.4	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			0.4	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			5.4		HCM 2000 Level of Service A	
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			69.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↖↖↖	↗
Volume (vph)	262	1267	145	34	172	356	188	403	981	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.95			1.00	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2844	2411			4102	1122
Fit Permitted		0.99			0.78	1.00			0.95	1.00
Satd. Flow (perm)		5749			2224	2411			4102	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	415	1011	270
RTOR Reduction (vph)	0	18	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1707	0	0	212	558	0	0	1453	243
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		24.0			21.5	21.5			27.0	27.0
Effective Green, g (s)		26.0			24.5	24.5			30.0	30.0
Actuated g/C Ratio		0.29			0.27	0.27			0.33	0.33
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1660			605	656			1367	374
v/s Ratio Prot						c0.23			c0.35	0.22
v/s Ratio Perm		0.30			0.10					
v/c Ratio		1.03			0.35	0.85			1.06	0.65
Uniform Delay, d1		32.0			26.3	31.0			30.0	25.5
Progression Factor		1.55			1.00	1.00			1.00	1.00
Incremental Delay, d2		25.9			0.4	10.3			43.0	3.9
Delay (s)		75.5			26.7	41.3			73.0	29.4
Level of Service		E			C	D			E	C
Approach Delay (s)		75.5			26.7	41.3			66.7	
Approach LOS		E			C	D			E	
Intersection Summary										
HCM 2000 Control Delay			64.9		HCM 2000 Level of Service E					
HCM 2000 Volume to Capacity ratio			1.02							
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				12.5	
Intersection Capacity Utilization			102.1%		ICU Level of Service				G	
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↕↔
Volume (vph)	51	317	276	49	155	105	14	231	55	735
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2620		2297		1161		1327	2558
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.95
Satd. Flow (perm)		1700	2620		2297		1161		621	2444
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	391	341	60	191	130	17	285	68	907
RTOR Reduction (vph)	0	0	19	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	337	499	0	322	0	3	0	346	914
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		419	733		535		247		386	1078
v/s Ratio Prot		c0.20	0.19		0.14				0.15	c0.14
v/s Ratio Perm							0.00		c0.24	0.23
v/c Ratio		0.80	0.68		0.60		0.01		0.90	0.85
Uniform Delay, d1		26.5	24.0		25.6		23.3		21.1	19.0
Progression Factor		1.00	1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2		15.1	5.1		5.0		0.1		25.9	8.3
Delay (s)		41.6	29.1		30.6		23.4		47.0	27.3
Level of Service		D	C		C		C		D	C
Approach Delay (s)			34.0		30.3					32.7
Approach LOS			C		C					C
Intersection Summary										
HCM 2000 Control Delay			32.8							
HCM 2000 Level of Service										C
HCM 2000 Volume to Capacity ratio			0.70							
Actuated Cycle Length (s)			75.0						13.5	
Intersection Capacity Utilization			65.4%							C
ICU Level of Service										
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔↔		↔	↕↔		↔	↕↔	
Volume (vph)	10	982	120	8	4	14	9	343	74	137	228	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.97		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	0.97		1.00	0.99	
Fit Protected		1.00	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1619	1353		1455		1272	2390		1540	3055	
Fit Permitted		1.00	1.00		0.62		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1618	1353		914		1272	2390		1540	3055	
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)	10	1012	124	8	4	14	9	354	76	141	235	10
RTOR Reduction (vph)	0	0	56	0	6	0	0	17	0	0	3	0
Lane Group Flow (vph)	0	1022	68	0	20	0	9	413	0	141	242	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		61.2	61.2		61.2		1.0	22.1		12.7	34.1	
Effective Green, g (s)		61.2	61.2		61.2		1.0	22.1		12.7	34.1	
Actuated g/C Ratio		0.55	0.55		0.55		0.01	0.20		0.11	0.30	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		884	739		499		11	472		174	930	
v/s Ratio Prot							0.01	c0.17		c0.09	0.08	
v/s Ratio Perm		c0.63	0.05		0.02							
v/c Ratio		1.16	0.09		0.04		0.82	0.88		0.81	0.26	
Uniform Delay, d1		25.4	12.1		11.7		55.4	43.6		48.4	29.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		83.0	0.1		0.0		162.4	16.4		22.9	0.1	
Delay (s)		108.4	12.1		11.8		217.7	60.0		71.3	29.5	
Level of Service		F	B		B		F	E		E	C	
Approach Delay (s)		97.9			11.8			63.2			44.8	
Approach LOS		F			B			E			D	
Intersection Summary												
HCM 2000 Control Delay			78.9									E
HCM 2000 Level of Service												
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			111.9					Sum of lost time (s)		15.9		
Intersection Capacity Utilization			98.9%					ICU Level of Service		F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	
Volume (vph)	7	828	7	2	5	16	5	29	1	282	166	13
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.96	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00	1.00	0.75	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	1.00		1.00	0.99	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2598			1432	1187	1037	1440		1377	1398	
Fit Permitted		0.95			0.90	1.00	0.93	1.00		0.95	1.00	
Satd. Flow (perm)		2479			1300	1187	1015	1440		1377	1398	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	8	952	8	2	6	18	6	33	1	324	191	15
RTOR Reduction (vph)	0	0	0	0	0	5	0	1	0	0	4	0
Lane Group Flow (vph)	0	968	0	0	8	13	6	33	0	324	202	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		33.2			33.2	45.6	4.3	4.3		12.4	21.7	
Effective Green, g (s)		33.2			33.2	45.6	4.3	4.3		12.4	21.7	
Actuated g/C Ratio		0.51			0.51	0.70	0.07	0.07		0.19	0.33	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		1268			665	925	67	95		263	467	
v/s Ratio Prot						0.00		0.02		c0.24	c0.14	
v/s Ratio Perm		c0.39			0.01	0.01	0.01					
v/c Ratio		0.76			0.01	0.01	0.09	0.35		1.23	0.43	
Uniform Delay, d1		12.7			7.8	2.9	28.5	29.0		26.3	16.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8			0.0	0.0	0.6	2.2		132.9	0.6	
Delay (s)		15.5			7.8	2.9	29.0	31.2		159.2	17.5	
Level of Service		B			A	A	C	C		F	B	
Approach Delay (s)		15.5			4.4			30.9			104.1	
Approach LOS		B			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	20	104	199	25	834	153
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.93	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1741	1535	809	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1741	1535	809	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	120	229	29	959	176
RTOR Reduction (vph)	0	110	0	24	0	0
Lane Group Flow (vph)	23	10	229	5	959	176
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	7.9	7.9	20.0	15.0	53.0	78.0
Effective Green, g (s)	7.9	7.9	20.0	15.0	53.0	78.0
Actuated g/C Ratio	0.08	0.08	0.21	0.16	0.55	0.81
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	93	143	320	168	626	971
v/s Ratio Prot	c0.02		c0.15	0.00	c0.85	0.15
v/s Ratio Perm		0.01		0.00		
v/c Ratio	0.25	0.07	0.72	0.03	1.53	0.18
Uniform Delay, d1	41.2	40.6	35.3	34.3	21.5	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.2	7.4	0.1	247.4	0.1
Delay (s)	42.6	40.8	42.7	34.4	268.8	2.0
Level of Service	D	D	D	C	F	A
Approach Delay (s)	41.1		41.8			227.5
Approach LOS	D		D			F

Intersection Summary			
HCM 2000 Control Delay	178.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	3	1	211	94	43	3
Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	0.97		0.98	1.00	1.00	
Frt	0.97		1.00	1.00	0.99	
Fit Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1591		1669	1531	3119	
Fit Permitted	0.96		0.72	1.00	1.00	
Satd. Flow (perm)	1591		1263	1531	3119	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	4	1	251	112	51	4
RTOR Reduction (vph)	1	0	0	0	1	0
Lane Group Flow (vph)	4	0	251	112	54	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	0.8		24.6	24.6	24.6	
Effective Green, g (s)	0.8		24.6	24.6	24.6	
Actuated g/C Ratio	0.02		0.69	0.69	0.69	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	35		877	1063	2167	
v/s Ratio Prot	c0.00			0.07	0.02	
v/s Ratio Perm			c0.20			
v/c Ratio	0.11		0.29	0.11	0.02	
Uniform Delay, d1	17.0		2.1	1.8	1.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.5		0.2	0.0	0.0	
Delay (s)	18.4		2.2	1.8	1.7	
Level of Service	B		A	A	A	
Approach Delay (s)	18.4			2.1	1.7	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	10	42	359	54	275	226
Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.94	0.98		1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1628	1437	3302		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1628	1437	3302		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	45	386	58	296	243
RTOR Reduction (vph)	0	42	11	0	0	0
Lane Group Flow (vph)	11	3	433	0	296	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	4.1	4.1	30.4		15.2	50.7
Effective Green, g (s)	4.1	4.1	30.4		15.2	50.7
Actuated g/C Ratio	0.06	0.06	0.47		0.23	0.78
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	102	90	1544		400	2668
v/s Ratio Prot			c0.13		c0.17	0.07
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.11	0.03	0.28		0.74	0.09
Uniform Delay, d1	28.7	28.6	10.6		23.1	1.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.1	0.5		7.0	0.1
Delay (s)	29.2	28.7	11.1		30.1	1.8
Level of Service	C	C	B		C	A
Approach Delay (s)	28.8		11.1			17.3
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	7	7	295	34	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1519	1342		2882	2768	
Flt Permitted	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1519	1342		2739	2768	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	8	347	40	12
RTOR Reduction (vph)	0	8	0	0	9	0
Lane Group Flow (vph)	12	0	0	355	43	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		11.2	11.2	
Effective Green, g (s)	0.6	0.6		11.2	11.2	
Actuated g/C Ratio	0.01	0.01		0.24	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	19	17		649	656	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.13		
v/c Ratio	0.63	0.01		0.55	0.07	
Uniform Delay, d1	23.2	23.0		15.8	13.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	52.7	0.1		0.9	0.0	
Delay (s)	75.9	23.1		16.7	14.0	
Level of Service	E	C		B	B	
Approach Delay (s)	54.8			16.7	14.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th


4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	129	1	20	4	2	5	28	222	8	5	53	38
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	140	1	25	5	3	5	35	241	10	5	58	41
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	140	27	5	8	287	63	41					
Volume Left (vph)	140	0	5	0	35	5	0					
Volume Right (vph)	0	25	0	5	10	0	41					
Hadj (s)	0.53	-0.63	0.53	-0.44	0.04	0.08	-0.67					
Departure Headway (s)	6.1	4.9	6.3	5.3	5.2	5.4	4.6					
Degree Utilization, x	0.24	0.04	0.01	0.01	0.41	0.09	0.05					
Capacity (veh/h)	559	687	525	618	676	634	733					
Control Delay (s)	9.7	6.9	8.2	7.2	11.8	7.8	6.7					
Approach Delay (s)	9.3		7.6		11.8	7.3						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	10.1		
Level of Service	B		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.


4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	152	133	99	1	61	6	68	255	16	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1274	1365	1131	1290	1365	1116	2515	2565		1296	2454	
Fit Permitted	0.71	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	955	1365	1131	899	1365	1116	2515	2565		1296	2454	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	171	149	111	1	69	7	76	287	18	1	183	80
RTOR Reduction (vph)	0	0	77	0	0	5	0	5	0	0	53	0
Lane Group Flow (vph)	171	149	34	1	69	2	76	300	0	1	210	0
Confl. Peds. (#/hr)	41		14	14		4			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	14.8	14.8	14.8	14.8	14.8	14.8	4.0	16.9		0.9	13.8	
Effective Green, g (s)	14.8	14.8	14.8	14.8	14.8	14.8	4.0	16.9		0.9	13.8	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.08	0.35		0.02	0.29	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	292	418	346	275	418	341	208	897		24	701	
v/s Ratio Prot		0.11			0.05		0.03	c0.12		0.00	c0.09	
v/s Ratio Perm	c0.18		0.03	0.00		0.00						
v/c Ratio	0.59	0.36	0.10	0.00	0.17	0.01	0.37	0.33		0.04	0.30	
Uniform Delay, d1	14.2	13.0	12.0	11.6	12.2	11.6	20.9	11.6		23.3	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.5	0.1	0.0	0.2	0.0	1.1	0.2		0.7	0.2	
Delay (s)	17.1	13.6	12.1	11.6	12.4	11.6	22.0	11.8		24.0	13.7	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		14.6			12.3			13.8			13.8	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.0				HCM 2000 Level of Service					B
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			48.3				Sum of lost time (s)				15.7	
Intersection Capacity Utilization			63.9%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	145	365	1	2	179	18	3	5	1	17	1	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1250	1621	1663		1492	1356	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1250	1239	1663		1184	1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	151	380	1	2	186	19	3	5	1	18	1	46
RTOR Reduction (vph)	0	0	0	0	0	12	0	1	0	0	37	0
Lane Group Flow (vph)	151	380	1	2	186	7	3	5	0	18	10	0
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8				4	
Actuated Green, G (s)	20.5	47.7	47.7	2.5	29.7	29.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	20.5	47.7	47.7	2.5	29.7	29.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.26	0.59	0.59	0.03	0.37	0.37	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	414	1014	862	50	631	462	231	311		221	253	
v/s Ratio Prot	c0.09	c0.22		0.00	0.11			0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.36	0.37	0.00	0.04	0.29	0.02	0.01	0.02		0.08	0.04	
Uniform Delay, d1	24.5	8.5	6.6	37.7	17.8	16.0	26.6	26.6		26.9	26.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.1	0.0	0.3	0.3	0.0	0.0	0.0		0.2	0.1	
Delay (s)	25.1	9.5	6.6	38.0	18.1	16.0	26.6	26.6		27.1	26.8	
Level of Service	C	A	A	D	B	B	C	C		C	C	
Approach Delay (s)		13.9			18.1			26.6			26.8	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay					16.2		HCM 2000 Level of Service					B
HCM 2000 Volume to Capacity ratio					0.32							
Actuated Cycle Length (s)					80.2		Sum of lost time (s)				15.0	
Intersection Capacity Utilization					73.3%		ICU Level of Service				D	
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	16	387	3	5	217	5	11	482	104	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1046	1540	2997			2989	1073
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.74	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1046	1182	2997			2271	1073
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	18	435	3	6	244	6	12	542	117	24	16	44
RTOR Reduction (vph)	0	0	2	0	0	3	0	17	0	0	0	29
Lane Group Flow (vph)	18	435	1	6	244	3	12	642	0	0	40	15
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	2.1	32.1	32.1	0.9	29.9	29.9	24.5	24.5			23.5	23.5
Effective Green, g (s)	2.1	32.1	32.1	0.9	29.9	29.9	24.5	24.5			23.5	23.5
Actuated g/C Ratio	0.03	0.46	0.46	0.01	0.42	0.42	0.35	0.35			0.33	0.33
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	36	553	627	19	515	443	410	1041			757	357
v/s Ratio Prot	c0.01	c0.36		0.00	0.20			c0.21				
v/s Ratio Perm			0.00			0.00	0.01				0.02	0.01
v/c Ratio	0.50	0.79	0.00	0.32	0.47	0.01	0.03	0.62			0.05	0.04
Uniform Delay, d1	33.7	16.3	10.5	34.5	14.6	11.7	15.2	19.1			15.9	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.5	7.3	0.0	9.3	0.7	0.0	0.0	1.1			0.0	0.0
Delay (s)	44.2	23.6	10.5	43.8	15.3	11.7	15.2	20.2			16.0	15.9
Level of Service	D	C	B	D	B	B	B	C			B	B
Approach Delay (s)		24.3			15.9			20.1			16.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	20	300	60	8	197	62	31	91	8	97	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.92	1.00	1.00	0.95	1.00	0.97	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1320	927		1335	1126	882	1070	957	908	1070	1034	
Fit Permitted	0.45	1.00		0.39	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	625	927		544	1126	882	1070	957	908	1070	1034	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	353	71	9	232	73	36	107	9	114	47	28
RTOR Reduction (vph)	0	7	0	0	0	30	0	0	8	0	24	0
Lane Group Flow (vph)	24	417	0	9	232	43	36	107	1	114	51	0
Confl. Peds. (#/hr)				6	6			28			4	11
Confl. Bikes (#/hr)				9		50				7		15
Parking (#/hr)			10	10					10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	37.1	37.1		36.4	36.4	46.0	9.3	11.5	11.5	9.6	11.8	
Effective Green, g (s)	37.1	37.1		36.4	36.4	46.0	9.3	11.5	11.5	9.6	11.8	
Actuated g/C Ratio	0.47	0.47		0.46	0.46	0.58	0.12	0.15	0.15	0.12	0.15	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	305	436		257	520	570	126	139	132	130	154	
v/s Ratio Prot	0.00	c0.45		0.00	c0.21	0.01	0.03	c0.11		c0.11	0.05	
v/s Ratio Perm	0.04			0.02		0.04			0.00			
v/c Ratio	0.08	0.96		0.04	0.45	0.07	0.29	0.77	0.01	0.88	0.33	
Uniform Delay, d1	11.7	20.1		15.1	14.4	7.1	31.7	32.4	28.8	34.0	30.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	31.9		0.1	0.6	0.1	1.3	22.2	0.0	43.7	1.3	
Delay (s)	11.8	51.9		15.2	15.0	7.2	33.0	54.6	28.8	77.7	31.3	
Level of Service	B	D		B	B	A	C	D	C	E	C	
Approach Delay (s)		49.8			13.2		48.0			59.3		
Approach LOS		D			B		D			E		

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

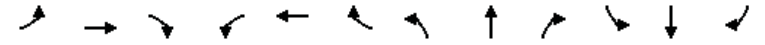


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	224	270	27	26	54	7	22	24	30	5	24	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.97		0.98	
Flpb, ped/bikes		0.99		0.99	1.00			0.99	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.91	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1469		1696	1760			1745	1492		1357	
Fit Permitted		0.83		0.42	1.00			0.86	1.00		0.99	
Satd. Flow (perm)		1238		758	1760			1529	1492		1342	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	280	338	34	32	68	9	28	30	38	6	30	75
RTOR Reduction (vph)	0	1	0	0	4	0	0	0	31	0	62	0
Lane Group Flow (vph)	0	651	0	32	73	0	0	58	7	0	49	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4		4	8			
Actuated Green, G (s)		43.1		43.1	43.1			14.6	14.6		14.6	
Effective Green, g (s)		43.1		43.1	43.1			14.6	14.6		14.6	
Actuated g/C Ratio		0.52		0.52	0.52			0.18	0.18		0.18	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		649		397	923			271	265		238	
v/s Ratio Prot				0.04								
v/s Ratio Perm		c0.53		0.04				c0.04	0.00		0.04	
v/c Ratio		1.00		0.08	0.08			0.21	0.03		0.21	
Uniform Delay, d1		19.5		9.7	9.7			28.8	27.9		28.8	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		35.9		0.1	0.0			0.4	0.0		0.4	
Delay (s)		55.4		9.8	9.7			29.2	27.9		29.2	
Level of Service		E		A	A			C	C		C	
Approach Delay (s)		55.4			9.7			28.7			29.2	
Approach LOS		E			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔	↔		↔	↔
Volume (vph)	46	468	21	22	101	13	16	280	41	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.99		1.00	0.99
Flpb, ped/bikes	0.97	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.98		1.00	0.96
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1666	3394		1695	3344			1260	2459		1260	2390
Fit Permitted	0.67	1.00		0.34	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1173	3394		607	3344			1260	2459		1260	2390
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	538	24	25	116	15	18	322	47	14	206	83
RTOR Reduction (vph)	0	3	0	0	9	0	0	10	0	0	40	0
Lane Group Flow (vph)	53	559	0	25	122	0	18	359	0	14	249	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Effective Green, g (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.07	0.48		0.03	0.43	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	383	1109		198	1092		93	1172		35	1030	
v/s Ratio Prot		c0.16		0.04			0.01	c0.15		0.01	c0.10	
v/s Ratio Perm	0.05			0.04								
v/c Ratio	0.14	0.50		0.13	0.11		0.19	0.31		0.40	0.24	
Uniform Delay, d1	21.9	25.0		21.8	21.7		40.1	14.8		44.0	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.3	0.0		1.0	0.7		7.3	0.1	
Delay (s)	22.0	25.3		22.1	21.7		41.1	15.4		51.3	16.8	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		25.1			21.8			16.6			18.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	15.5
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	2	558	11	2	184	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3411		1711	3419			1705		1711	1621	
Flt Permitted	0.63	1.00		0.42	1.00			0.78		0.75	1.00	
Satd. Flow (perm)	1126	3411		751	3419			1388		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	607	12	2	200	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	1	0
Lane Group Flow (vph)	2	617	0	2	200	0	0	4	0	2	2	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.4	12.4		12.4	12.4			7.7		7.7	7.7	
Effective Green, g (s)	12.4	12.4		12.4	12.4			7.7		7.7	7.7	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.26		0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	463	1405		309	1408			355		344	414	
v/s Ratio Prot		c0.18			0.06						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.00	0.44		0.01	0.14			0.01		0.01	0.00	
Uniform Delay, d1	5.2	6.4		5.2	5.5			8.4		8.3	8.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.0			0.0		0.0	0.0	
Delay (s)	5.2	6.6		5.2	5.6			8.4		8.4	8.3	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		6.6			5.6			8.4			8.3	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.27	A
Actuated Cycle Length (s)	30.1	Sum of lost time (s)
Intersection Capacity Utilization	31.6%	10.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



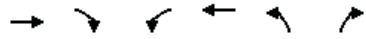
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	11	85	0	0	254	12	155	574	494	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.93				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3401			5097		1711	3184				2694
Flt Permitted		0.92			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3150			5097		1711	3184				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	14	106	0	0	318	15	194	718	618	0	0	31
RTOR Reduction (vph)	0	0	0	0	7	0	0	205	0	0	0	29
Lane Group Flow (vph)	0	120	0	0	326	0	194	1131	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1484			1777		697	1298				141
v/s Ratio Prot		c0.00			c0.06		0.11	c0.36				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.18		0.28	0.87				0.01
Uniform Delay, d1		11.2			17.2		15.0	20.7				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.0	8.2				0.1
Delay (s)		11.3			17.4		16.0	28.9				34.3
Level of Service		B			B		B	C				C
Approach Delay (s)		11.3			17.4			27.3				34.3
Approach LOS		B			B			C				C

Intersection Summary		
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.53	C
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	50.6%	14.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	96	169	195	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1620	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1620	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	117	206	238	291	0	0
RTOR Reduction (vph)	18	50	0	0	0	0
Lane Group Flow (vph)	153	102	238	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	40.4	40.4	9.6	60.0		
Effective Green, g (s)	40.4	40.4	9.6	60.0		
Actuated g/C Ratio	0.67	0.67	0.16	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1090	961	531	1801		
v/s Ratio Prot	0.09		c0.07	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.14	0.11	0.45	0.16		
Uniform Delay, d1	3.5	3.4	22.8	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	0.6	0.0		
Delay (s)	3.6	3.5	23.4	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.5			10.6	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			7.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.23			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			23.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔		↔	↔	↔	↔	↔	↔
Volume (vph)	61	33	105	2	25	0	85	212	0	6	163	55
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1189	1902		1159	1279		1215	2431		1215	2297	
Fit Permitted	0.40	1.00		0.83	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	496	1902		1017	1279		1215	2431		1215	2297	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	69	37	118	2	28	0	96	238	0	7	183	62
RTOR Reduction (vph)	0	86	0	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	69	69	0	2	28	0	96	238	0	7	220	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	15.4	15.4		4.8	4.8		6.0	23.7		2.0	19.7	
Effective Green, g (s)	15.4	15.4		4.8	4.8		6.0	23.7		2.0	19.7	
Actuated g/C Ratio	0.27	0.27		0.08	0.08		0.10	0.41		0.03	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	510		85	106		127	1003		42	788	
v/s Ratio Prot	c0.03	0.04			0.02		c0.08	0.10		0.01	c0.10	
v/s Ratio Perm	c0.06			0.00								
v/c Ratio	0.35	0.13		0.02	0.26		0.76	0.24		0.17	0.28	
Uniform Delay, d1	16.6	15.9		24.1	24.6		25.0	11.0		26.9	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1		0.1	1.3		22.3	0.1		1.9	0.2	
Delay (s)	17.7	16.1		24.3	26.0		47.2	11.1		28.8	13.9	
Level of Service	B	B		C	C		D	B		C	B	
Approach Delay (s)		16.6			25.9			21.5			14.3	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.2									B
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			57.4							21.6		
Intersection Capacity Utilization			70.8%									C
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
WITH SF GIANTS GAME AT AT&T PARK
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	462	634	215	465	575	87	26	433	91	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.97		1.00	0.99			1.00	0.89			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			
Frt	1.00	0.96		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2884		2987	2974			5533	1232			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2884		2987	2974			5533	1232			
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	570	783	265	574	710	107	32	535	112	0	0	0
RTOR Reduction (vph)	0	30	0	0	9	0	0	0	93	0	0	0
Lane Group Flow (vph)	570	1018	0	574	808	0	0	567	19	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	22.7	38.8		33.7	49.8			18.6	18.6			
Effective Green, g (s)	22.7	38.8		33.7	49.8			18.6	18.6			
Actuated g/C Ratio	0.21	0.35		0.31	0.45			0.17	0.17			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	924	1017		915	1346			935	208			
v/s Ratio Prot	0.13	c0.35		0.19	c0.27							
v/s Ratio Perm								0.10	0.02			
v/c Ratio	0.62	1.00		0.63	0.60			0.61	0.09			
Uniform Delay, d1	39.7	35.6		32.8	22.6			42.3	38.6			
Progression Factor	1.00	1.00		0.74	0.36			1.09	6.15			
Incremental Delay, d2	1.2	28.4		0.8	0.5			1.0	0.2			
Delay (s)	40.9	64.0		25.1	8.7			47.3	237.4			
Level of Service	D	E		C	A			D	F			
Approach Delay (s)		55.8			15.4			78.7			0.0	
Approach LOS		E			B			E			A	

Intersection Summary

HCM 2000 Control Delay	44.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

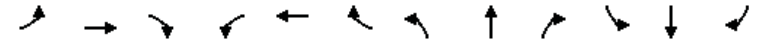
Warriors Arena Existing Plus Project (Basketball Game), Saturday Evening, With Giants Game
Fehr & Peers

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	108	1034	45	50	492	59	11	72	40	237	694	241
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.98		1.00	0.93			1.00	0.63	1.00	0.98	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4324		1296	2376			1583	844	1043	2882	563
Fit Permitted	0.95	1.00		0.95	1.00			0.88	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1540	4324		1296	2376			1396	844	764	2882	563
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	123	1175	51	57	559	67	12	82	45	269	789	274
RTOR Reduction (vph)	0	4	0	0	7	0	0	0	28	0	2	98
Lane Group Flow (vph)	123	1222	0	57	619	0	0	94	17	269	814	149
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	13.0	43.1		11.3	39.8			45.7	45.7	46.7	46.7	46.7
Effective Green, g (s)	13.0	43.1		11.3	39.8			45.7	45.7	46.7	46.7	46.7
Actuated g/C Ratio	0.11	0.36		0.09	0.33			0.38	0.38	0.39	0.39	0.39
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	166	1553		122	788			531	321	297	1121	219
v/s Ratio Prot	0.08	c0.28		0.04	c0.26						0.28	
v/s Ratio Perm								0.07	0.02	c0.35		0.26
v/c Ratio	0.74	0.79		0.47	0.79			0.18	0.05	0.91	0.73	0.68
Uniform Delay, d1	51.9	34.3		51.5	36.2			24.7	23.5	34.6	31.2	30.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.2	4.1		2.8	5.2			0.2	0.1	29.0	2.4	8.1
Delay (s)	68.1	38.5		54.3	41.4			24.8	23.5	63.6	33.6	38.5
Level of Service	E	D		D	D			C	C	E	C	D
Approach Delay (s)		41.2			42.5			24.4			40.6	
Approach LOS		D			D			C			D	

Intersection Summary

HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena Existing Plus Project (Basketball Game), Saturday Evening, With Giants Game
Fehr & Peers

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1150	105	0	744	48	37
Ideal Flow (vphpl)	1000	1000	1000	1000	1000	1000
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1598			1621	810	714
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1598			1621	810	714
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1264	115	0	818	53	41
RTOR Reduction (vph)	3	0	0	0	0	35
Lane Group Flow (vph)	1376	0	0	818	53	6
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)	1					
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	83.8			83.8	14.9	14.9
Effective Green, g (s)	83.8			83.8	14.9	14.9
Actuated g/C Ratio	0.76			0.76	0.14	0.14
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1217			1234	109	96
v/s Ratio Prot	c0.86			0.50	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	1.13			0.66	0.49	0.06
Uniform Delay, d1	13.1			6.3	44.0	41.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	69.5			1.4	3.4	0.3
Delay (s)	82.6			7.7	47.4	41.7
Level of Service	F			A	D	D
Approach Delay (s)	82.6			7.7	44.9	
Approach LOS	F			A	D	
Intersection Summary						
HCM 2000 Control Delay		54.3			HCM 2000 Level of Service D	
HCM 2000 Volume to Capacity ratio		1.03				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	11.3
Intersection Capacity Utilization		91.9%			ICU Level of Service	F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↔	↔			↔	↔
Volume (vph)	31	352	98	28	284	654	209	497	1065	249
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.97			1.00	0.97			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.97			1.00	0.96			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5634			2870	2501			4106	1122
Fit Permitted		1.00			0.76	1.00			0.95	1.00
Satd. Flow (perm)		5634			2186	2501			4106	1122
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	371	103	29	299	688	220	523	1121	262
RTOR Reduction (vph)	0	70	0	0	0	31	0	0	0	0
Lane Group Flow (vph)	0	437	0	0	328	877	0	0	1670	236
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		13.3			22.0	22.0			22.2	22.2
Effective Green, g (s)		15.3			25.0	25.0			25.2	25.2
Actuated g/C Ratio		0.20			0.33	0.33			0.34	0.34
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1149			728	833			1379	376
v/s Ratio Prot						c0.35			c0.41	0.21
v/s Ratio Perm					0.15					
v/c Ratio		0.38			0.45	1.05			1.21	0.63
Uniform Delay, d1		25.8			19.6	25.0			24.9	21.0
Progression Factor		1.00			0.89	1.00			1.00	1.00
Incremental Delay, d2		0.2			0.1	46.1			101.9	3.3
Delay (s)		26.0			17.7	71.1			126.8	24.2
Level of Service		C			B	E			F	C
Approach Delay (s)		26.0			17.7	71.1			114.1	
Approach LOS		C			B	E			F	
Intersection Summary										
HCM 2000 Control Delay			82.5		HCM 2000 Level of Service F					
HCM 2000 Volume to Capacity ratio		1.00								
Actuated Cycle Length (s)		75.0			Sum of lost time (s)			12.5		
Intersection Capacity Utilization		98.7%			ICU Level of Service			F		
Analysis Period (min)		15								
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



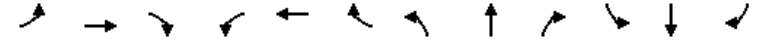
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↕		↔		↕	↕↕
Volume (vph)	70	408	558	56	242	215	40	322	61	799
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.87		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2661		2224		1161		1327	2553
Fit Permitted		0.95	1.00		1.00		1.00		0.29	0.93
Satd. Flow (perm)		1700	2661		2224		1161		401	2382
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	74	434	594	60	257	229	43	343	65	850
RTOR Reduction (vph)	0	0	12	0	1	0	31	0	0	0
Lane Group Flow (vph)	0	456	694	0	489	0	8	0	367	891
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		419	745		518		247		328	1060
v/s Ratio Prot		c0.27	0.26		0.22				c0.19	0.14
v/s Ratio Perm							0.01		c0.30	0.22
v/c Ratio		1.09	0.93		0.94		0.03		1.12	0.84
Uniform Delay, d1		28.2	26.3		28.3		23.4		24.1	18.9
Progression Factor		1.00	1.00		1.00		1.00		0.79	0.75
Incremental Delay, d2		69.9	19.9		27.9		0.3		57.8	0.8
Delay (s)		98.1	46.2		56.2		23.6		76.9	15.1
Level of Service		F	D		E		C		E	B
Approach Delay (s)			66.6		53.8					33.1
Approach LOS			E		D					C

Intersection Summary	
HCM 2000 Control Delay	50.0 HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.89
Actuated Cycle Length (s)	75.0 Sum of lost time (s) 13.5
Intersection Capacity Utilization	76.1% ICU Level of Service D
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↕		↔	↕↕		↕	↕↕	
Volume (vph)	58	28	137	0	3	3	20	427	25	99	333	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	0.99		1.00	0.97	
Fit Protected		0.97	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1546	1348		1485		1377	2703		1540	2951	
Fit Permitted		0.79	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1268	1348		1485		1377	2703		1540	2951	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	65	31	154	0	3	3	22	480	28	111	374	109
RTOR Reduction (vph)	0	0	136	0	3	0	0	2	0	0	10	0
Lane Group Flow (vph)	0	96	18	0	3	0	22	506	0	111	473	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm		NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		14.2	14.2		14.2		4.6	74.9		15.0	85.6	
Effective Green, g (s)		14.2	14.2		14.2		4.6	74.9		15.0	85.6	
Actuated g/C Ratio		0.12	0.12		0.12		0.04	0.62		0.12	0.71	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		150	159		175		52	1687		192	2105	
v/s Ratio Prot					0.00		0.02	c0.19		c0.07	0.16	
v/s Ratio Perm		c0.08	0.01									
v/c Ratio		0.64	0.11		0.02		0.42	0.30		0.58	0.22	
Uniform Delay, d1		50.5	47.3		46.7		56.4	10.4		49.5	5.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.0	0.3		0.0		2.0	0.5		2.6	0.1	
Delay (s)		59.4	47.6		46.8		58.4	10.9		52.1	5.9	
Level of Service		E	D		D		E	B		D	A	
Approach Delay (s)		52.1			46.8			12.9			14.6	
Approach LOS		D			D			B			B	

Intersection Summary	
HCM 2000 Control Delay	20.9 HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.39
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 15.9
Intersection Capacity Utilization	53.9% ICU Level of Service A
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	3	35	9	3	73	44	1	36	5	182	219	142
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.99	1.00	0.99		1.00	0.89	
Flpb, ped/bikes		1.00			1.00	1.00	0.87	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.98		1.00	0.94	
Fit Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2505			1447	1218	1198	1412		1377	1218	
Fit Permitted		0.93			0.99	1.00	0.71	1.00		0.95	1.00	
Satd. Flow (perm)		2349			1430	1218	901	1412		1377	1218	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	4	47	12	4	97	59	1	48	7	243	292	189
RTOR Reduction (vph)	0	10	0	0	0	24	0	6	0	0	22	0
Lane Group Flow (vph)	0	53	0	0	101	35	1	49	0	243	459	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		8.1			8.1	29.6	5.6	5.6		21.5	32.1	
Effective Green, g (s)		8.1			8.1	29.6	5.6	5.6		21.5	32.1	
Actuated g/C Ratio		0.16			0.16	0.59	0.11	0.11		0.43	0.64	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		379			230	839	100	157		589	778	
v/s Ratio Prot						0.02		0.03		0.18	c0.38	
v/s Ratio Perm		0.02			c0.07	0.01	0.00					
v/c Ratio		0.14			0.44	0.04	0.01	0.31		0.41	0.59	
Uniform Delay, d1		18.1			19.0	4.3	19.8	20.5		10.0	5.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			1.3	0.0	0.0	1.1		0.2	1.2	
Delay (s)		18.2			20.3	4.3	19.9	21.7		10.1	6.4	
Level of Service		B			C	A	B	C		B	A	
Approach Delay (s)		18.2			14.4			21.6			7.7	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015

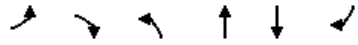


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	26	136	318	19	827	192
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	851	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	851	1134	1194
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	33	174	408	24	1060	246
RTOR Reduction (vph)	0	155	0	11	0	0
Lane Group Flow (vph)	33	19	408	13	1060	246
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.4	8.4	34.2	29.2	20.1	59.3
Effective Green, g (s)	8.4	8.4	34.2	29.2	20.1	59.3
Actuated g/C Ratio	0.11	0.11	0.44	0.38	0.26	0.76
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	122	188	675	374	293	911
v/s Ratio Prot	c0.03		c0.27	0.01	c0.93	0.21
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.27	0.10	0.60	0.04	3.62	0.27
Uniform Delay, d1	31.8	31.2	16.6	15.3	28.8	2.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	1.5	0.0	1186.4	0.2
Delay (s)	33.0	31.5	18.1	15.4	1215.2	2.9
Level of Service	C	C	B	B	F	A
Approach Delay (s)	31.7		18.0			986.9
Approach LOS	C		B			F

Intersection Summary			
HCM 2000 Control Delay	670.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.66		
Actuated Cycle Length (s)	77.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	Y	Y	
Volume (vph)	6	3	284	93	63	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.95		1.00	1.00	0.99	
Flpb, ped/bikes	0.97		0.97	1.00	1.00	
Frt	0.95		1.00	1.00	0.98	
Fit Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1533		1665	1531	3064	
Fit Permitted	0.97		0.68	1.00	1.00	
Satd. Flow (perm)	1533		1193	1531	3064	
Peak-hour factor, PHF	0.66	0.66	0.66	0.66	0.66	0.66
Adj. Flow (vph)	9	5	430	141	95	18
RTOR Reduction (vph)	5	0	0	0	5	0
Lane Group Flow (vph)	9	0	430	141	108	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	0.9		30.4	30.4	30.4	
Effective Green, g (s)	0.9		30.4	30.4	30.4	
Actuated g/C Ratio	0.02		0.74	0.74	0.74	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	33		878	1126	2255	
v/s Ratio Prot	c0.01			0.09	0.04	
v/s Ratio Perm			c0.36			
v/c Ratio	0.28		0.49	0.13	0.05	
Uniform Delay, d1	19.9		2.2	1.6	1.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	4.5		0.4	0.1	0.0	
Delay (s)	24.4		2.7	1.6	1.5	
Level of Service	C		A	A	A	
Approach Delay (s)	24.4			2.4	1.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y	Y	Y	Y	Y	Y
Volume (vph)	15	48	358	80	291	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.92	0.99		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1558	1410	3284		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1558	1410	3284		1711	3421
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	62	465	104	378	417
RTOR Reduction (vph)	0	59	17	0	0	0
Lane Group Flow (vph)	19	3	553	0	378	417
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	6.4	6.4	65.0		33.3	103.4
Effective Green, g (s)	6.4	6.4	65.0		33.3	103.4
Actuated g/C Ratio	0.05	0.05	0.54		0.28	0.86
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	83	75	1778		474	2947
v/s Ratio Prot			c0.17		c0.22	0.12
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.23	0.04	0.31		0.80	0.14
Uniform Delay, d1	54.4	53.9	15.2		40.2	1.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.2	0.5		9.1	0.1
Delay (s)	55.8	54.1	15.6		49.3	1.4
Level of Service	E	D	B		D	A
Approach Delay (s)	54.5		15.6			24.2
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	7	7	367	56	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1518	1341		2883	2807	
Flt Permitted	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1518	1341		2743	2807	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	8	432	66	12
RTOR Reduction (vph)	0	8	0	0	9	0
Lane Group Flow (vph)	12	0	0	440	69	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		13.3	13.3	
Effective Green, g (s)	0.6	0.6		13.3	13.3	
Actuated g/C Ratio	0.01	0.01		0.27	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	18	16		738	755	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.16		
v/c Ratio	0.67	0.01		0.60	0.09	
Uniform Delay, d1	24.3	24.1		15.7	13.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.1	0.2		1.3	0.1	
Delay (s)	90.4	24.3		17.0	13.6	
Level of Service	F	C		B	B	
Approach Delay (s)	63.9			17.0	13.6	
Approach LOS	E			B	B	
Intersection Summary						
HCM 2000 Control Delay			18.3	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.24			
Actuated Cycle Length (s)			49.4	Sum of lost time (s)		15.0
Intersection Capacity Utilization			26.5%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						


HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	130	2	56	5	2	5	46	225	9	5	53	38
Peak Hour Factor	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.92	0.91	0.92	0.92	0.92
Hourly flow rate (vph)	141	2	62	5	2	5	51	245	10	5	58	41
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	141	64	5	8	305	63	41					
Volume Left (vph)	141	0	5	0	51	5	0					
Volume Right (vph)	0	62	0	5	10	0	41					
Hadj (s)	0.53	-0.64	0.53	-0.46	0.05	0.08	-0.67					
Departure Headway (s)	6.1	5.0	6.4	5.4	5.3	5.5	4.8					
Degree Utilization, x	0.24	0.09	0.01	0.01	0.45	0.10	0.05					
Capacity (veh/h)	553	680	514	603	663	618	711					
Control Delay (s)	9.9	7.2	8.3	7.3	12.5	7.9	6.8					
Approach Delay (s)	9.1		7.7		12.5	7.5						
Approach LOS	A		A		B	A						
Intersection Summary												
Delay			10.4									
Level of Service			B									
Intersection Capacity Utilization			42.3%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	111	157	112	1	65	20	127	307	23	1600	1600	1600
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1252	1365	1120	1284	1365	1091	2515	2556		1296	2409	
Fit Permitted	0.71	1.00	1.00	0.52	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	930	1365	1120	708	1365	1091	2515	2556		1296	2409	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	135	191	137	1	79	24	155	374	28	10	237	162
RTOR Reduction (vph)	0	0	109	0	0	19	0	3	0	0	79	0
Lane Group Flow (vph)	135	191	28	1	79	5	155	399	0	10	320	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	20.1	20.1	20.1	20.1	20.1	20.1	11.3	59.0		1.9	49.6	
Effective Green, g (s)	20.1	20.1	20.1	20.1	20.1	20.1	11.3	59.0		1.9	49.6	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.12	0.61		0.02	0.51	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	193	283	232	147	283	226	293	1559		25	1235	
v/s Ratio Prot		0.14			0.06		c0.06	0.16		0.01	c0.13	
v/s Ratio Perm	c0.15		0.03	0.00		0.00						
v/c Ratio	0.70	0.67	0.12	0.01	0.28	0.02	0.53	0.26		0.40	0.26	
Uniform Delay, d1	35.5	35.3	31.1	30.4	32.2	30.5	40.2	8.7		46.8	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	6.2	0.2	0.0	0.5	0.0	1.7	0.4		10.2	0.1	
Delay (s)	46.1	41.5	31.4	30.4	32.7	30.5	41.9	9.1		57.0	13.3	
Level of Service	D	D	C	C	C	C	D	A		E	B	
Approach Delay (s)		39.8			32.2			18.2			14.4	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	96.7	Sum of lost time (s)	15.7
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	81	350	1	1	296	27	3	5	1	28	1	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1241	1621	1669		1483	1353	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1241	1220	1669		1175	1353	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	91	393	1	1	333	30	3	6	1	31	1	63
RTOR Reduction (vph)	0	0	0	0	0	17	0	1	0	0	47	0
Lane Group Flow (vph)	91	393	1	1	333	13	3	6	0	31	17	0
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8	8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	11.0	46.4	46.4	2.7	38.1	38.1	21.9	21.9		21.9	21.9	
Effective Green, g (s)	11.0	46.4	46.4	2.7	38.1	38.1	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.13	0.54	0.54	0.03	0.44	0.44	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	920	782	50	755	549	310	425		299	344	
v/s Ratio Prot	c0.06	c0.23		0.00	0.20						0.01	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.44	0.43	0.00	0.02	0.44	0.02	0.01	0.01		0.10	0.05	
Uniform Delay, d1	34.7	11.8	9.1	40.4	16.6	13.5	23.9	24.0		24.5	24.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.5	0.0	0.2	0.4	0.0	0.0	0.0		0.2	0.1	
Delay (s)	36.1	13.3	9.1	40.5	17.0	13.5	24.0	24.0		24.7	24.3	
Level of Service	D	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		17.6			16.8		24.0				24.4	
Approach LOS		B			B		C				C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015

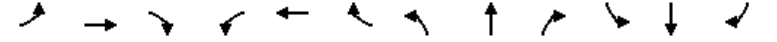


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔			↔	↔
Volume (vph)	71	376	32	47	280	28	11	272	42	15	191	20
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	3018			3068	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.59	1.00			0.90	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	960	3018			2785	1072
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	89	470	40	59	350	35	14	340	52	19	239	25
RTOR Reduction (vph)	0	0	19	0	0	18	0	13	0	0	0	20
Lane Group Flow (vph)	89	470	21	59	350	17	14	379	0	0	258	5
Confl. Peds. (#/hr)												3
Confl. Bikes (#/hr)												36
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	7.5	37.9	37.9	5.2	34.6	34.6	15.8	15.8			14.8	14.8
Effective Green, g (s)	7.5	37.9	37.9	5.2	34.6	34.6	15.8	15.8			14.8	14.8
Actuated g/C Ratio	0.10	0.53	0.53	0.07	0.48	0.48	0.22	0.22			0.21	0.21
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	126	640	726	111	584	504	210	663			573	220
v/s Ratio Prot	c0.07	c0.39		0.04	0.29			c0.13				
v/s Ratio Perm			0.02			0.02	0.01				0.09	0.00
v/c Ratio	0.71	0.73	0.03	0.53	0.60	0.03	0.07	0.57			0.45	0.02
Uniform Delay, d1	31.1	13.1	8.2	32.2	13.6	9.8	22.2	25.0			25.0	22.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	16.5	4.4	0.0	4.8	1.7	0.0	0.1	1.2			0.6	0.0
Delay (s)	47.6	17.5	8.2	37.0	15.3	9.9	22.3	26.2			25.6	22.8
Level of Service	D	B	A	D	B	A	C	C			C	C
Approach Delay (s)		21.3			17.7			26.1			25.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015

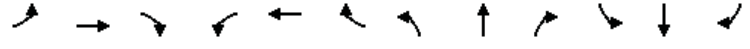


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔			↔	↔
Volume (vph)	15	348	58	7	194	110	48	158	3	127	45	20
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	0.98	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1315	931		1335	1126	870	1070	957	916	1070	1042	
Fit Permitted	0.46	1.00		0.31	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	642	931		430	1126	870	1070	957	916	1070	1042	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	405	67	8	226	128	56	184	3	148	52	23
RTOR Reduction (vph)	0	5	0	0	0	51	0	0	2	0	17	0
Lane Group Flow (vph)	17	467	0	8	226	77	56	184	1	148	58	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	52.1	52.1		51.2	51.2	65.2	24.7	21.0	21.0	14.0	10.3	
Effective Green, g (s)	52.1	52.1		51.2	51.2	65.2	24.7	21.0	21.0	14.0	10.3	
Actuated g/C Ratio	0.48	0.48		0.47	0.47	0.60	0.23	0.19	0.19	0.13	0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	320	449		210	534	566	245	186	178	138	99	
v/s Ratio Prot	0.00	c0.50		0.00	c0.20	0.02	c0.05	c0.19		c0.14	0.06	
v/s Ratio Perm				0.02		0.07			0.00			
v/c Ratio	0.05	1.04		0.04	0.42	0.14	0.23	0.99	0.00	1.07	0.58	
Uniform Delay, d1	15.1	27.8		24.5	18.6	9.2	33.8	43.3	35.0	46.9	46.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	53.2		0.1	0.5	0.1	0.5	62.2	0.0	97.3	8.5	
Delay (s)	15.2	81.0		24.5	19.1	9.3	34.3	105.5	35.0	144.2	55.2	
Level of Service	B	F		C	B	A	C	F	C	F	E	
Approach Delay (s)		78.7			15.8			88.2			114.3	
Approach LOS		E			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	69.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	107.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

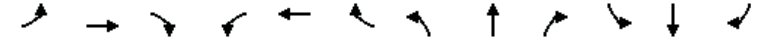


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	228	346	34	42	63	9	35	39	60	9	41	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.97		0.98	
Flpb, ped/bikes		0.99		0.99	1.00			0.99	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.93	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1473		1697	1757			1746	1491		1387	
Fit Permitted		0.84		0.40	1.00			0.85	1.00		0.98	
Satd. Flow (perm)		1265		718	1757			1520	1491		1360	
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)	253	384	38	47	70	10	39	43	67	10	46	67
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	53	0	53	0
Lane Group Flow (vph)	0	673	0	47	76	0	0	82	14	0	70	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4		4	8			
Actuated Green, G (s)		42.5		42.5	42.5		16.9	16.9			16.9	
Effective Green, g (s)		42.5		42.5	42.5		16.9	16.9			16.9	
Actuated g/C Ratio		0.51		0.51	0.51		0.20	0.20			0.20	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		643		365	893		307	301			274	
v/s Ratio Prot				0.04								
v/s Ratio Perm	c0.53			0.07			c0.05	0.01			0.05	
v/c Ratio	1.05			0.13	0.08		0.27	0.04			0.26	
Uniform Delay, d1	20.5			10.8	10.6		28.1	26.9			28.1	
Progression Factor	1.00			1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	48.3			0.2	0.0		0.5	0.1			0.5	
Delay (s)	68.9			11.0	10.6		28.6	26.9			28.6	
Level of Service	E			B	B		C	C			C	
Approach Delay (s)	68.9			10.7			27.8				28.6	
Approach LOS	E			B			C				C	

Intersection Summary			
HCM 2000 Control Delay	51.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔	↔		↔	↔
Volume (vph)	93	572	45	20	123	15	54	349	14	21	204	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)		5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1
Lane Util. Factor		1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95
Frbp, ped/bikes		1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99
Flpb, ped/bikes		0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.99		1.00	0.98		1.00	0.99		1.00	0.96
Fit Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1668	3375		1700	3347		1260	2498		1260	2387
Fit Permitted		0.65	1.00		0.17	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1138	3375		297	3347		1260	2498		1260	2387
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	111	681	54	24	146	18	64	415	17	25	243	98
RTOR Reduction (vph)	0	5	0	0	9	0	0	2	0	0	43	0
Lane Group Flow (vph)	111	730	0	24	155	0	64	430	0	25	298	0
Confl. Peds. (#/hr)	34		24	24		34		16		16		15
Confl. Bikes (#/hr)			2			6		6				19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.9	33.9		33.9	33.9		37.1	67.0		5.6	35.5	
Effective Green, g (s)	33.9	33.9		33.9	33.9		37.1	67.0		5.6	35.5	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.30	0.55		0.05	0.29	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	316	937		82	930		383	1371		57	694	
v/s Ratio Prot		c0.22		0.05			0.05	c0.17		0.02	c0.13	
v/s Ratio Perm	0.10			0.08								
v/c Ratio	0.35	0.78		0.29	0.17		0.17	0.31		0.44	0.43	
Uniform Delay, d1	35.3	40.6		34.6	33.4		31.1	15.0		56.7	35.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	4.1		2.0	0.1		0.2	0.6		5.3	0.4	
Delay (s)	35.9	44.7		36.6	33.4		31.3	15.6		62.0	35.5	
Level of Service	D	D		D	C		C	B		E	D	
Approach Delay (s)		43.6		33.8			17.6				37.3	
Approach LOS		D		C			B				D	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	122.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



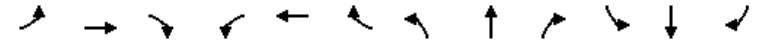
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↔
Volume (vph)	2	729	11	2	247	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3414		1711	3419			1705		1711	1621	
Flt Permitted	0.59	1.00		0.34	1.00			0.78		0.75	1.00	
Satd. Flow (perm)	1055	3414		608	3419			1386		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	792	12	2	268	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	2	0	0	1	0	0	12	0	0	2	0
Lane Group Flow (vph)	2	802	0	2	268	0	0	3	0	2	1	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8			7.8		7.8	7.8	
Effective Green, g (s)	15.8	15.8		15.8	15.8			7.8		7.8	7.8	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.23		0.23	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	496	1605		285	1607			321		312	376	
v/s Ratio Prot		c0.24			0.08						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.00	0.50		0.01	0.17		0.01			0.01	0.00	
Uniform Delay, d1	4.7	6.2		4.7	5.1		9.9			9.9	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.0		0.0			0.0	0.0	
Delay (s)	4.7	6.4		4.7	5.2		9.9			9.9	9.9	
Level of Service	A	A		A	A		A			A	A	
Approach Delay (s)		6.4			5.2		9.9				9.9	
Approach LOS		A			A		A				A	

Intersection Summary		
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.34	A
Actuated Cycle Length (s)	33.6	Sum of lost time (s)
Intersection Capacity Utilization	36.3%	ICU Level of Service
Analysis Period (min)	15	A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



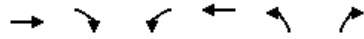
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	11	74	0	0	302	21	209	440	665	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.91				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3399			5082		1711	3112				2694
Flt Permitted		0.92			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3147			5082		1711	3112				2694
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	81	0	0	332	23	230	484	731	0	0	27
RTOR Reduction (vph)	0	0	0	0	10	0	0	361	0	0	0	26
Lane Group Flow (vph)	0	93	0	0	345	0	230	854	0	0	0	1
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1483			1772		697	1269				141
v/s Ratio Prot		c0.00			c0.07		0.13	c0.27				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.06			0.19		0.33	0.67				0.01
Uniform Delay, d1		11.1			17.3		15.4	18.4				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.3	2.9				0.1
Delay (s)		11.2			17.5		16.7	21.2				34.3
Level of Service		B			B		B	C				C
Approach Delay (s)		11.2			17.5		20.5					34.3
Approach LOS		B			B		C					C

Intersection Summary		
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.43	B
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	52.1%	ICU Level of Service
Analysis Period (min)	15	A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	85	175	211	325	0	0
Ideal Flow (vphpl)	1000	1000	1000	1000	1000	1000
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	*0.85	*0.85	*0.60	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.94	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	755	672	1080	948		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	755	672	1080	948		
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	98	201	243	374	0	0
RTOR Reduction (vph)	29	71	0	0	0	0
Lane Group Flow (vph)	127	72	243	374	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	30.2	30.2	19.8	60.0		
Effective Green, g (s)	30.2	30.2	19.8	60.0		
Actuated g/C Ratio	0.50	0.50	0.33	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	380	338	356	948		
v/s Ratio Prot	0.17		c0.22	c0.39		
v/s Ratio Perm		0.11				
v/c Ratio	0.33	0.21	0.68	0.39		
Uniform Delay, d1	8.9	8.3	17.4	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	0.3	5.3	0.3		
Delay (s)	9.4	8.6	22.7	0.3		
Level of Service	A	A	C	A		
Approach Delay (s)	9.0			9.1	0.0	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay			9.1		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.55			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			36.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔↔	
Volume (vph)	110	79	150	2	84	4	115	285	5	3	203	97
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	0.95	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	1872		1116	1260		1215	2419		1215	2218	
Fit Permitted	0.47	1.00		0.58	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	572	1872		684	1260		1215	2419		1215	2218	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	133	95	181	2	101	5	139	343	6	4	245	117
RTOR Reduction (vph)	0	124	0	0	2	0	0	1	0	0	40	0
Lane Group Flow (vph)	133	152	0	2	104	0	139	348	0	4	322	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	37.5	37.5		15.3	15.3		19.1	61.8		4.4	47.1	
Effective Green, g (s)	37.5	37.5		15.3	15.3		19.1	61.8		4.4	47.1	
Actuated g/C Ratio	0.31	0.31		0.13	0.13		0.16	0.51		0.04	0.39	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	585		87	160		193	1245		44	870	
v/s Ratio Prot	c0.07	0.08			c0.08		c0.11	0.14		0.00	c0.15	
v/s Ratio Perm	0.09			0.00								
v/c Ratio	0.51	0.26		0.02	0.65		0.72	0.28		0.09	0.37	
Uniform Delay, d1	32.3	30.9		45.8	49.8		47.9	16.5		55.9	25.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.2		0.1	9.1		12.4	0.6		0.9	1.2	
Delay (s)	33.8	31.1		45.9	59.0		60.3	17.0		56.8	27.1	
Level of Service	C	C		D	E		E	B		E	C	
Approach Delay (s)		32.0			58.7			29.4			27.4	
Approach LOS		C			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.9									C
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			120.0							21.6		
Intersection Capacity Utilization			73.9%									D
Analysis Period (min)			15									
c Critical Lane Group												

2040 CUMULATIVE WITH PROJECT – NO EVENT
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	924	825	48	386	937	47	79	1494	481	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	0.99		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3001		2987	3010			5476	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3001		2987	3010			5476	942			
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)	953	851	49	398	966	48	81	1540	496	0	0	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	206	0	0	0
Lane Group Flow (vph)	953	896	0	398	1014	0	0	1621	290	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Effective Green, g (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Actuated g/C Ratio	0.17	0.34		0.12	0.31			0.36	0.36			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1014		358	922			1951	335			
v/s Ratio Prot	c0.21	0.30		0.13	c0.34							
v/s Ratio Perm								0.30	c0.31			
v/c Ratio	1.29	0.88		1.11	1.10			0.83	0.87			
Uniform Delay, d1	45.9	34.4		48.4	38.1			32.4	33.0			
Progression Factor	1.37	1.51		1.43	0.99			0.96	1.16			
Incremental Delay, d2	132.8	4.7		71.8	55.6			3.1	19.8			
Delay (s)	195.8	56.7		141.1	93.3			34.3	58.0			
Level of Service	F	E		F	F			C	E			
Approach Delay (s)		128.2			106.8			39.9			0.0	
Approach LOS		F			F			D			A	

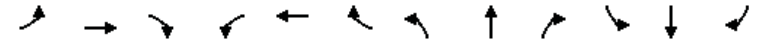
Intersection Summary

HCM 2000 Control Delay	87.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕↕	↕↕	↔	↕↕	↕↕
Volume (vph)	346	1643	36	30	962	24	8	250	107	47	625	592
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.86	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.77	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4143		1459	2863			1527	813	1123	2319	550
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.51	1.00	1.00
Satd. Flow (perm)	1459	4143		1459	2863			1477	813	607	2319	550
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	353	1677	37	31	982	24	8	255	109	48	638	604
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	71	0	29	228
Lane Group Flow (vph)	353	1712	0	31	1005	0	0	263	38	48	832	153
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.39		0.08	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1619		118	934			512	282	216	826	196
v/s Ratio Prot	c0.24	0.41		0.02	c0.35						c0.36	
v/s Ratio Perm								0.18	0.05	0.08		0.28
v/c Ratio	1.86	1.06		0.26	1.08			0.51	0.13	0.22	1.01	0.78
Uniform Delay, d1	47.8	33.5		47.5	37.0			28.5	24.6	24.7	35.4	31.5
Progression Factor	0.59	1.13		0.89	0.88			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	394.4	32.6		0.1	36.4			0.9	0.2	0.5	33.1	17.5
Delay (s)	422.6	70.3		42.2	68.9			29.4	24.8	25.3	68.5	49.0
Level of Service	F	E		D	E			C	C	C	E	D
Approach Delay (s)		130.5			68.1			28.0			61.1	
Approach LOS		F			E			C			E	

Intersection Summary

HCM 2000 Control Delay	90.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	123.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↑	↑
Volume (vph)	2002	157	0	1562	100	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.91			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	4366			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	4366			3079	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2085	164	0	1627	104	24
RTOR Reduction (vph)	8	0	0	0	0	3
Lane Group Flow (vph)	2241	0	0	1627	104	21
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	2464			1738	512	451
v/s Ratio Prot	0.51			c0.53	c0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.91			0.94	0.20	0.05
Uniform Delay, d1	21.4			22.1	26.3	24.9
Progression Factor	1.00			0.75	1.00	1.00
Incremental Delay, d2	6.3			3.1	0.9	0.2
Delay (s)	27.8			19.8	27.2	25.1
Level of Service	C			B	C	C
Approach Delay (s)	27.8			19.8	26.8	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	250	1050	150	100	570	810	340	336	1371	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		6062			3026	2596			4316	1033
Fit Permitted		0.99			0.52	1.00			0.95	1.00
Satd. Flow (perm)		6062			1584	2596			4316	1033
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	272	1129	161	108	613	871	366	365	1474	495
RTOR Reduction (vph)	0	23	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1539	0	0	721	1236	0	0	1889	445
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1953			492	807			1294	309
v/s Ratio Prot						c0.48			c0.44	
v/s Ratio Perm		0.25			0.46					0.43
v/c Ratio		0.79			1.54dl	1.53			1.46	1.44
Uniform Delay, d1		27.7			31.0	31.0			31.5	31.5
Progression Factor		1.56			0.31	1.00			1.00	1.00
Incremental Delay, d2		2.0			210.5	245.3			211.2	215.6
Delay (s)		45.2			220.1	276.3			242.7	247.1
Level of Service		D			F	F			F	F
Approach Delay (s)		45.2			220.1	276.3			243.6	
Approach LOS		D			F	F			F	

Intersection Summary			
HCM 2000 Control Delay	194.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	135.5%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	105	305	1050	110	565	140	500	260	180	956
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.90		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.95		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		2494	3622		2497		1228		1401	2689
Fit Permitted		0.95	1.00		1.00		1.00		0.15	0.60
Satd. Flow (perm)		2494	3622		2497		1228		218	1616
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	328	1129	118	608	151	538	280	194	1028
RTOR Reduction (vph)	0	0	12	0	15	0	226	0	0	0
Lane Group Flow (vph)	0	408	1268	0	879	0	177	0	373	1129
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0		23.0		42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5		23.0		43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27		0.26		0.48	0.48
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		623	1006		679		313		322	977
v/s Ratio Prot		0.16	c0.35		c0.35				0.21	c0.21
v/s Ratio Perm							0.14		0.35	0.35
v/c Ratio		0.65	1.26		1.29		0.56		1.16	1.16
Uniform Delay, d1		30.3	32.5		32.8		29.1		33.1	23.2
Progression Factor		1.00	1.00		1.00		1.00		1.07	1.08
Incremental Delay, d2		5.3	125.5		143.1		7.2		74.8	71.2
Delay (s)		35.6	158.0		175.9		36.3		110.0	96.3
Level of Service		D	F		F		D		F	F
Approach Delay (s)			128.4		132.5					99.7
Approach LOS			F		F					F
Intersection Summary										
HCM 2000 Control Delay										
HCM 2000 Volume to Capacity ratio										
Actuated Cycle Length (s)										
Intersection Capacity Utilization										
Analysis Period (min)										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔	↔	↔	↔	↔
Volume (vph)	56	98	214	28	30	77	39	1457	106	58	422	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	0.99		1.00	0.99	
Fit Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1585	1353		1457		1540	3023		1540	3051	
Fit Permitted		0.85	1.00		0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1371	1353		1358		1540	3023		1540	3051	
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)	59	103	225	29	32	81	41	1534	112	61	444	24
RTOR Reduction (vph)	0	0	153	0	48	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	162	72	0	94	0	41	1641	0	61	464	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Effective Green, g (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Actuated g/C Ratio		0.32	0.32		0.32		0.08	0.48		0.04	0.44	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		440	434		435		123	1435		69	1351	
v/s Ratio Prot							0.03	c0.54		c0.04	0.15	
v/s Ratio Perm		c0.12	0.05		0.07							
v/c Ratio		0.37	0.17		0.22		0.33	1.14		0.88	0.34	
Uniform Delay, d1		26.1	24.4		24.8		43.5	26.2		47.5	18.3	
Progression Factor		1.00	1.00		1.00		1.24	0.64		1.00	1.00	
Incremental Delay, d2		2.4	0.8		1.1		6.6	72.7		79.1	0.7	
Delay (s)		28.5	25.2		25.9		60.5	89.4		126.6	19.0	
Level of Service		C	C		C		E	F		F	B	
Approach Delay (s)					25.9			88.7			31.4	
Approach LOS					C			F			C	
Intersection Summary												
HCM 2000 Control Delay					65.7			HCM 2000 Level of Service			E	
HCM 2000 Volume to Capacity ratio					0.83							
Actuated Cycle Length (s)					100.0			Sum of lost time (s)			15.9	
Intersection Capacity Utilization					97.5%			ICU Level of Service			F	
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015

	↖	→	↘	↙	←	↖	↙	↘	↙	↖	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	40	31	20	8	36	48	18	259	24	313	317	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.99	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.86	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2868			1605	1359	1327	1595		1540	1543	
Fit Permitted		0.83			0.91	1.00	0.53	1.00		0.95	1.00	
Satd. Flow (perm)		2432			1472	1359	745	1595		1540	1543	
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)	43	33	22	9	39	52	19	278	26	337	341	46
RTOR Reduction (vph)	0	19	0	0	0	33	0	4	0	0	4	0
Lane Group Flow (vph)	0	79	0	0	48	19	19	300	0	337	383	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		5.7			5.7	17.4	14.1	14.1		11.7	30.8	
Effective Green, g (s)		5.7			5.7	17.4	14.1	14.1		11.7	30.8	
Actuated g/C Ratio		0.12			0.12	0.37	0.30	0.30		0.25	0.66	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		298			180	654	225	483		387	1022	
v/s Ratio Prot						0.01		c0.19		c0.22	0.25	
v/s Ratio Perm		0.03			c0.03	0.01	0.03					
v/c Ratio		0.26			0.27	0.03	0.08	0.62		0.87	0.37	
Uniform Delay, d1		18.5			18.5	9.2	11.6	13.9		16.7	3.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			0.8	0.0	0.2	2.5		18.8	0.2	
Delay (s)		19.0			19.3	9.2	11.7	16.4		35.4	3.8	
Level of Service		B			B	A	B	B		D	A	
Approach Delay (s)		19.0			14.1			16.1			18.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		17.6										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		46.5				Sum of lost time (s)		15.0				
Intersection Capacity Utilization		68.8%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015

	↖	↙	↑	↘	↗	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↙	↑	↘	↗	↓
Volume (vph)	186	475	995	72	324	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2368	2431	1309	1540	1621
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2368	2431	1309	1540	1621
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	516	1082	78	352	321
RTOR Reduction (vph)	0	422	0	12	0	0
Lane Group Flow (vph)	202	94	1082	66	352	321
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	19.7	19.7	49.1	49.1	24.1	78.2
Effective Green, g (s)	19.7	19.7	49.1	49.1	24.1	78.2
Actuated g/C Ratio	0.18	0.18	0.46	0.46	0.22	0.72
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	432	1106	595	343	1174
v/s Ratio Prot	c0.13		c0.45		c0.23	0.20
v/s Ratio Perm		0.04		0.05		
v/c Ratio	0.72	0.22	0.98	0.11	1.03	0.27
Uniform Delay, d1	41.5	37.5	28.9	16.9	41.9	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	0.3	21.7	0.1	55.5	0.1
Delay (s)	50.0	37.8	50.6	17.0	97.4	5.2
Level of Service	D	D	D	B	F	A
Approach Delay (s)	41.2		48.3			53.4
Approach LOS	D		D			D
Intersection Summary						
HCM 2000 Control Delay			47.7		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			107.9		Sum of lost time (s)	15.0
Intersection Capacity Utilization			75.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	24	48	43	195	456	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	1.00	
Flpb, ped/bikes	0.98		0.99	1.00	1.00	
Frt	0.91		1.00	1.00	0.99	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1523		1688	1531	3107	
Fit Permitted	0.98		0.44	1.00	1.00	
Satd. Flow (perm)	1523		787	1531	3107	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	53	48	217	507	51
RTOR Reduction (vph)	48	0	0	0	7	0
Lane Group Flow (vph)	32	0	48	217	551	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Actuated Green, G (s)	3.9		24.8	24.8	24.8	
Effective Green, g (s)	3.9		24.8	24.8	24.8	
Actuated g/C Ratio	0.10		0.66	0.66	0.66	
Clearance Time (s)	4.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	157		517	1007	2043	
v/s Ratio Prot				0.14	c0.18	
v/s Ratio Perm	c0.02		0.06			
v/c Ratio	0.21		0.09	0.22	0.27	
Uniform Delay, d1	15.5		2.4	2.6	2.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7		0.1	0.1	0.1	
Delay (s)	16.1		2.4	2.7	2.8	
Level of Service	B		A	A	A	
Approach Delay (s)	16.1			2.6	2.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	211	332	1409	17	80	1021
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3412		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3412		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	234	369	1566	19	89	1134
RTOR Reduction (vph)	0	142	1	0	0	0
Lane Group Flow (vph)	234	227	1584	0	89	1134
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1641		135	2090
v/s Ratio Prot			c0.46		0.05	c0.33
v/s Ratio Perm	0.15	c0.15				
v/c Ratio	0.52	0.54	0.97		0.66	0.54
Uniform Delay, d1	29.8	30.1	25.1		44.7	11.3
Progression Factor	1.00	1.00	1.66		1.05	1.04
Incremental Delay, d2	1.0	1.4	9.4		11.1	0.3
Delay (s)	30.8	31.5	51.2		57.9	12.1
Level of Service	C	C	D		E	B
Approach Delay (s)	31.2		51.2			15.4
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	30	55	198	409	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1540	1351		3041	2974	
Flt Permitted	0.95	1.00		0.72	1.00	
Satd. Flow (perm)	1540	1351		2225	2974	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	35	65	233	481	112
RTOR Reduction (vph)	0	34	0	0	37	0
Lane Group Flow (vph)	47	1	0	298	556	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.1	2.1		15.4	15.4	
Effective Green, g (s)	2.1	2.1		15.4	15.4	
Actuated g/C Ratio	0.04	0.04		0.29	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	60	53		645	862	
v/s Ratio Prot	c0.03				c0.19	
v/s Ratio Perm		0.00		0.13		
v/c Ratio	0.78	0.03		0.46	0.65	
Uniform Delay, d1	25.3	24.5		15.5	16.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	47.5	0.2		0.5	1.7	
Delay (s)	72.8	24.7		16.0	18.1	
Level of Service	E	C		B	B	
Approach Delay (s)	52.3			16.0	18.1	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	167	67	107	53	87	10	221	45	19	10	197	164
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	182	77	123	61	100	11	254	49	22	11	214	178
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	182	200	61	111	325	225	178					
Volume Left (vph)	182	0	61	0	254	11	0					
Volume Right (vph)	0	123	0	11	22	0	178					
Hadj (s)	0.53	-0.40	0.53	-0.03	0.15	0.06	-0.67					
Departure Headway (s)	7.7	6.8	8.2	7.6	7.0	7.0	6.3					
Degree Utilization, x	0.39	0.38	0.14	0.23	0.63	0.44	0.31					
Capacity (veh/h)	444	505	403	434	492	490	543					
Control Delay (s)	14.3	12.6	11.3	11.7	21.4	14.2	10.9					
Approach Delay (s)	13.4		11.5		21.4	12.8						
Approach LOS	B		B		C	B						

Intersection Summary			
Delay		15.0	
Level of Service		B	
Intersection Capacity Utilization		56.8%	ICU Level of Service B
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	193	209	313	24	305	143	310	1090	58	73	943	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1621	1337	1527	1621	1304	2987	3049		1540	2978	
Fit Permitted	0.40	1.00	1.00	0.54	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	638	1621	1337	867	1621	1304	2987	3049		1540	2978	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	212	230	344	26	335	157	341	1198	64	80	1036	237
RTOR Reduction (vph)	0	0	206	0	0	104	0	4	0	0	20	0
Lane Group Flow (vph)	212	230	138	26	335	53	341	1258	0	80	1253	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0	12.5	43.9		6.4	37.8	
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	12.5	43.9		6.4	37.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.12	0.44		0.06	0.38	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	216	551	454	294	551	443	373	1338		98	1125	
v/s Ratio Prot		0.14			0.21		0.11	0.41		0.05	0.42	
v/s Ratio Perm	0.33		0.10	0.03		0.04						
v/c Ratio	0.98	0.42	0.30	0.09	0.61	0.12	0.91	0.94		0.82	1.11	
Uniform Delay, d1	32.7	25.4	24.3	22.5	27.5	22.7	43.2	26.8		46.2	31.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.55	0.92		1.01	1.00	
Incremental Delay, d2	55.7	0.5	0.4	0.1	1.9	0.1	9.2	4.7		34.3	62.2	
Delay (s)	88.4	25.9	24.7	22.6	29.4	22.8	33.2	29.3		81.0	93.5	
Level of Service	F	C	C	C	C	C	C	C		F	F	
Approach Delay (s)		42.2			27.0			30.1			92.7	
Approach LOS		D			C			C			F	
Intersection Summary												
HCM 2000 Control Delay			51.9				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				15.7		
Intersection Capacity Utilization			102.1%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	127	550	14	42	712	77	49	54	77	88	34	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.88	1.00	0.98		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.87	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1269	1621	1520		1525	1399	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.34	1.00		0.67	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1269	572	1520		1068	1399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	598	15	46	774	84	53	59	84	96	37	248
RTOR Reduction (vph)	0	0	7	0	0	43	0	68	0	0	200	0
Lane Group Flow (vph)	138	598	8	46	774	41	53	75	0	96	85	0
Confl. Peds. (#/hr)		50			50					50		50
Confl. Bikes (#/hr)				10		10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	8.0	38.5	38.5	4.6	35.1	35.1	13.9	13.9		13.9	13.9	
Effective Green, g (s)	8.0	38.5	38.5	4.6	35.1	35.1	13.9	13.9		13.9	13.9	
Actuated g/C Ratio	0.11	0.53	0.53	0.06	0.49	0.49	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	180	912	754	103	831	618	110	293		206	270	
v/s Ratio Prot	0.09	0.35		0.03	0.45			0.05			0.06	
v/s Ratio Perm			0.01			0.03	0.09				0.09	
v/c Ratio	0.77	0.66	0.01	0.45	0.93	0.07	0.48	0.26		0.47	0.31	
Uniform Delay, d1	31.1	12.0	7.8	32.5	17.3	9.8	25.8	24.7		25.8	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.6	3.7	0.0	3.1	16.9	0.0	3.3	0.5		1.7	0.7	
Delay (s)	48.7	15.7	7.9	35.5	34.2	9.8	29.1	25.1		27.4	25.6	
Level of Service	D	B	A	D	C	A	C	C		C	C	
Approach Delay (s)		21.6			32.0			26.2			26.1	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay					27.0		HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio					0.80							
Actuated Cycle Length (s)					72.0		Sum of lost time (s)				15.0	
Intersection Capacity Utilization					94.4%		ICU Level of Service				F	
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	137	400	234	66	831	92	138	173	129	162	329	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	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	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1540	1540	1378	1540	1540	1321	1540	2882			3029	1357
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.32	1.00			0.68	1.00
Satd. Flow (perm)	1540	1540	1378	1540	1540	1321	518	2882			2108	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	143	417	244	69	866	96	144	180	134	169	343	195
RTOR Reduction (vph)	0	0	100	0	0	25	0	96	0	0	0	142
Lane Group Flow (vph)	143	417	144	69	866	71	144	218	0	0	512	53
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	68.6	68.6	6.3	64.9	64.9	34.3	34.3			33.3	33.3
Effective Green, g (s)	9.0	68.6	68.6	6.3	64.9	64.9	34.3	34.3			33.3	33.3
Actuated g/C Ratio	0.07	0.56	0.56	0.05	0.53	0.53	0.28	0.28			0.27	0.27
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	113	864	773	79	817	701	145	808			574	369
v/s Ratio Prot	c0.09	c0.27		0.04	c0.56			0.08				
v/s Ratio Perm			0.10			0.05	c0.28				0.24	0.04
v/c Ratio	1.27	0.48	0.19	0.87	1.06	1.01	0.99	0.27			0.89	0.14
Uniform Delay, d1	56.6	16.1	13.1	57.6	28.6	14.2	43.8	34.2			42.7	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	172.2	1.9	0.5	60.4	48.6	0.1	72.3	0.2			16.0	0.2
Delay (s)	228.8	18.1	13.7	118.0	77.3	14.3	116.2	34.4			58.8	33.8
Level of Service	F	B	B	F	E	B	F	C			E	C
Approach Delay (s)		54.2			74.1			60.1			51.9	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	61.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	72	561	76	58	612	486	75	329	48	162	140	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.95		*0.95	*0.95	*0.95	*0.95	*0.95	*0.95	*0.95	*0.95	*0.95
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1279		1463	1540	1178	1463	1309	1257	1463	1382	
Fit Permitted	0.10	1.00		0.19	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	168	1279		290	1540	1178	1463	1309	1257	1463	1382	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	77	597	81	62	651	517	80	350	51	172	149	139
RTOR Reduction (vph)	0	4	0	0	0	74	0	0	39	0	31	0
Lane Group Flow (vph)	77	674	0	62	651	443	80	350	12	172	257	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)		10	10					10				
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	51.1	51.1		51.1	51.1	61.1	11.6	25.0	25.0	10.0	23.4	
Effective Green, g (s)	51.1	51.1		51.1	51.1	61.1	11.6	25.0	25.0	10.0	23.4	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.56	0.11	0.23	0.23	0.09	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	117	598		169	720	713	155	299	287	133	296	
v/s Ratio Prot	0.02	c0.53		0.01	c0.42	0.06	0.05	c0.27		c0.12	0.19	
v/s Ratio Perm	0.29			0.16		0.32			0.01			
v/c Ratio	0.66	1.13		0.37	0.90	0.62	0.52	1.17	0.04	1.29	0.87	
Uniform Delay, d1	22.9	29.1		35.3	26.8	16.2	46.1	42.1	32.8	49.6	41.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.6	76.9		1.4	14.8	1.7	2.9	106.5	0.1	176.6	22.4	
Delay (s)	35.5	105.9		36.6	41.6	17.9	49.0	148.6	32.8	226.2	63.8	
Level of Service	D	F		D	D	B	D	F	C	F	E	
Approach Delay (s)		98.7			31.4			119.8			124.5	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	77.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	109.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	78	93	49	56	372	17	41	126	109	21	61	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	
Frt	1.00	0.95		1.00	0.99			1.00	0.85		0.90	
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1695	3198		1680	1786			1776	1496		1575	
Fit Permitted	0.30	1.00		0.65	1.00			0.78	1.00		0.97	
Satd. Flow (perm)	537	3198		1154	1786			1409	1496		1540	
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)	87	103	54	62	413	19	46	140	121	23	68	298
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	87	0	153	0
Lane Group Flow (vph)	87	121	0	62	430	0	0	186	34	0	236	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	21.1	21.1		21.1	21.1			18.3	18.3		18.3	
Effective Green, g (s)	21.1	21.1		21.1	21.1			18.3	18.3		18.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.28	0.28		0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	175	1047		378	585			400	425		437	
v/s Ratio Prot		0.04			c0.24							
v/s Ratio Perm	0.16			0.05				0.13	0.02		c0.15	
v/c Ratio	0.50	0.12		0.16	0.74			0.47	0.08		0.54	
Uniform Delay, d1	17.4	15.1		15.4	19.2			19.0	16.9		19.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	2.2	0.0		0.2	4.8			0.9	0.1		1.3	
Delay (s)	19.6	15.2		15.6	24.0			19.9	17.0		20.8	
Level of Service	B	B		B	C			B	B		C	
Approach Delay (s)		16.8			22.9			18.7			20.8	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	205	134	106	117	519	45	106	1208	49	36	941	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	1.00		1.00	0.99
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.99		1.00	0.96
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1689	3143		1682	3367			1711	3398		1711	3269
Fit Permitted	0.33	1.00		0.59	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	587	3143		1050	3367			1711	3398		1711	3269
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	218	143	113	124	552	48	113	1285	52	38	1001	322
RTOR Reduction (vph)	0	72	0	0	6	0	0	3	0	0	31	0
Lane Group Flow (vph)	218	184	0	124	594	0	113	1334	0	38	1292	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Effective Green, g (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.10	0.38		0.10	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	215	1153		385	1235		169	1287		169	1238	
v/s Ratio Prot		0.06			0.18		0.07	c0.39		0.02	c0.40	
v/s Ratio Perm	c0.37			0.12								
v/c Ratio	1.01	0.16		0.32	0.48		0.67	1.04		0.22	1.04	
Uniform Delay, d1	31.6	21.3		22.7	24.3		43.5	31.1		41.5	31.1	
Progression Factor	1.00	1.00		1.00	1.00		0.92	0.85		1.49	0.57	
Incremental Delay, d2	65.0	0.3		2.2	1.3		17.7	34.1		1.0	27.8	
Delay (s)	96.7	21.6		24.9	25.7		57.7	60.5		63.1	45.5	
Level of Service	F	C		C	C		E	E		E	D	
Approach Delay (s)		56.1			25.5			60.3			46.0	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

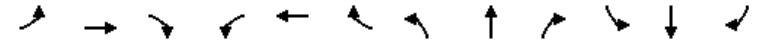


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	85	453	76	16	834	105	51	0	24	46	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98			0.96		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1711	3347		1711	3364			1666		1711	1531	
Flt Permitted	0.16	1.00		0.38	1.00			0.76		0.70	1.00	
Satd. Flow (perm)	289	3347		678	3364			1304		1268	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	492	83	17	907	114	55	0	26	50	0	187
RTOR Reduction (vph)	0	15	0	0	11	0	0	14	0	0	36	0
Lane Group Flow (vph)	92	560	0	17	1010	0	0	67	0	50	151	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.0	39.0		39.0	39.0			41.0		41.0	41.0	
Effective Green, g (s)	39.0	39.0		39.0	39.0			41.0		41.0	41.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46		0.46	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	125	1450		293	1457			594		577	697	
v/s Ratio Prot		0.17			0.30						0.10	
v/s Ratio Perm	c0.32			0.03				0.05		0.04		
v/c Ratio	0.74	0.39		0.06	0.69			0.11		0.09	0.22	
Uniform Delay, d1	21.2	17.4		14.8	20.7			14.1		13.9	14.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	31.7	0.8		0.4	2.7			0.4		0.3	0.7	
Delay (s)	52.9	18.1		15.2	23.4			14.4		14.2	15.5	
Level of Service	D	B		B	C			B		B	B	
Approach Delay (s)		22.9			23.3			14.4			15.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

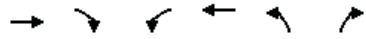


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	37	129	0	0	1028	99	539	248	498	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	1.00				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			0.99		1.00	0.90				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3383			5064		1711	3079				2694
Flt Permitted		0.76			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2611			5064		1711	3079				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	38	132	0	0	1049	101	550	253	508	0	0	618
RTOR Reduction (vph)	0	0	0	0	11	0	0	309	0	0	0	142
Lane Group Flow (vph)	0	170	0	0	1139	0	550	452	0	0	0	476
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		57.5			31.5		43.0	43.0				22.5
Effective Green, g (s)		57.5			31.5		43.0	43.0				22.5
Actuated g/C Ratio		0.52			0.29		0.39	0.39				0.20
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1522			1450		668	1203				551
v/s Ratio Prot		0.02			c0.22		c0.32	0.15				c0.18
v/s Ratio Perm		0.04										
v/c Ratio		0.11			0.79		0.82	0.38				0.86
Uniform Delay, d1		13.3			36.1		30.1	23.9				42.3
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			4.4		11.0	0.9				16.3
Delay (s)		13.5			40.5		41.1	24.8				58.6
Level of Service		B			D		D	C				E
Approach Delay (s)		13.5			40.5		31.7					58.6
Approach LOS		B			D		C					E

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	166	430	1416	757	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.93	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1575	1424	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1575	1424	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	171	443	1460	780	0	0
RTOR Reduction (vph)	4	4	0	0	0	0
Lane Group Flow (vph)	318	288	1460	780	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	21.3	21.3	38.7	70.0		
Effective Green, g (s)	21.3	21.3	38.7	70.0		
Actuated g/C Ratio	0.30	0.30	0.55	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	479	433	1834	1801		
v/s Ratio Prot	0.20		c0.44	0.43		
v/s Ratio Perm		c0.20				
v/c Ratio	0.66	0.66	0.80	0.43		
Uniform Delay, d1	21.2	21.2	12.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	3.8	2.5	0.2		
Delay (s)	24.7	25.1	15.0	0.2		
Level of Service	C	C	B	A		
Approach Delay (s)	24.9			9.8	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	227	168	188	9	204	13	209	969	29	110	925	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	2495		1448	1592		1540	3056		1540	2899	
Fit Permitted	0.32	1.00		0.53	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	509	2495		809	1592		1540	3056		1540	2899	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	236	175	196	9	212	14	218	1009	30	115	964	286
RTOR Reduction (vph)	0	139	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	236	232	0	9	224	0	218	1037	0	115	1222	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.2	29.2		18.9	18.9		16.6	42.7		11.8	37.9	
Effective Green, g (s)	29.2	29.2		18.9	18.9		16.6	42.7		11.8	37.9	
Actuated g/C Ratio	0.29	0.29		0.19	0.19		0.17	0.43		0.12	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	198	728		152	300		255	1304		181	1098	
v/s Ratio Prot	c0.06	0.09			0.14		0.14	c0.34		0.07	c0.42	
v/s Ratio Perm	c0.29			0.01								
v/c Ratio	1.19	0.32		0.06	0.75		0.85	0.80		0.64	1.11	
Uniform Delay, d1	35.9	27.6		33.3	38.3		40.5	24.9		42.0	31.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.92	0.89	
Incremental Delay, d2	125.3	0.3		0.2	9.6		23.3	5.1		6.8	63.3	
Delay (s)	161.2	27.9		33.4	47.9		63.8	29.9		45.4	90.8	
Level of Service	F	C		C	D		E	C		D	F	
Approach Delay (s)		79.7			47.4			35.8			87.0	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.6
Intersection Capacity Utilization	104.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

2040 CUMULATIVE WITH PROJECT - NO EVENT
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	662	674	232	381	618	102	74	709	281	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.96		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2882		2987	2966			5505	1238			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2882		2987	2966			5505	1238			
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)	736	749	258	423	687	113	82	788	312	0	0	0
RTOR Reduction (vph)	0	31	0	0	11	0	0	0	227	0	0	0
Lane Group Flow (vph)	736	976	0	423	789	0	0	870	85	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	21.3	38.8		22.2	39.7			30.1	30.1			
Effective Green, g (s)	21.3	38.8		22.2	39.7			30.1	30.1			
Actuated g/C Ratio	0.19	0.35		0.20	0.36			0.27	0.27			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	867	1016		602	1070			1506	338			
v/s Ratio Prot	0.16	c0.34		0.14	c0.27							
v/s Ratio Perm								0.16	0.07			
v/c Ratio	0.85	0.96		0.70	0.74			0.58	0.25			
Uniform Delay, d1	42.8	34.9		40.8	30.6			34.5	31.2			
Progression Factor	0.69	0.56		0.73	0.41			1.40	5.85			
Incremental Delay, d2	5.2	15.0		1.6	1.2			0.5	0.4			
Delay (s)	34.6	34.5		31.3	13.6			48.7	182.8			
Level of Service	C	C		C	B			D	F			
Approach Delay (s)		34.5			19.7			84.1			0.0	
Approach LOS		C			B			F			A	

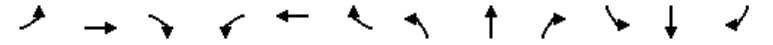
Intersection Summary

HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	348	1439	114	64	572	56	16	178	42	87	497	199
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.97		1.00	0.94			1.00	0.63	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.74	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4253		1296	2415			1586	857	1147	2874	581
Fit Permitted	0.95	1.00		0.95	1.00			0.89	1.00	0.55	1.00	1.00
Satd. Flow (perm)	1540	4253		1296	2415			1420	857	664	2874	581
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	370	1531	121	68	609	60	17	189	45	93	529	212
RTOR Reduction (vph)	0	7	0	0	6	0	0	0	33	0	3	129
Lane Group Flow (vph)	370	1645	0	68	663	0	0	206	12	93	547	62
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	26.1	50.1		11.4	33.8			28.6	28.6	29.6	29.6	29.6
Effective Green, g (s)	26.1	50.1		11.4	33.8			28.6	28.6	29.6	29.6	29.6
Actuated g/C Ratio	0.24	0.46		0.10	0.31			0.26	0.26	0.27	0.27	0.27
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	365	1937		134	742			369	222	178	773	156
v/s Ratio Prot	0.24	c0.39		0.05	c0.27						c0.19	
v/s Ratio Perm								0.15	0.01	0.14		0.11
v/c Ratio	1.01	0.85		0.51	0.89			0.56	0.05	0.52	0.71	0.40
Uniform Delay, d1	42.0	26.6		46.6	36.4			35.2	30.5	34.2	36.3	32.9
Progression Factor	0.82	1.00		0.75	0.72			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.1	2.4		2.1	9.7			1.8	0.1	2.8	3.0	1.7
Delay (s)	70.7	29.0		37.0	35.9			37.1	30.6	36.9	39.3	34.6
Level of Service	E	C		D	D			D	C	D	D	C
Approach Delay (s)		36.6			36.0			35.9			37.9	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	137.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1748	91	0	787	35	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3054			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3054			3079	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1921	100	0	865	38	168
RTOR Reduction (vph)	2	0	0	0	0	8
Lane Group Flow (vph)	2019	0	0	865	38	160
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	80.4			80.4	18.3	18.3
Effective Green, g (s)	80.4			80.4	18.3	18.3
Actuated g/C Ratio	0.73			0.73	0.17	0.17
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2232			2250	256	225
v/s Ratio Prot	c0.66			0.28	0.02	
v/s Ratio Perm						c0.12
v/c Ratio	0.90			0.38	0.15	0.71
Uniform Delay, d1	11.8			5.5	39.2	43.3
Progression Factor	1.00			0.19	1.00	1.00
Incremental Delay, d2	6.6			0.1	0.3	9.8
Delay (s)	18.4			1.1	39.5	53.2
Level of Service	B			A	D	D
Approach Delay (s)	18.4			1.1	50.6	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			15.7		HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			79.1%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↔
Volume (vph)	246	1136	135	65	529	548	292	246	855	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.98	1.00
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.99			1.00	0.95			0.99	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		6082			3025	2563			4236	1185
Fit Permitted		0.99			0.66	1.00			0.96	1.00
Satd. Flow (perm)		6082			2004	2563			4236	1185
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	254	1171	139	67	545	565	301	254	881	469
RTOR Reduction (vph)	0	23	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1541	0	0	612	865	0	0	1233	371
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		20.5			22.0	22.0			15.0	15.0
Effective Green, g (s)		22.5			25.0	25.0			18.0	18.0
Actuated g/C Ratio		0.30			0.33	0.33			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1824			668	854			1016	284
v/s Ratio Prot						c0.34			0.29	c0.31
v/s Ratio Perm		0.25			0.31					
v/c Ratio		0.84			0.92	1.01			1.21	1.31
Uniform Delay, d1		24.6			24.0	25.0			28.5	28.5
Progression Factor		1.00			0.89	1.00			1.00	1.00
Incremental Delay, d2		3.8			6.9	33.9			105.3	161.0
Delay (s)		28.4			28.2	58.9			133.8	189.5
Level of Service		C			C	E			F	F
Approach Delay (s)		28.4			28.2	58.9			146.7	
Approach LOS		C			C	E			F	
Intersection Summary										
HCM 2000 Control Delay					74.9				HCM 2000 Level of Service E	
HCM 2000 Volume to Capacity ratio					1.08					
Actuated Cycle Length (s)					75.0			Sum of lost time (s)	12.5	
Intersection Capacity Utilization					110.3%			ICU Level of Service	H	
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

	↖	↗	→	↘	↑	↖	↗	↘	↙	↓
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↖↗	↖↗↘		↖↗		↖		↖	↖↗
Volume (vph)	335	200	510	120	259	41	292	236	77	727
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.98		0.90		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.97		0.95		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		2186	3343		2476		1225		1401	2697
Fit Permitted		0.95	0.99		1.00		1.00		0.28	0.95
Satd. Flow (perm)		2186	3343		2476		1225		406	2560
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	414	247	630	148	320	51	360	291	95	898
RTOR Reduction (vph)	0	0	34	0	44	0	179	0	0	0
Lane Group Flow (vph)	0	570	835	0	460	0	48	0	362	922
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		539	936		577		261		341	1132
v/s Ratio Prot		c0.26	0.25		0.19				c0.18	0.14
v/s Ratio Perm							0.04		c0.28	0.22
v/c Ratio		1.58dl	0.89		0.80		0.19		1.06	0.81
Uniform Delay, d1		28.2	25.9		27.1		24.2		24.3	18.6
Progression Factor		1.00	1.00		1.00		1.00		0.93	0.93
Incremental Delay, d2		54.9	12.6		10.9		1.6		51.8	3.3
Delay (s)		83.1	38.5		38.0		25.7		74.3	20.5
Level of Service		F	D		D		C		E	C
Approach Delay (s)			56.2		34.2					35.7
Approach LOS			E		C					D
Intersection Summary										
HCM 2000 Control Delay			43.9		HCM 2000 Level of Service					D
HCM 2000 Volume to Capacity ratio			0.85							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)				13.5	
Intersection Capacity Utilization			72.3%		ICU Level of Service				C	
Analysis Period (min)			15							
dl Defacto Left Lane. Recode with 1 though lane as a left lane. c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

	↖	→	↘	↙	←	↖	↗	↑	↘	↙	↘	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Volume (vph)	50	13	144	12	12	16	18	555	1570	1570	34	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1549	1354		1497		1272	2532		1540	3050	
Fit Permitted		0.74	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1195	1354		1337		1272	2532		1540	3050	
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)	52	13	148	12	12	16	19	572	12	35	208	12
RTOR Reduction (vph)	0	0	125	0	14	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	65	23	0	26	0	19	583	0	35	216	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		6.6	6.6		6.6		0.9	18.0		2.5	19.9	
Effective Green, g (s)		6.6	6.6		6.6		0.9	18.0		2.5	19.9	
Actuated g/C Ratio		0.15	0.15		0.15		0.02	0.42		0.06	0.46	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		183	207		205		26	1059		89	1411	
v/s Ratio Prot							0.01	c0.23		c0.02	0.07	
v/s Ratio Perm		c0.05	0.02		0.02							
v/c Ratio		0.36	0.11		0.13		0.73	0.55		0.39	0.15	
Uniform Delay, d1		16.3	15.7		15.7		20.9	9.4		19.5	6.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2	0.2		0.3		62.1	0.6		1.0	0.1	
Delay (s)		17.5	15.9		16.0		83.0	10.1		20.6	6.7	
Level of Service		B	B		B		F	B		C	A	
Approach Delay (s)		16.4			16.0			12.4			8.6	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			43.0		Sum of lost time (s)				15.9			
Intersection Capacity Utilization			53.1%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	15	13	14	5	11	26	13	89	4	190	164	31
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.96	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2388			1426	1227	1152	1437		1377	1360	
Fit Permitted		0.95			1.00	1.00	0.62	1.00		0.95	1.00	
Satd. Flow (perm)		2321			1449	1227	749	1437		1377	1360	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	17	15	16	6	13	30	15	102	5	218	189	36
RTOR Reduction (vph)	0	15	0	0	0	15	0	3	0	0	5	0
Lane Group Flow (vph)	0	33	0	0	19	15	15	104	0	218	220	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.4			2.4	22.1	7.0	7.0		19.7	31.7	
Effective Green, g (s)		2.4			2.4	22.1	7.0	7.0		19.7	31.7	
Actuated g/C Ratio		0.05			0.05	0.50	0.16	0.16		0.45	0.72	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		126			78	754	118	228		615	977	
v/s Ratio Prot						0.01		c0.07		c0.16	0.16	
v/s Ratio Perm		c0.01			0.01	0.00	0.02					
v/c Ratio		0.26			0.24	0.02	0.13	0.46		0.35	0.23	
Uniform Delay, d1		20.0			20.0	5.5	15.9	16.8		8.0	2.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			1.6	0.0	0.5	1.5		0.1	0.1	
Delay (s)		21.1			21.6	5.5	16.4	18.3		8.1	2.2	
Level of Service		C			C	A	B	B		A	A	
Approach Delay (s)		21.1			11.8			18.1			5.1	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	109	214	292	62	193	144
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1745	1535	849	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1745	1535	849	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	125	246	336	71	222	166
RTOR Reduction (vph)	0	202	0	40	0	0
Lane Group Flow (vph)	125	44	336	31	222	166
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	15.0	15.0	33.4	28.4	20.2	58.6
Effective Green, g (s)	15.0	15.0	33.4	28.4	20.2	58.6
Actuated g/C Ratio	0.18	0.18	0.40	0.34	0.24	0.70
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	203	313	613	339	274	836
v/s Ratio Prot	c0.11		c0.22	0.02	c0.20	0.14
v/s Ratio Perm		0.03		0.02		
v/c Ratio	0.62	0.14	0.55	0.09	0.81	0.20
Uniform Delay, d1	31.6	28.9	19.3	18.8	29.9	4.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.2	1.0	0.1	16.4	0.1
Delay (s)	37.1	29.1	20.3	18.9	46.3	4.5
Level of Service	D	C	C	B	D	A
Approach Delay (s)	31.8		20.1			28.4
Approach LOS	C		C			C

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↕	↕↔	
Volume (vph)	13	31	23	139	147	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.95		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.90		1.00	1.00	1.00	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1525		1676	1531	3151	
Fit Permitted	0.99		0.64	1.00	1.00	
Satd. Flow (perm)	1525		1127	1531	3151	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	15	37	27	165	175	4
RTOR Reduction (vph)	35	0	0	0	1	0
Lane Group Flow (vph)	17	0	27	165	178	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.3		22.3	22.3	22.3	
Effective Green, g (s)	2.3		22.3	22.3	22.3	
Actuated g/C Ratio	0.07		0.64	0.64	0.64	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	101		726	986	2030	
v/s Ratio Prot	c0.01			c0.11	0.06	
v/s Ratio Perm			0.02			
v/c Ratio	0.17		0.04	0.17	0.09	
Uniform Delay, d1	15.3		2.2	2.5	2.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8		0.0	0.1	0.0	
Delay (s)	16.1		2.3	2.5	2.3	
Level of Service	B		A	A	A	
Approach Delay (s)	16.1			2.5	2.3	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕↔		↕	↕↔
Volume (vph)	11	96	470	7	106	474
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.95	1.00		1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1631	1454	3407		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1631	1454	3407		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	12	103	505	8	114	510
RTOR Reduction (vph)	0	94	1	0	0	0
Lane Group Flow (vph)	12	9	512	0	114	510
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	5.8	5.8	34.0		7.8	46.9
Effective Green, g (s)	5.8	5.8	34.0		7.8	46.9
Actuated g/C Ratio	0.09	0.09	0.54		0.12	0.75
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	150	134	1841		212	2550
v/s Ratio Prot			c0.15		c0.07	0.15
v/s Ratio Perm	c0.01	0.01				
v/c Ratio	0.08	0.07	0.28		0.54	0.20
Uniform Delay, d1	26.1	26.1	7.8		25.9	2.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.2	0.4		2.6	0.2
Delay (s)	26.3	26.3	8.2		28.5	2.6
Level of Service	C	C	A		C	A
Approach Delay (s)	26.3		8.2			7.3
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	15.3
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	15	14	122	162	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1353		2869	2840	
Flt Permitted	0.95	1.00		0.90	1.00	
Satd. Flow (perm)	1540	1353		2605	2840	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	18	16	144	191	19
RTOR Reduction (vph)	0	17	0	0	16	0
Lane Group Flow (vph)	47	1	0	160	194	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.2	2.2		8.3	8.3	
Effective Green, g (s)	2.2	2.2		8.3	8.3	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	73	64		471	513	
v/s Ratio Prot	c0.03				c0.07	
v/s Ratio Perm		0.00		0.06		
v/c Ratio	0.64	0.01		0.34	0.38	
Uniform Delay, d1	21.5	20.8		16.4	16.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.8	0.1		0.4	0.5	
Delay (s)	39.3	20.9		16.8	17.0	
Level of Service	D	C		B	B	
Approach Delay (s)	34.2			16.8	17.0	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			19.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.15			
Actuated Cycle Length (s)			45.9		Sum of lost time (s)	15.0
Intersection Capacity Utilization			27.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						


HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	230	32	32	2	18	10	48	68	13	10	159	178
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	250	41	41	3	23	11	61	74	16	11	173	193
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	250	81	3	34	151	184	193					
Volume Left (vph)	250	0	3	0	61	11	0					
Volume Right (vph)	0	41	0	11	16	0	193					
Hadj (s)	0.53	-0.32	0.53	-0.19	0.05	0.06	-0.67					
Departure Headway (s)	6.5	5.6	7.0	6.3	6.1	5.9	5.1					
Degree Utilization, x	0.45	0.13	0.00	0.06	0.26	0.30	0.28					
Capacity (veh/h)	531	605	468	521	561	585	667					
Control Delay (s)	13.5	8.3	8.8	8.5	11.2	10.2	8.9					
Approach Delay (s)	12.2		8.5		11.2	9.5						
Approach LOS	B		A		B	A						
Intersection Summary												
Delay					10.8							
Level of Service					B							
Intersection Capacity Utilization					50.5%		ICU Level of Service				A	
Analysis Period (min)					15							

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.


4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	66	210	116	8	214	18	73	387	67	14	384	82
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1275	1365	1129	1289	1365	1110	2515	2521		1296	2513	
Fit Permitted	0.57	1.00	1.00	0.57	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	759	1365	1129	776	1365	1110	2515	2521		1296	2513	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	74	236	130	9	240	20	82	435	75	16	431	92
RTOR Reduction (vph)	0	0	94	0	0	14	0	12	0	0	17	0
Lane Group Flow (vph)	74	236	36	9	240	6	82	498	0	16	506	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9	16.9	6.0	26.5		1.5	22.0	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9	16.9	6.0	26.5		1.5	22.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.10	0.44		0.02	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	380	314	216	380	309	249	1102		32	912	
v/s Ratio Prot		0.17			c0.18		0.03	c0.20		0.01	c0.20	
v/s Ratio Perm	0.10		0.03	0.01		0.01						
v/c Ratio	0.35	0.62	0.12	0.04	0.63	0.02	0.33	0.45		0.50	0.55	
Uniform Delay, d1	17.5	19.1	16.3	15.9	19.1	15.8	25.4	12.0		29.2	15.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	3.1	0.2	0.1	3.4	0.0	0.8	0.3		11.8	0.7	
Delay (s)	18.5	22.2	16.4	16.0	22.5	15.9	26.2	12.3		40.9	16.1	
Level of Service	B	C	B	B	C	B	C	B		D	B	
Approach Delay (s)		19.9			21.8			14.2			16.9	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			60.6			Sum of lost time (s)				15.7		
Intersection Capacity Utilization			71.2%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	56	332	2	14	326	31	4	11		48	11	96
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1248	1621	1572		1491	1385	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1248	1169	1572		1165	1385	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	58	346	2	15	340	32	4	11		12	50	100
RTOR Reduction (vph)	0	0	1	0	0	18	0	9		0	0	73
Lane Group Flow (vph)	58	346	1	15	340	14	4	14		0	50	38
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	7.8	42.5	42.5	2.6	37.3	37.3	22.3	22.3		22.3	22.3	
Effective Green, g (s)	7.8	42.5	42.5	2.6	37.3	37.3	22.3	22.3		22.3	22.3	
Actuated g/C Ratio	0.09	0.52	0.52	0.03	0.45	0.45	0.27	0.27		0.27	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	879	747	51	772	564	316	425		315	374	
v/s Ratio Prot	c0.04	c0.20		0.01	c0.20		0.01	0.01			0.03	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.38	0.39	0.00	0.29	0.44	0.03	0.01	0.03		0.16	0.10	
Uniform Delay, d1	35.0	12.1	9.7	39.0	15.4	12.5	22.0	22.1		22.9	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.3	0.0	3.2	0.4	0.0	0.0	0.0		0.2	0.1	
Delay (s)	36.6	13.4	9.7	42.2	15.8	12.5	22.0	22.2		23.1	22.7	
Level of Service	D	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		16.7			16.6			22.1			22.8	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.8				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			82.4			Sum of lost time (s)				15.0		
Intersection Capacity Utilization			73.3%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	25	335	60	16	394	18	31	54	27	30	85	50
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1052	1540	2927			3039	1073
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.67	1.00			0.86	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1052	1085	2927			2637	1073
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	28	376	67	18	443	20	35	61	30	34	96	56
RTOR Reduction (vph)	0	0	26	0	0	9	0	26	0	0	0	49
Lane Group Flow (vph)	28	376	41	18	443	11	35	65	0	0	130	7
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	2.0	32.0	32.0	0.9	29.9	29.9	8.0	8.0			7.0	7.0
Effective Green, g (s)	2.0	32.0	32.0	0.9	29.9	29.9	8.0	8.0			7.0	7.0
Actuated g/C Ratio	0.04	0.59	0.59	0.02	0.55	0.55	0.15	0.15			0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	45	721	818	25	673	583	161	434			342	139
v/s Ratio Prot	c0.02	0.31		0.01	c0.36			0.02				
v/s Ratio Perm			0.03			0.01	0.03				c0.05	0.01
v/c Ratio	0.62	0.52	0.05	0.72	0.66	0.02	0.22	0.15			0.38	0.05
Uniform Delay, d1	25.6	6.4	4.6	26.4	8.4	5.4	20.2	20.0			21.5	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	23.8	0.7	0.0	67.0	2.3	0.0	0.7	0.2			0.7	0.2
Delay (s)	49.4	7.1	4.6	93.3	10.8	5.4	20.9	20.2			22.2	20.7
Level of Service	D	A	A	F	B	A	C	C			C	C
Approach Delay (s)		9.3			13.6			20.4			21.7	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015

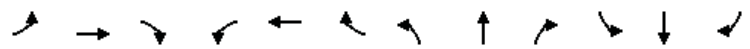


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	31	317	65	14	340	121	38	120	13	87	41	73
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.95	0.95
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90	0.90
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1330	926		1335	1126	868	1070	957	914	1070	965	965
Fit Permitted	0.29	1.00		0.35	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	403	926		498	1126	868	1070	957	914	1070	965	965
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	36	373	76	16	400	142	45	141	15	102	48	86
RTOR Reduction (vph)	0	6	0	0	0	56	0	0	12	0	67	0
Lane Group Flow (vph)	36	443	0	16	400	86	45	141	3	102	67	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10	10				10				
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	51.8	51.8		51.1	51.1	62.2	15.5	18.3	18.3	11.1	13.9	
Effective Green, g (s)	51.8	51.8		51.1	51.1	62.2	15.5	18.3	18.3	11.1	13.9	
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.61	0.15	0.18	0.18	0.11	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	223	467		260	560	567	161	170	162	115	130	
v/s Ratio Prot	0.00	c0.48		0.00	c0.36	0.02	0.04	c0.15		c0.10	0.07	
v/s Ratio Perm	0.08			0.03		0.08			0.00			
v/c Ratio	0.16	0.95		0.06	0.71	0.15	0.28	0.83	0.02	0.89	0.51	
Uniform Delay, d1	15.0	24.2		19.5	20.1	8.8	38.7	40.7	34.8	45.2	41.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	28.5		0.1	4.3	0.1	1.0	27.1	0.0	50.0	3.4	
Delay (s)	15.3	52.7		19.6	24.4	8.9	39.6	67.8	34.8	95.2	44.6	
Level of Service	B	D		B	C	A	D	E	C	F	D	
Approach Delay (s)		49.9			20.3			59.0			66.5	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	42.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

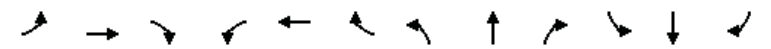


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	75	89	34	32	124	60	29	26	42	10	29	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.98		0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.95			1.00	0.85		0.89	
Fit Protected	0.95	1.00		0.95	1.00			0.97	1.00		1.00	
Satd. Flow (prot)	1691	3004		1687	1693			1748	1500		1333	
Fit Permitted	0.60	1.00		0.65	1.00			0.75	1.00		0.99	
Satd. Flow (perm)	1071	3004		1163	1693			1350	1500		1316	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	94	111	42	40	155	75	36	32	52	12	36	212
RTOR Reduction (vph)	0	31	0	0	22	0	0	0	40	0	164	0
Lane Group Flow (vph)	94	122	0	40	208	0	0	68	12	0	96	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4			4	8		
Actuated Green, G (s)	12.6	12.6		12.6	12.6			11.1	11.1		11.1	
Effective Green, g (s)	12.6	12.6		12.6	12.6			11.1	11.1		11.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.23	0.23		0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	277	778		301	438			308	342		300	
v/s Ratio Prot		0.04			c0.12							
v/s Ratio Perm	0.09			0.03				0.05	0.01		c0.07	
v/c Ratio	0.34	0.16		0.13	0.47			0.22	0.03		0.32	
Uniform Delay, d1	14.6	13.9		13.8	15.2			15.2	14.6		15.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.7	0.1		0.2	0.8			0.4	0.0		0.6	
Delay (s)	15.4	14.0		14.0	16.0			15.6	14.6		16.2	
Level of Service	B	B		B	B			B	B		B	
Approach Delay (s)		14.5			15.7			15.2			16.2	
Approach LOS		B			B			B			B	

Intersection Summary		
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.28	
Actuated Cycle Length (s)	48.6	Sum of lost time (s)
Intersection Capacity Utilization	53.6%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	79	154	44	98	205	25	42	423	20	27	405	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00		1.00	0.99
Flpb, ped/bikes	0.98	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	0.98			1.00	0.99		1.00	0.98
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1672	3280		1682	3348			1260	2501		1260	2449
Fit Permitted	0.59	1.00		0.61	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1033	3280		1079	3348			1260	2501		1260	2449
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	91	177	51	113	236	29	48	486	23	31	466	87
RTOR Reduction (vph)	0	26	0	0	10	0	0	3	0	0	15	0
Lane Group Flow (vph)	91	202	0	113	255	0	48	506	0	31	538	0
Confl. Peds. (#/hr)	34		24	24		34				16		15
Confl. Bikes (#/hr)			2			6				6		19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		9.3	40.4		8.2	39.3	
Effective Green, g (s)	30.1	30.1		30.1	30.1		9.3	40.4		8.2	39.3	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.10	0.43		0.09	0.42	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	1048		344	1069		124	1072		109	1021	
v/s Ratio Prot		0.06			0.08		0.04	c0.20		0.02	c0.22	
v/s Ratio Perm	0.09			c0.10								
v/c Ratio	0.28	0.19		0.33	0.24		0.39	0.47		0.28	0.53	
Uniform Delay, d1	23.9	23.2		24.4	23.6		39.8	19.3		40.3	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.1		0.6	0.1		2.0	1.5		1.4	0.5	
Delay (s)	24.4	23.3		24.9	23.7		41.8	20.7		41.7	21.0	
Level of Service	C	C		C	C		D	C		D	C	
Approach Delay (s)		23.6			24.1			22.6			22.1	
Approach LOS		C			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.46	
Actuated Cycle Length (s)	94.2	Sum of lost time (s)
Intersection Capacity Utilization	104.3%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

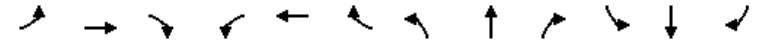


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	28	300	22	8	260	53	27	0	2	7	5	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97			0.99		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3386		1711	3334			1705		1711	1561	
Flt Permitted	0.55	1.00		0.54	1.00			0.73		0.74	1.00	
Satd. Flow (perm)	984	3386		976	3334			1307		1327	1561	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	326	24	9	283	58	29	0	2	8	5	39
RTOR Reduction (vph)	0	10	0	0	34	0	0	22	0	0	28	0
Lane Group Flow (vph)	30	340	0	9	307	0	0	9	0	8	16	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6			7.9		7.9	7.9	
Effective Green, g (s)	9.6	9.6		9.6	9.6			7.9		7.9	7.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.29		0.29	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	343	1182		340	1163			375		381	448	
v/s Ratio Prot		c0.10			0.09						c0.01	
v/s Ratio Perm	0.03			0.01				0.01		0.01		
v/c Ratio	0.09	0.29		0.03	0.26			0.02		0.02	0.04	
Uniform Delay, d1	6.0	6.5		5.9	6.4			7.0		7.0	7.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.0	0.1			0.0		0.0	0.0	
Delay (s)	6.1	6.6		5.9	6.5			7.1		7.0	7.1	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		6.6			6.5			7.1			7.1	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.17	A
Actuated Cycle Length (s)	27.5	Sum of lost time (s)
Intersection Capacity Utilization	33.1%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

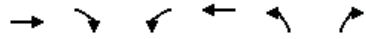


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	27	133	0	0	361	33	219	95	227	0	0	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.89				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3392			5068		1711	3060				2694
Flt Permitted		0.86			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2931			5068		1711	3060				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	34	166	0	0	451	41	274	119	284	0	0	172
RTOR Reduction (vph)	0	0	0	0	15	0	0	168	0	0	0	163
Lane Group Flow (vph)	0	200	0	0	477	0	274	235	0	0	0	9
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1393			1767		697	1248				141
v/s Ratio Prot		c0.01			c0.09		c0.16	0.08				0.00
v/s Ratio Perm		0.06										
v/c Ratio		0.14			0.27		0.39	0.19				0.06
Uniform Delay, d1		11.6			17.8		15.9	14.4				34.2
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.2			0.4		1.7	0.3				0.9
Delay (s)		11.8			18.2		17.5	14.8				35.1
Level of Service		B			B		B	B				D
Approach Delay (s)		11.8			18.2			15.9				35.1
Approach LOS		B			B			B				D

Intersection Summary		
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.33	B
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	40.5%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

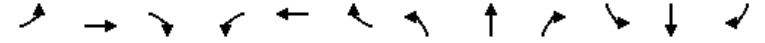
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	160	128	387	330	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	1.00	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.99	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1689	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1689	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	195	156	472	402	0	0
RTOR Reduction (vph)	4	55	0	0	0	0
Lane Group Flow (vph)	207	85	472	402	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	36.3	36.3	13.7	60.0		
Effective Green, g (s)	36.3	36.3	13.7	60.0		
Actuated g/C Ratio	0.60	0.60	0.23	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1021	863	757	1801		
v/s Ratio Prot	0.12		c0.14	c0.22		
v/s Ratio Perm		0.06				
v/c Ratio	0.20	0.10	0.62	0.22		
Uniform Delay, d1	5.3	5.0	20.8	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	1.6	0.1		
Delay (s)	5.4	5.0	22.4	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	5.3			12.1	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			31.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	83	41	109	3	38	0	101	343	0	39	382	126
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1177	1892		1141	1279		1215	2431		1215	2289	
Fit Permitted	0.44	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	541	1892		776	1279		1215	2431		1215	2289	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	93	46	122	3	43	0	113	385	0	44	429	142
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	93	81	0	3	43	0	113	385	0	44	547	0
Confl. Peds. (#/hr)			100	100		100			100			100
Confl. Bikes (#/hr)			10	10		10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.2	22.2		7.9	7.9		10.5	26.8		11.6	27.9	
Effective Green, g (s)	22.2	22.2		7.9	7.9		10.5	26.8		11.6	27.9	
Actuated g/C Ratio	0.29	0.29		0.10	0.10		0.14	0.35		0.15	0.36	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	230	546		79	131		165	847		183	830	
v/s Ratio Prot	c0.05	0.04			0.03		c0.09	0.16		0.04	c0.24	
v/s Ratio Perm	c0.07			0.00								
v/c Ratio	0.40	0.15		0.04	0.33		0.68	0.45		0.24	0.66	
Uniform Delay, d1	21.3	20.3		31.1	32.0		31.6	19.4		28.8	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.1		0.2	1.5		11.2	0.4		0.7	1.9	
Delay (s)	22.5	20.5		31.3	33.5		42.8	19.8		29.5	22.4	
Level of Service	C	C		C	C		D	B		C	C	
Approach Delay (s)		21.2			33.4			25.0			22.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			23.7									C
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			76.9							21.6		
Intersection Capacity Utilization			72.5%									C
Analysis Period (min)			15									
c Critical Lane Group												

2040 CUMULATIVE WITH PROJECT-CONVENTION EVENT
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	924	825	48	402	937	47	79	1537	531	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3001		2987	3010			5478	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3001		2987	3010			5478	942			
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)	953	851	49	414	966	48	81	1585	547	0	0	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	206	0	0	0
Lane Group Flow (vph)	953	896	0	414	1014	0	0	1666	341	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Effective Green, g (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Actuated g/C Ratio	0.17	0.34		0.12	0.31			0.36	0.36			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1014		358	922			1952	335			
v/s Ratio Prot	c0.21	0.30		0.14	c0.34							
v/s Ratio Perm								0.30	c0.36			
v/c Ratio	1.29	0.88		1.16	1.10			0.85	1.02			
Uniform Delay, d1	45.9	34.4		48.4	38.1			32.7	35.4			
Progression Factor	1.37	1.51		1.43	0.99			0.97	1.07			
Incremental Delay, d2	132.8	4.7		88.8	55.7			3.8	53.3			
Delay (s)	195.8	56.7		157.8	93.5			35.4	91.2			
Level of Service	F	E		F	F			D	F			
Approach Delay (s)		128.2			112.1			49.2			0.0	
Approach LOS		F			F			D			A	

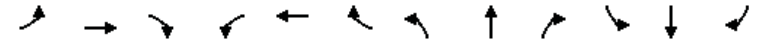
Intersection Summary

HCM 2000 Control Delay	92.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕↕	↕↕	↔	↕↕	↕↕
Volume (vph)	346	1643	36	30	962	24	8	250	107	47	639	592
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.87	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.77	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4143		1459	2863			1528	813	1123	2336	550
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.51	1.00	1.00
Satd. Flow (perm)	1459	4143		1459	2863			1477	813	607	2336	550
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	353	1677	37	31	982	24	8	255	109	48	652	604
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	71	0	27	228
Lane Group Flow (vph)	353	1712	0	31	1005	0	0	263	38	48	842	159
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.39		0.08	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1619		118	934			512	282	216	832	196
v/s Ratio Prot	c0.24	0.41		0.02	c0.35						c0.36	
v/s Ratio Perm								0.18	0.05	0.08		0.29
v/c Ratio	1.86	1.06		0.26	1.08			0.51	0.13	0.22	1.01	0.81
Uniform Delay, d1	47.8	33.5		47.5	37.0			28.5	24.6	24.7	35.4	32.0
Progression Factor	0.59	1.13		0.89	0.88			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	394.4	32.6		0.1	36.4			0.9	0.2	0.5	34.2	21.2
Delay (s)	422.6	70.3		42.1	68.9			29.4	24.8	25.3	69.6	53.2
Level of Service	F	E		D	E			C	C	C	E	D
Approach Delay (s)		130.5			68.1			28.0			63.1	
Approach LOS		F			E			C			E	

Intersection Summary

HCM 2000 Control Delay	90.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	123.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↖	↗
Volume (vph)	2002	157	0	1562	100	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.91			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	4366			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	4366			3079	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2085	164	0	1627	104	24
RTOR Reduction (vph)	8	0	0	0	0	3
Lane Group Flow (vph)	2241	0	0	1627	104	21
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	2464			1738	512	451
v/s Ratio Prot	0.51			c0.53	c0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.91			0.94	0.20	0.05
Uniform Delay, d1	21.4			22.1	26.3	24.9
Progression Factor	1.00			0.76	1.00	1.00
Incremental Delay, d2	6.3			1.3	0.9	0.2
Delay (s)	27.8			18.0	27.2	25.1
Level of Service	C			B	C	C
Approach Delay (s)	27.8			18.0	26.8	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↖↑	↑↑			↖↖↖	↗
Volume (vph)	250	1050	150	100	570	810	340	335	1370	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		6062			3026	2596			4316	1033
Fit Permitted		0.99			0.52	1.00			0.95	1.00
Satd. Flow (perm)		6062			1584	2596			4316	1033
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	272	1129	161	108	613	871	366	364	1473	495
RTOR Reduction (vph)	0	23	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1539	0	0	721	1236	0	0	1887	445
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1953			492	807			1294	309
v/s Ratio Prot						c0.48			c0.44	
v/s Ratio Perm		0.25			0.46					0.43
v/c Ratio		0.79			1.54dl	1.53			1.46	1.44
Uniform Delay, d1		27.7			31.0	31.0			31.5	31.5
Progression Factor		1.56			0.31	1.00			1.00	1.00
Incremental Delay, d2		2.0			210.5	245.3			210.6	215.6
Delay (s)		45.2			220.0	276.3			242.1	247.1
Level of Service		D			F	F			F	F
Approach Delay (s)		45.2			220.0	276.3			243.0	
Approach LOS		D			F	F			F	

Intersection Summary			
HCM 2000 Control Delay	194.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	135.5%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations										
Volume (vph)	105	321	1050	110	565	140	500	260	180	955
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.90		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.95		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		2494	3622		2497		1228		1401	2689
Fit Permitted		0.95	1.00		1.00		1.00		0.15	0.60
Satd. Flow (perm)		2494	3622		2497		1228		218	1616
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	345	1129	118	608	151	538	280	194	1027
RTOR Reduction (vph)	0	0	12	0	15	0	226	0	0	0
Lane Group Flow (vph)	0	423	1270	0	879	0	177	0	373	1128
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	Perm	pm+pt	pm+pt	NA		
Protected Phases	2	2	2	8		7	7	4		
Permitted Phases					8	4	4			
Actuated Green, G (s)		22.5	22.5	23.0	23.0		42.0	42.0		
Effective Green, g (s)		22.5	25.0	24.5	23.0		43.5	43.5		
Actuated g/C Ratio		0.25	0.28	0.27	0.26		0.48	0.48		
Clearance Time (s)		4.5	4.5	4.0	4.0		4.0	4.0		
Lane Grp Cap (vph)		623	1006	679	313		322	977		
v/s Ratio Prot		0.17	c0.35	c0.35			0.21	c0.21		
v/s Ratio Perm					0.14		0.35	0.35		
v/c Ratio		0.68	1.26	1.29	0.56		1.16	1.15		
Uniform Delay, d1		30.5	32.5	32.8	29.1		33.1	23.2		
Progression Factor		1.00	1.00	1.00	1.00		1.07	1.08		
Incremental Delay, d2		5.9	126.3	143.1	7.2		74.8	70.8		
Delay (s)		36.4	158.8	175.9	36.3		110.1	95.9		
Level of Service		D	F	F	D		F	F		
Approach Delay (s)			128.5	132.5				99.4		
Approach LOS			F	F				F		
Intersection Summary										
HCM 2000 Control Delay										
HCM 2000 Volume to Capacity ratio										
Actuated Cycle Length (s)										
Intersection Capacity Utilization										
Analysis Period (min)										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	98	228	28	30	77	39	1550	106	58	438	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	0.99		1.00	0.99	
Fit Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1585	1353		1457		1540	3026		1540	3052	
Fit Permitted		0.85	1.00		0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1371	1353		1358		1540	3026		1540	3052	
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)	59	103	240	29	32	81	41	1632	112	61	461	24
RTOR Reduction (vph)	0	0	163	0	48	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	162	77	0	94	0	41	1739	0	61	481	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Effective Green, g (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Actuated g/C Ratio		0.32	0.32		0.32		0.08	0.48		0.04	0.44	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		440	434		435		123	1437		69	1352	
v/s Ratio Prot							0.03	c0.57		c0.04	0.16	
v/s Ratio Perm		c0.12	0.06		0.07							
v/c Ratio		0.37	0.18		0.22		0.33	1.21		0.88	0.36	
Uniform Delay, d1		26.1	24.4		24.8		43.5	26.2		47.5	18.4	
Progression Factor		1.00	1.00		1.00		1.23	0.66		1.00	1.00	
Incremental Delay, d2		2.4	0.9		1.1		6.7	100.8		79.1	0.7	
Delay (s)		28.5	25.3		25.9		60.1	118.1		126.6	19.1	
Level of Service		C	C		C		E	F		F	B	
Approach Delay (s)					25.9			116.8			31.1	
Approach LOS					C			F			C	
Intersection Summary												
HCM 2000 Control Delay												
HCM 2000 Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	40	31	20	8	36	48	18	259	24	327	317	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.99	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.85	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2864			1605	1361	1303	1595		1540	1538	
Fit Permitted		0.83			0.91	1.00	0.53	1.00		0.95	1.00	
Satd. Flow (perm)		2427			1472	1361	731	1595		1540	1538	
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)	43	33	22	9	39	52	19	278	26	352	341	46
RTOR Reduction (vph)	0	19	0	0	0	30	0	5	0	0	5	0
Lane Group Flow (vph)	0	79	0	0	48	22	19	299	0	352	382	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		5.9			5.9	21.7	15.1	15.1		15.8	35.9	
Effective Green, g (s)		5.9			5.9	21.7	15.1	15.1		15.8	35.9	
Actuated g/C Ratio		0.11			0.11	0.42	0.29	0.29		0.31	0.69	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		276			167	701	213	464		469	1065	
v/s Ratio Prot						0.01		c0.19		c0.23	0.25	
v/s Ratio Perm		0.03			c0.03	0.01	0.03					
v/c Ratio		0.28			0.29	0.03	0.09	0.64		0.75	0.36	
Uniform Delay, d1		21.0			21.0	8.9	13.3	16.0		16.2	3.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			1.0	0.0	0.2	3.1		6.6	0.2	
Delay (s)		21.6			22.0	8.9	13.5	19.1		22.9	3.5	
Level of Service		C			C	A	B	B		C	A	
Approach Delay (s)		21.6			15.2			18.7			12.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	186	491	1042	72	323	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2368	2431	1309	1540	1621
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2368	2431	1309	1540	1621
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	534	1133	78	351	333
RTOR Reduction (vph)	0	436	0	11	0	0
Lane Group Flow (vph)	202	98	1133	67	351	333
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	19.9	19.9	49.1	49.1	24.1	78.2
Effective Green, g (s)	19.9	19.9	49.1	49.1	24.1	78.2
Actuated g/C Ratio	0.18	0.18	0.45	0.45	0.22	0.72
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	283	435	1104	594	343	1172
v/s Ratio Prot	c0.13		c0.47		c0.23	0.21
v/s Ratio Perm		0.04		0.05		
v/c Ratio	0.71	0.23	1.03	0.11	1.02	0.28
Uniform Delay, d1	41.4	37.5	29.5	17.0	42.0	5.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.3	0.3	34.0	0.1	54.7	0.1
Delay (s)	49.7	37.8	63.5	17.0	96.7	5.3
Level of Service	D	D	E	B	F	A
Approach Delay (s)	41.1		60.5			52.2
Approach LOS	D		E			D

Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	24	48	43	195	456	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.91		1.00	1.00	0.99	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1547		1688	1531	3107	
Fit Permitted	0.98		0.44	1.00	1.00	
Satd. Flow (perm)	1547		787	1531	3107	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	53	48	217	507	51
RTOR Reduction (vph)	48	0	0	0	7	0
Lane Group Flow (vph)	32	0	48	217	551	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	3.8		24.6	24.6	24.6	
Effective Green, g (s)	3.8		24.6	24.6	24.6	
Actuated g/C Ratio	0.10		0.64	0.64	0.64	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	153		504	980	1990	
v/s Ratio Prot	c0.02			0.14	c0.18	
v/s Ratio Perm			0.06			
v/c Ratio	0.21		0.10	0.22	0.28	
Uniform Delay, d1	15.9		2.6	2.9	3.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7		0.1	0.1	0.1	
Delay (s)	16.6		2.7	3.0	3.1	
Level of Service	B		A	A	A	
Approach Delay (s)	16.6			3.0	3.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	211	441	1409	17	109	1021
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3412		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3412		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	234	490	1566	19	121	1134
RTOR Reduction (vph)	0	142	1	0	0	0
Lane Group Flow (vph)	234	348	1584	0	121	1134
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	46.1		9.9	61.1
Effective Green, g (s)	28.7	28.7	46.1		9.9	61.1
Actuated g/C Ratio	0.29	0.29	0.46		0.10	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1572		169	2090
v/s Ratio Prot			c0.46		c0.07	0.33
v/s Ratio Perm	0.15	c0.24				
v/c Ratio	0.52	0.83	1.01		0.72	0.54
Uniform Delay, d1	29.8	33.4	26.9		43.7	11.3
Progression Factor	1.00	1.00	1.66		1.04	1.04
Incremental Delay, d2	1.0	12.7	13.6		13.5	0.3
Delay (s)	30.8	46.0	58.4		59.0	12.0
Level of Service	C	D	E		E	B
Approach Delay (s)	41.1		58.4			16.6
Approach LOS	D		E			B

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	30	55	198	409	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1540	1351		3041	2974	
Flt Permitted	0.95	1.00		0.72	1.00	
Satd. Flow (perm)	1540	1351		2225	2974	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	35	65	233	481	112
RTOR Reduction (vph)	0	34	0	0	37	0
Lane Group Flow (vph)	47	1	0	298	556	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.1	2.1		15.4	15.4	
Effective Green, g (s)	2.1	2.1		15.4	15.4	
Actuated g/C Ratio	0.04	0.04		0.29	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	60	53		645	862	
v/s Ratio Prot	c0.03				c0.19	
v/s Ratio Perm		0.00		0.13		
v/c Ratio	0.78	0.03		0.46	0.65	
Uniform Delay, d1	25.3	24.5		15.5	16.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	47.5	0.2		0.5	1.7	
Delay (s)	72.8	24.7		16.0	18.1	
Level of Service	E	C		B	B	
Approach Delay (s)	52.3			16.0	18.1	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	136	67	107	53	87	10	221	48	19	10	274	193
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	148	77	123	61	100	11	254	52	22	11	298	210
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	148	200	61	111	328	309	210					
Volume Left (vph)	148	0	61	0	254	11	0					
Volume Right (vph)	0	123	0	11	22	0	210					
Hadj (s)	0.53	-0.40	0.53	-0.03	0.15	0.05	-0.67					
Departure Headway (s)	8.0	7.1	8.4	7.8	7.2	7.0	6.3					
Degree Utilization, x	0.33	0.39	0.14	0.24	0.65	0.60	0.37					
Capacity (veh/h)	426	471	390	418	484	499	552					
Control Delay (s)	13.7	13.4	11.6	12.1	22.6	18.8	11.6					
Approach Delay (s)	13.5		11.9		22.6	15.9						
Approach LOS	B		B		C	C						

Intersection Summary			
Delay		16.4	
Level of Service		C	
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

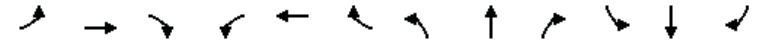


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	193	197	313	24	334	143	310	1090	40	73	943	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1512	1621	1337	1526	1621	1304	2987	3058		1540	2978	
Fit Permitted	0.37	1.00	1.00	0.56	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	581	1621	1337	901	1621	1304	2987	3058		1540	2978	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	212	216	344	26	367	157	341	1198	44	80	1036	237
RTOR Reduction (vph)	0	0	225	0	0	103	0	2	0	0	20	0
Lane Group Flow (vph)	212	216	119	26	367	54	341	1240	0	80	1253	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	200	559	461	310	559	449	418	1155		184	1066	
v/s Ratio Prot		0.13			0.23		0.11	c0.41		0.05	c0.42	
v/s Ratio Perm	c0.36		0.09	0.03		0.04						
v/c Ratio	1.06	0.39	0.26	0.08	0.66	0.12	0.82	1.07		0.43	1.18	
Uniform Delay, d1	32.8	24.8	23.5	22.1	27.7	22.4	41.7	31.1		40.9	32.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.83		1.01	1.01	
Incremental Delay, d2	80.4	2.0	1.3	0.5	5.9	0.5	1.7	34.9		6.3	87.7	
Delay (s)	113.1	26.8	24.9	22.6	33.7	22.9	26.2	60.6		47.6	120.0	
Level of Service	F	C	C	C	C	C	C	E		D	F	
Approach Delay (s)		49.7			30.1			53.2			115.7	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	69.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	123.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	127	538	14	42	741	77	49	54	77	88	34	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.88	1.00	0.98		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.87	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1801	1489	1711	1801	1340	1711	1604		1610	1477	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.33	1.00		0.67	1.00	
Satd. Flow (perm)	1711	1801	1489	1711	1801	1340	594	1604		1127	1477	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	585	15	46	805	84	53	59	84	96	37	248
RTOR Reduction (vph)	0	0	7	0	0	43	0	68	0	0	198	0
Lane Group Flow (vph)	138	585	8	46	805	41	53	75	0	96	87	0
Confl. Peds. (#/hr)	50					50						50
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8	8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	8.0	38.5	38.5	4.6	35.1	35.1	13.6	13.6		13.6	13.6	
Effective Green, g (s)	8.0	38.5	38.5	4.6	35.1	35.1	13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.11	0.54	0.54	0.06	0.49	0.49	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	967	799	109	881	655	112	304		213	280	
v/s Ratio Prot	c0.08	c0.32		0.03	c0.45		0.03	c0.09		0.05		0.06
v/s Ratio Perm			0.01				0.03	c0.09			0.09	
v/c Ratio	0.73	0.60	0.01	0.42	0.91	0.06	0.47	0.25		0.45	0.31	
Uniform Delay, d1	30.8	11.4	7.7	32.3	16.9	9.6	25.9	24.7		25.7	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.9	2.8	0.0	2.6	13.7	0.0	3.1	0.4		1.5	0.6	
Delay (s)	43.7	14.2	7.8	34.9	30.6	9.7	29.0	25.1		27.3	25.7	
Level of Service	D	B	A	C	C	A	C	C		C	C	
Approach Delay (s)		19.6			28.9			26.2			26.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	137	388	234	66	860	92	138	173	129	162	329	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	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	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1540	1540	1378	1540	1540	1315	1540	2882			3029	1356
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.30	1.00			0.68	1.00
Satd. Flow (perm)	1540	1540	1378	1540	1540	1315	485	2882			2090	1356
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	143	404	244	69	896	96	144	180	134	169	343	195
RTOR Reduction (vph)	0	0	82	0	0	25	0	100	0	0	0	147
Lane Group Flow (vph)	143	404	162	69	896	71	144	214	0	0	512	48
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	70.4	70.4	6.4	66.8	66.8	31.0	31.0			30.0	30.0
Effective Green, g (s)	9.0	70.4	70.4	6.4	66.8	66.8	31.0	31.0			30.0	30.0
Actuated g/C Ratio	0.07	0.58	0.58	0.05	0.55	0.55	0.26	0.26			0.25	0.25
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	114	897	803	81	851	727	124	739			519	336
v/s Ratio Prot	c0.09	c0.26		0.04	c0.58			0.07				
v/s Ratio Perm			0.12			0.05	c0.30				0.24	0.04
v/c Ratio	1.25	0.45	0.20	0.85	1.05	0.10	1.16	0.29			0.99	0.14
Uniform Delay, d1	55.9	14.3	11.9	56.7	27.0	12.8	44.9	36.1			45.2	35.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	167.6	1.6	0.6	53.8	45.7	0.1	130.6	0.2			35.7	0.2
Delay (s)	223.5	15.9	12.5	110.5	72.7	12.8	175.5	36.3			80.9	35.6
Level of Service	F	B	B	F	E	B	F	D			F	D
Approach Delay (s)		52.4			69.8			80.1			68.4	
Approach LOS		D			E			F			E	

Intersection Summary

HCM 2000 Control Delay	66.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	72	537	76	58	594	533	75	329	48	173	140	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1076		1540	1296	997	1232	1102	1058	1232	1165	
Fit Permitted	0.09	1.00		0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	147	1076		147	1296	997	1232	1102	1058	1232	1165	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	77	571	81	62	632	567	80	350	51	184	149	139
RTOR Reduction (vph)	0	4	0	0	0	78	0	0	39	0	31	0
Lane Group Flow (vph)	77	648	0	62	632	489	80	350	12	184	257	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)		10	10					10				
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	48.1	48.1		48.1	48.1	60.1	10.7	25.0	25.0	12.0	26.3	
Effective Green, g (s)	48.1	48.1		48.1	48.1	60.1	10.7	25.0	25.0	12.0	26.3	
Actuated g/C Ratio	0.44	0.44		0.44	0.44	0.55	0.10	0.23	0.23	0.11	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	114	474		114	571	595	120	252	242	135	281	
v/s Ratio Prot	0.02	c0.60		0.02	0.49	c0.09	0.06	c0.32		c0.15	0.22	
v/s Ratio Perm	0.27			0.22		0.40			0.01			
v/c Ratio	0.68	1.37		0.54	1.11	0.82	0.67	1.39	0.05	1.36	0.91	
Uniform Delay, d1	25.7	30.4		47.0	30.4	20.1	47.4	42.0	32.7	48.5	40.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.7	177.9		5.2	70.4	8.9	13.1	197.6	0.1	203.5	32.0	
Delay (s)	40.4	208.3		52.2	100.8	29.0	60.6	239.6	32.8	252.0	72.2	
Level of Service	D	F		D	F	C	E	F	C	F	E	
Approach Delay (s)		190.6			66.1			187.9			142.3	
Approach LOS		F			E			F			F	

Intersection Summary

HCM 2000 Control Delay	129.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	81	93	49	56	372	17	41	126	109	21	61	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	
Frt	1.00	0.95		1.00	0.99			1.00	0.85		0.89	
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1695	3198		1679	1786			1776	1496		1564	
Fit Permitted	0.30	1.00		0.65	1.00			0.72	1.00		0.98	
Satd. Flow (perm)	531	3198		1153	1786			1301	1496		1536	
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)	90	103	54	62	413	19	46	140	121	23	68	383
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	86	0	194	0
Lane Group Flow (vph)	90	121	0	62	430	0	0	186	35	0	280	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	21.3	21.3		21.3	21.3			19.1	19.1		19.1	
Effective Green, g (s)	21.3	21.3		21.3	21.3			19.1	19.1		19.1	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.29	0.29		0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	173	1043		376	582			380	437		449	
v/s Ratio Prot		0.04			c0.24							
v/s Ratio Perm	0.17			0.05			0.14	0.02			c0.18	
v/c Ratio	0.52	0.12		0.16	0.74		0.49	0.08			0.62	
Uniform Delay, d1	17.9	15.4		15.7	19.5		19.1	16.7			20.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	2.8	0.0		0.2	4.9		1.0	0.1			2.7	
Delay (s)	20.7	15.5		15.9	24.4		20.1	16.8			22.7	
Level of Service	C	B		B	C		C	B			C	
Approach Delay (s)		17.4			23.3			18.8			22.7	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	205	138	106	99	614	45	106	1190	49	36	941	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	1.00		1.00	0.99
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.99		1.00	0.96
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1693	3147		1682	3375			1711	3397		1711	3269
Fit Permitted	0.27	1.00		0.59	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	480	3147		1046	3375			1711	3397		1711	3269
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	218	147	113	105	653	48	113	1266	52	38	1001	322
RTOR Reduction (vph)	0	72	0	0	6	0	0	3	0	0	31	0
Lane Group Flow (vph)	218	188	0	105	695	0	113	1315	0	38	1292	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Effective Green, g (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.10	0.38		0.10	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	176	1154		383	1238		169	1287		169	1238	
v/s Ratio Prot		0.06			0.21		0.07	c0.39		0.02	c0.40	
v/s Ratio Perm	c0.45			0.10								
v/c Ratio	1.24	0.16		0.27	0.56		0.67	1.02		0.22	1.04	
Uniform Delay, d1	31.6	21.3		22.3	25.2		43.5	31.1		41.5	31.1	
Progression Factor	1.00	1.00		1.00	1.00		0.94	0.89		1.56	0.58	
Incremental Delay, d2	146.3	0.3		1.8	1.8		17.7	29.7		0.8	26.1	
Delay (s)	178.0	21.6		24.0	27.1		58.4	57.4		65.5	44.3	
Level of Service	F	C		C	C		E	E		E	D	
Approach Delay (s)		92.9			26.7			57.5			44.8	
Approach LOS		F			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	85	457	76	16	929	105	51	0	24	46	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98			0.96		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1711	3348		1711	3369			1666		1711	1531	
Flt Permitted	0.14	1.00		0.38	1.00			0.75		0.70	1.00	
Satd. Flow (perm)	255	3348		691	3369			1299		1268	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	497	83	17	1010	114	55	0	26	50	0	187
RTOR Reduction (vph)	0	15	0	0	10	0	0	15	0	0	35	0
Lane Group Flow (vph)	92	565	0	17	1114	0	0	66	0	50	152	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	42.0	42.0		42.0	42.0			38.0		38.0	38.0	
Effective Green, g (s)	42.0	42.0		42.0	42.0			38.0		38.0	38.0	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.42		0.42	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	119	1562		322	1572			548		535	646	
v/s Ratio Prot		0.17			0.33						c0.10	
v/s Ratio Perm	c0.36			0.02				0.05		0.04		
v/c Ratio	0.77	0.36		0.05	0.71			0.12		0.09	0.24	
Uniform Delay, d1	20.0	15.4		13.1	19.1			15.8		15.6	16.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	37.7	0.7		0.3	2.7			0.4		0.3	0.9	
Delay (s)	57.7	16.1		13.4	21.9			16.3		16.0	17.5	
Level of Service	E	B		B	C			B		B	B	
Approach Delay (s)		21.8			21.7			16.3			17.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.0	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)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

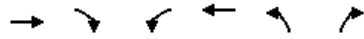


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	37	129	0	0	1123	99	539	248	502	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frbp, ped/bikes		1.00			1.00		1.00	1.00				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			0.99		1.00	0.90				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3383			5070		1711	3078				2694
Flt Permitted		0.75			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2581			5070		1711	3078				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	38	132	0	0	1146	101	550	253	512	0	0	618
RTOR Reduction (vph)	0	0	0	0	10	0	0	321	0	0	0	123
Lane Group Flow (vph)	0	170	0	0	1237	0	550	444	0	0	0	495
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		59.5			32.5		41.0	41.0				23.5
Effective Green, g (s)		59.5			32.5		41.0	41.0				23.5
Actuated g/C Ratio		0.54			0.30		0.37	0.37				0.21
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1567			1497		637	1147				575
v/s Ratio Prot		0.02			c0.24		c0.32	0.14				c0.18
v/s Ratio Perm		0.04										
v/c Ratio		0.11			0.83		0.86	0.39				0.86
Uniform Delay, d1		12.3			36.1		31.9	25.3				41.7
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			5.4		14.5	1.0				15.5
Delay (s)		12.5			41.5		46.4	26.3				57.1
Level of Service		B			D		D	C				E
Approach Delay (s)		12.5			41.5		34.7					57.1
Approach LOS		B			D		C					E

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	166	430	1511	757	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.93	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1575	1424	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1575	1424	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	171	443	1558	780	0	0
RTOR Reduction (vph)	3	3	0	0	0	0
Lane Group Flow (vph)	319	289	1558	780	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	21.4	21.4	38.6	70.0		
Effective Green, g (s)	21.4	21.4	38.6	70.0		
Actuated g/C Ratio	0.31	0.31	0.55	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	481	435	1830	1801		
v/s Ratio Prot	0.20		c0.47	0.43		
v/s Ratio Perm		c0.20				
v/c Ratio	0.66	0.66	0.85	0.43		
Uniform Delay, d1	21.2	21.2	13.3	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	3.8	4.0	0.2		
Delay (s)	24.6	25.0	17.3	0.2		
Level of Service	C	C	B	A		
Approach Delay (s)	24.8			11.6	0.0	
Approach LOS	C			B	A	
Intersection Summary						
HCM 2000 Control Delay			14.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			69.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	224	168	188	9	312	39	209	954	29	110	910	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.98		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.99	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1529	2496		1448	1569		1540	3055		1540	2898	
Fit Permitted	0.19	1.00		0.53	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	309	2496		809	1569		1540	3055		1540	2898	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	233	175	196	9	325	41	218	994	30	115	948	283
RTOR Reduction (vph)	0	124	0	0	5	0	0	2	0	0	28	0
Lane Group Flow (vph)	233	247	0	9	361	0	218	1022	0	115	1203	0
Confl. Peds. (#/hr)	100		100	100		100			100		100	100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.5	36.5		24.5	24.5		11.0	37.4		9.8	36.2	
Effective Green, g (s)	36.5	36.5		24.5	24.5		11.0	37.4		9.8	36.2	
Actuated g/C Ratio	0.36	0.36		0.24	0.24		0.11	0.37		0.10	0.36	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	911		198	384		169	1142		150	1049	
v/s Ratio Prot	c0.08	0.10		0.23			c0.14	0.33		0.07	c0.42	
v/s Ratio Perm	c0.36			0.01								
v/c Ratio	1.20	0.27		0.05	0.94		1.29	0.90		0.77	1.15	
Uniform Delay, d1	30.0	22.4		28.8	37.0		44.5	29.5		44.0	31.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.93	0.91	
Incremental Delay, d2	129.3	0.2		0.1	31.2		167.4	10.9		19.8	77.0	
Delay (s)	159.3	22.5		28.9	68.2		211.9	40.4		60.7	106.0	
Level of Service	F	C		C	E		F	D		E	F	
Approach Delay (s)		75.3			67.3			70.5			102.1	
Approach LOS		E			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			82.9								F	
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			105.2%							G		
Analysis Period (min)			15									
c Critical Lane Group												

2040 CUMULATIVE WITH PROJECT – BASKETBALL GAME
WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	924	825	48	407	937	47	79	1490	477	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	0.99		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3001		2987	3010			5475	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3001		2987	3010			5475	942			
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)	953	851	49	420	966	48	81	1536	492	0	0	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	206	0	0	0
Lane Group Flow (vph)	953	896	0	420	1014	0	0	1617	286	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Effective Green, g (s)	18.2	37.2		13.2	33.7			39.2	39.2			
Actuated g/C Ratio	0.17	0.34		0.12	0.31			0.36	0.36			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1014		358	922			1951	335			
v/s Ratio Prot	c0.21	0.30		0.14	c0.34							
v/s Ratio Perm								0.30	c0.30			
v/c Ratio	1.29	0.88		1.17	1.10			0.83	0.85			
Uniform Delay, d1	45.9	34.4		48.4	38.1			32.3	32.7			
Progression Factor	1.37	1.51		1.42	0.99			0.96	1.17			
Incremental Delay, d2	132.8	4.7		95.4	55.8			3.0	18.2			
Delay (s)	195.8	56.7		164.4	93.6			34.2	56.5			
Level of Service	F	E		F	F			C	E			
Approach Delay (s)		128.2			114.3			39.4			0.0	
Approach LOS		F			F			D			A	

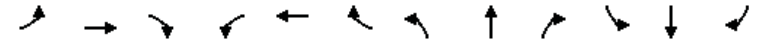
Intersection Summary

HCM 2000 Control Delay	89.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



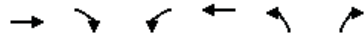
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↔	↕↕	↕
Volume (vph)	346	1643	36	30	962	24	8	250	107	47	657	592
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.87	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.77	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4143		1459	2863			1528	813	1123	2354	550
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.51	1.00	1.00
Satd. Flow (perm)	1459	4143		1459	2863			1467	813	607	2354	550
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	353	1677	37	31	982	24	8	255	109	48	670	604
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	71	0	25	226
Lane Group Flow (vph)	353	1712	0	31	1005	0	0	263	38	48	856	167
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	43.0		8.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.39		0.08	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1619		118	934			509	282	216	838	196
v/s Ratio Prot	c0.24	0.41		0.02	c0.35						c0.36	
v/s Ratio Perm								0.18	0.05	0.08		0.30
v/c Ratio	1.86	1.06		0.26	1.08			0.52	0.13	0.22	1.02	0.85
Uniform Delay, d1	47.8	33.5		47.5	37.0			28.6	24.6	24.7	35.4	32.7
Progression Factor	0.59	1.13		0.89	0.88			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	394.4	32.6		0.1	36.4			0.9	0.2	0.5	36.6	28.3
Delay (s)	422.6	70.3		42.4	68.9			29.4	24.8	25.3	72.0	61.0
Level of Service	F	E		D	E			C	C	C	E	E
Approach Delay (s)		130.5			68.1			28.1			67.0	
Approach LOS		F			E			C			E	

Intersection Summary

HCM 2000 Control Delay	91.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	123.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↑	↑
Volume (vph)	2002	157	0	1562	100	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.91			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	4366			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	4366			3079	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2085	164	0	1627	104	24
RTOR Reduction (vph)	8	0	0	0	0	3
Lane Group Flow (vph)	2241	0	0	1627	104	21
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	2464			1738	512	451
v/s Ratio Prot	0.51			c0.53	c0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.91			0.94	0.20	0.05
Uniform Delay, d1	21.4			22.1	26.3	24.9
Progression Factor	1.00			0.76	1.00	1.00
Incremental Delay, d2	6.3			1.3	0.9	0.2
Delay (s)	27.8			18.1	27.2	25.1
Level of Service	C			B	C	C
Approach Delay (s)	27.8			18.1	26.8	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑	↑
Volume (vph)	250	1050	150	100	570	810	340	362	1424	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		6062			3026	2596			4318	1033
Fit Permitted		0.99			0.52	1.00			0.95	1.00
Satd. Flow (perm)		6062			1584	2596			4318	1033
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	272	1129	161	108	613	871	366	393	1531	495
RTOR Reduction (vph)	0	23	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1539	0	0	721	1236	0	0	1974	445
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1953			492	807			1295	309
v/s Ratio Prot						c0.48			c0.46	
v/s Ratio Perm		0.25			0.46					0.43
v/c Ratio		0.79			1.54dl	1.53			1.52	1.44
Uniform Delay, d1		27.7			31.0	31.0			31.5	31.5
Progression Factor		1.56			0.31	1.00			1.00	1.00
Incremental Delay, d2		2.0			210.5	245.3			239.9	215.6
Delay (s)		45.2			220.1	276.3			271.4	247.1
Level of Service		D			F	F			F	F
Approach Delay (s)		45.2			220.1	276.3			266.9	
Approach LOS		D			F	F			F	

Intersection Summary			
HCM 2000 Control Delay	204.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	137.2%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	105	303	1050	110	565	140	500	260	180	982
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.90		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.95		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		2494	3622		2497		1228		1401	2690
Fit Permitted		0.95	1.00		1.00		1.00		0.15	0.61
Satd. Flow (perm)		2494	3622		2497		1228		218	1652
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	326	1129	118	608	151	538	280	194	1056
RTOR Reduction (vph)	0	0	12	0	15	0	226	0	0	0
Lane Group Flow (vph)	0	406	1268	0	879	0	177	0	379	1151
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)		22.5	22.5		23.0		23.0	42.0	42.0	
Effective Green, g (s)		22.5	25.0		24.5		23.0	43.5	43.5	
Actuated g/C Ratio		0.25	0.28		0.27		0.26	0.48	0.48	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		623	1006		679		313	322	988	
v/s Ratio Prot		0.16	c0.35		c0.35			0.22	c0.21	
v/s Ratio Perm							0.14	0.35	0.35	
v/c Ratio		0.65	1.26		1.29		0.56	1.18	1.16	
Uniform Delay, d1		30.2	32.5		32.8		29.1	33.1	23.2	
Progression Factor		1.00	1.00		1.00		1.00	1.05	1.07	
Incremental Delay, d2		5.2	125.5		143.1		7.2	82.9	75.4	
Delay (s)		35.5	158.0		175.9		36.3	117.7	100.2	
Level of Service		D	F		F		D	F	F	
Approach Delay (s)			128.5		132.5				104.5	
Approach LOS			F		F				F	
Intersection Summary										
HCM 2000 Control Delay			121.5							F
HCM 2000 Volume to Capacity ratio			1.09							
Actuated Cycle Length (s)			90.0		Sum of lost time (s)			13.5		
Intersection Capacity Utilization			99.2%		ICU Level of Service				F	
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↑	↑	↔	↔	↔
Volume (vph)	56	224	209	28	30	77	39	1449	139	70	429	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	0.99		1.00	0.99	
Fit Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1601	1353		1458		1540	3007		1540	3049	
Fit Permitted		0.91	1.00		0.90		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1471	1353		1321		1540	3007		1540	3049	
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)	59	236	220	29	32	81	41	1525	146	74	452	26
RTOR Reduction (vph)	0	0	149	0	48	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	295	71	0	94	0	41	1664	0	74	474	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Effective Green, g (s)		32.1	32.1		32.1		8.0	47.5		4.5	44.3	
Actuated g/C Ratio		0.32	0.32		0.32		0.08	0.48		0.04	0.44	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		472	434		424		123	1428		69	1350	
v/s Ratio Prot							0.03	c0.55		c0.05	0.16	
v/s Ratio Perm		c0.20	0.05		0.07							
v/c Ratio		0.62	0.16		0.22		0.33	1.17		1.07	0.35	
Uniform Delay, d1		28.8	24.3		24.8		43.5	26.2		47.8	18.4	
Progression Factor		1.00	1.00		1.00		1.23	0.64		1.00	1.00	
Incremental Delay, d2		6.1	0.8		1.2		6.7	81.8		129.7	0.7	
Delay (s)		35.0	25.1		26.0		60.3	98.6		177.4	19.1	
Level of Service		C	C		C		E	F		F	B	
Approach Delay (s)					26.0			97.7			40.3	
Approach LOS					C			F			D	
Intersection Summary												
HCM 2000 Control Delay			71.6				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)				15.9			
Intersection Capacity Utilization			104.5%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	40	139	20	8	38	48	18	259	24	326	332	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.96	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2978			1605	1353	1292	1595		1540	1530	
Fit Permitted		0.88			0.91	1.00	0.52	1.00		0.95	1.00	
Satd. Flow (perm)		2654			1479	1353	711	1595		1540	1530	
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)	43	149	22	9	41	52	19	278	26	351	357	51
RTOR Reduction (vph)	0	12	0	0	0	29	0	5	0	0	6	0
Lane Group Flow (vph)	0	202	0	0	50	23	19	299	0	351	402	0
Confl. Peds. (#/hr)	28		3	3			28	213		19		213
Confl. Bikes (#/hr)			1							18		10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		9.7			9.7	25.0	15.8	15.8		15.3	36.1	
Effective Green, g (s)		9.7			9.7	25.0	15.8	15.8		15.3	36.1	
Actuated g/C Ratio		0.17			0.17	0.45	0.28	0.28		0.27	0.65	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	461				257	727	201	451		422	989	
v/s Ratio Prot						0.01		c0.19		c0.23	0.26	
v/s Ratio Perm	c0.08				0.03	0.01	0.03					
v/c Ratio	0.44				0.19	0.03	0.09	0.66		0.83	0.41	
Uniform Delay, d1	20.6				19.7	8.6	14.7	17.7		19.0	4.7	
Progression Factor	1.00				1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7				0.4	0.0	0.2	3.6		13.1	0.3	
Delay (s)	21.3				20.1	8.6	14.9	21.3		32.1	5.0	
Level of Service	C				C	A	B	C		C	A	
Approach Delay (s)	21.3				14.2			20.9			17.5	
Approach LOS	C				B			C			B	

Intersection Summary

HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	186	473	984	72	420	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2368	2431	1304	1540	1621
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2368	2431	1304	1540	1621
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	514	1070	78	457	299
RTOR Reduction (vph)	0	420	0	12	0	0
Lane Group Flow (vph)	202	94	1070	66	457	299
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	19.7	19.7	44.1	44.1	29.1	78.2
Effective Green, g (s)	19.7	19.7	44.1	44.1	29.1	78.2
Actuated g/C Ratio	0.18	0.18	0.41	0.41	0.27	0.72
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	432	993	532	415	1174
v/s Ratio Prot	c0.13		c0.44		c0.30	0.18
v/s Ratio Perm		0.04		0.05		
v/c Ratio	0.72	0.22	1.08	0.12	1.10	0.25
Uniform Delay, d1	41.5	37.5	31.9	19.9	39.4	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	0.3	51.8	0.1	74.4	0.1
Delay (s)	50.0	37.8	83.7	20.0	113.8	5.1
Level of Service	D	D	F	B	F	A
Approach Delay (s)	41.2		79.4			70.8
Approach LOS	D		E			E

Intersection Summary

HCM 2000 Control Delay	66.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	
Volume (vph)	24	48	87	213	456	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frb, ped/bikes	0.96		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.91		1.00	1.00	0.99	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1547		1688	1531	3107	
Fit Permitted	0.98		0.44	1.00	1.00	
Satd. Flow (perm)	1547		787	1531	3107	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	53	97	237	507	51
RTOR Reduction (vph)	48	0	0	0	7	0
Lane Group Flow (vph)	32	0	97	237	551	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	3.8		24.6	24.6	24.6	
Effective Green, g (s)	3.8		24.6	24.6	24.6	
Actuated g/C Ratio	0.10		0.64	0.64	0.64	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	153		504	980	1990	
v/s Ratio Prot	c0.02			0.15	c0.18	
v/s Ratio Perm			0.12			
v/c Ratio	0.21		0.19	0.24	0.28	
Uniform Delay, d1	15.9		2.8	2.9	3.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7		0.2	0.1	0.1	
Delay (s)	16.6		3.0	3.1	3.1	
Level of Service	B		A	A	A	
Approach Delay (s)	16.6			3.0	3.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Volume (vph)	211	322	1442	52	74	1022
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frb, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3394		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3394		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	234	358	1602	58	82	1136
RTOR Reduction (vph)	0	141	3	0	0	0
Lane Group Flow (vph)	234	217	1657	0	82	1136
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1632		135	2090
v/s Ratio Prot			c0.49		0.05	c0.33
v/s Ratio Perm	0.15	c0.15				
v/c Ratio	0.52	0.52	1.02		0.61	0.54
Uniform Delay, d1	29.8	29.8	25.9		44.5	11.3
Progression Factor	1.00	1.00	1.63		1.04	1.04
Incremental Delay, d2	1.0	1.1	15.6		7.5	0.3
Delay (s)	30.8	30.9	57.9		54.1	12.1
Level of Service	C	C	E		D	B
Approach Delay (s)	30.9		57.9			14.9
Approach LOS	C		E			B

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	32	57	260	409	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1540	1351		3047	2974	
Flt Permitted	0.95	1.00		0.74	1.00	
Satd. Flow (perm)	1540	1351		2271	2974	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	38	67	306	481	112
RTOR Reduction (vph)	0	36	0	0	37	0
Lane Group Flow (vph)	47	2	0	373	556	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.1	2.1		15.4	15.4	
Effective Green, g (s)	2.1	2.1		15.4	15.4	
Actuated g/C Ratio	0.04	0.04		0.29	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	60	53		658	862	
v/s Ratio Prot	c0.03				c0.19	
v/s Ratio Perm		0.00		0.16		
v/c Ratio	0.78	0.03		0.57	0.65	
Uniform Delay, d1	25.3	24.5		16.0	16.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	47.5	0.2		1.1	1.7	
Delay (s)	72.8	24.7		17.1	18.1	
Level of Service	E	C		B	B	
Approach Delay (s)	51.3			17.1	18.1	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th


4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	50	67	107	53	87	10	221	44	19	10	164	122
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	54	77	123	61	100	11	254	48	22	11	178	133
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	54	200	61	111	324	189	133					
Volume Left (vph)	54	0	61	0	254	11	0					
Volume Right (vph)	0	123	0	11	22	0	133					
Hadj (s)	0.53	-0.40	0.53	-0.03	0.15	0.06	-0.67					
Departure Headway (s)	7.3	6.4	7.4	6.9	6.4	6.5	5.7					
Degree Utilization, x	0.11	0.35	0.13	0.21	0.58	0.34	0.21					
Capacity (veh/h)	457	527	440	477	533	526	588					
Control Delay (s)	10.0	11.6	10.3	10.5	17.9	11.5	9.0					
Approach Delay (s)	11.2		10.4		17.9	10.5						
Approach LOS	B		B		C	B						

Intersection Summary			
Delay		12.9	
Level of Service		B	
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	249	131	313	24	263	143	315	1102	19	73	943	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1507	1621	1337	1524	1621	1304	2987	3069		1540	2978	
Fit Permitted	0.46	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	736	1621	1337	1061	1621	1304	2987	3069		1540	2978	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	274	144	344	26	289	157	346	1211	21	80	1036	238
RTOR Reduction (vph)	0	0	225	0	0	103	0	1	0	0	20	0
Lane Group Flow (vph)	274	144	119	26	289	54	346	1231	0	80	1254	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	253	559	461	366	559	449	418	1160		184	1066	
v/s Ratio Prot		0.09			0.18		0.12	c0.40		0.05	c0.42	
v/s Ratio Perm	c0.37		0.09	0.02		0.04						
v/c Ratio	1.08	0.26	0.26	0.07	0.52	0.12	0.83	1.06		0.43	1.18	
Uniform Delay, d1	32.8	23.5	23.5	22.0	26.1	22.4	41.8	31.1		40.9	32.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.81		1.01	1.00	
Incremental Delay, d2	80.5	1.1	1.3	0.4	3.4	0.5	5.1	33.3		6.3	88.1	
Delay (s)	113.2	24.7	24.9	22.4	29.5	22.9	29.8	58.7		47.5	120.3	
Level of Service	F	C	C	C	C	C	C	E		D	F	
Approach Delay (s)		56.6			26.9			52.3			116.0	
Approach LOS		E			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	70.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	123.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	140	528	14	42	674	79	49	54	77	88	34	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.87	1.00	0.98		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.87	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1801	1489	1711	1801	1338	1711	1606		1609	1478	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.37	1.00		0.67	1.00	
Satd. Flow (perm)	1711	1801	1489	1711	1801	1338	667	1606		1128	1478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	574	15	46	733	86	53	59	84	96	37	248
RTOR Reduction (vph)	0	0	7	0	0	45	0	66	0	0	195	0
Lane Group Flow (vph)	152	574	8	46	733	41	53	77	0	96	90	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)			10		10			10				10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8	8			4	
Permitted Phases			2			6	8					4
Actuated Green, G (s)	8.0	37.4	37.4	4.6	34.0	34.0	15.6	15.6		15.6	15.6	
Effective Green, g (s)	8.0	37.4	37.4	4.6	34.0	34.0	15.6	15.6		15.6	15.6	
Actuated g/C Ratio	0.11	0.52	0.52	0.06	0.47	0.47	0.21	0.21		0.21	0.21	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	927	767	108	843	626	143	345		242	317	
v/s Ratio Prot	c0.09	c0.32		0.03	c0.41		0.03	0.08		0.05		0.06
v/s Ratio Perm			0.01				0.03	0.08				c0.09
v/c Ratio	0.81	0.62	0.01	0.43	0.87	0.07	0.37	0.22		0.40	0.28	
Uniform Delay, d1	31.6	12.5	8.6	32.7	17.3	10.6	24.3	23.5		24.5	23.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.9	3.1	0.0	2.7	9.5	0.0	1.6	0.3		1.1	0.5	
Delay (s)	53.5	15.6	8.6	35.4	26.8	10.6	25.9	23.8		25.5	24.3	
Level of Service	D	B	A	D	C	B	C	C		C	C	
Approach Delay (s)		23.3			25.7			24.4			24.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	142	382	238	67	789	94	138	245	138	162	336	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	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	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1540	1540	1378	1540	1540	1321	1540	2912			3030	1357
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.32	1.00			0.64	1.00
Satd. Flow (perm)	1540	1540	1378	1540	1540	1321	523	2912			1976	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	148	398	248	70	822	98	144	255	144	169	350	195
RTOR Reduction (vph)	0	0	105	0	0	27	0	67	0	0	0	140
Lane Group Flow (vph)	148	398	143	70	822	71	144	332	0	0	519	55
Confl. Peds. (#/hr)												3
Confl. Bikes (#/hr)												36
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	65.5	65.5	6.3	61.8	61.8	34.6	34.6			33.6	33.6
Effective Green, g (s)	9.0	65.5	65.5	6.3	61.8	61.8	34.6	34.6			33.6	33.6
Actuated g/C Ratio	0.08	0.55	0.55	0.05	0.52	0.52	0.29	0.29			0.28	0.28
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	116	844	755	81	797	683	151	843			556	381
v/s Ratio Prot	c0.10	c0.26		0.05	c0.53			0.11				
v/s Ratio Perm			0.10			0.05	c0.28				0.26	0.04
v/c Ratio	1.28	0.47	0.19	0.86	1.03	0.10	0.95	0.39			0.93	0.14
Uniform Delay, d1	55.2	16.4	13.6	56.1	28.8	14.7	41.6	34.0			41.8	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	175.0	1.9	0.6	56.9	40.2	0.1	59.0	0.3			22.9	0.2
Delay (s)	230.2	18.3	14.1	113.0	69.0	14.8	100.6	34.3			64.7	32.3
Level of Service	F	B	B	F	E	B	F	C			E	C
Approach Delay (s)		56.5			66.7			51.9			55.8	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	58.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015

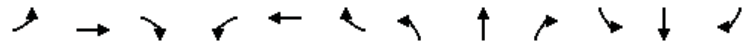


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	72	571	76	58	581	475	75	329	48	142	140	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1077		1540	1296	992	1232	1102	1058	1232	1165	
Fit Permitted	0.09	1.00		0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	140	1077		140	1296	992	1232	1102	1058	1232	1165	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	77	607	81	62	618	505	80	350	51	151	149	139
RTOR Reduction (vph)	0	4	0	0	0	78	0	0	39	0	31	0
Lane Group Flow (vph)	77	684	0	62	618	427	80	350	12	151	257	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10						
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	50.1	50.1		50.1	50.1	60.1	9.0	25.0	25.0	10.0	26.0	
Effective Green, g (s)	50.1	50.1		50.1	50.1	60.1	9.0	25.0	25.0	10.0	26.0	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.55	0.08	0.23	0.23	0.09	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	114	495		114	595	592	101	252	242	113	277	
v/s Ratio Prot	0.02	c0.63		0.02	c0.48	0.07	0.06	c0.32		c0.12	0.22	
v/s Ratio Perm	0.28			0.23		0.36			0.01			
v/c Ratio	0.68	1.38		0.54	1.04	0.72	0.79	1.39	0.05	1.34	0.93	
Uniform Delay, d1	25.3	29.4		47.7	29.4	18.2	49.1	42.0	32.7	49.5	40.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.7	183.8		5.2	47.3	4.3	33.3	197.6	0.1	199.4	34.9	
Delay (s)	40.0	213.3		52.9	76.7	22.5	82.4	239.6	32.8	248.9	75.5	
Level of Service	D	F		D	E	C	F	F	C	F	E	
Approach Delay (s)		195.8			52.4			191.5			135.1	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	126.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



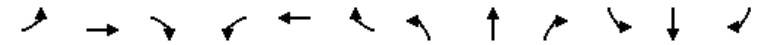
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	77	155	49	56	372	17	41	126	109	21	61	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	1.00			1.00			1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00			0.99			0.98	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.96		1.00	0.99			0.95			0.90	
Fit Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1695	3265		1682	1786			1675			1581	
Fit Permitted	0.29	1.00		0.61	1.00			0.89			0.97	
Satd. Flow (perm)	521	3265		1081	1786			1505			1534	
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)	86	172	54	62	413	19	46	140	121	23	68	261
RTOR Reduction (vph)	0	35	0	0	2	0	0	30	0	0	131	0
Lane Group Flow (vph)	86	191	0	62	430	0	0	277	0	0	221	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	21.5	21.5		21.5	21.5			20.2			20.2	
Effective Green, g (s)	21.5	21.5		21.5	21.5			20.2			20.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.30			0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	168	1055		349	577			457			465	
v/s Ratio Prot		0.06			c0.24							
v/s Ratio Perm	0.16			0.06				c0.18			0.14	
v/c Ratio	0.51	0.18		0.18	0.75			0.61			0.48	
Uniform Delay, d1	18.2	16.2		16.2	20.1			19.8			18.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.6	0.1		0.2	5.2			2.3			0.8	
Delay (s)	20.9	16.3		16.4	25.3			22.0			19.6	
Level of Service	C	B		B	C			C			B	
Approach Delay (s)		17.5			24.1			22.0			19.6	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	205	177	106	96	507	45	108	1187	67	36	941	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.99		1.00	1.00			1.00	1.00		1.00	0.99
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.94		1.00	0.99			1.00	0.99		1.00	0.96
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1688	3184		1684	3366			1711	3389		1711	3269
Fit Permitted	0.34	1.00		0.56	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	602	3184		985	3366			1711	3389		1711	3269
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	218	188	113	102	539	48	115	1263	71	38	1001	322
RTOR Reduction (vph)	0	72	0	0	6	0	0	4	0	0	31	0
Lane Group Flow (vph)	218	229	0	102	581	0	115	1330	0	38	1292	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Effective Green, g (s)	36.7	36.7		36.7	36.7		9.9	37.9		9.9	37.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.10	0.38		0.10	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	220	1168		361	1235		169	1284		169	1238	
v/s Ratio Prot		0.07			0.17		0.07	c0.39		0.02	c0.40	
v/s Ratio Perm	c0.36			0.10								
v/c Ratio	0.99	0.20		0.28	0.47		0.68	1.04		0.22	1.04	
Uniform Delay, d1	31.5	21.6		22.4	24.2		43.5	31.1		41.5	31.1	
Progression Factor	1.00	1.00		1.00	1.00		0.94	0.90		1.56	0.58	
Incremental Delay, d2	58.4	0.4		2.0	1.3		18.5	33.8		0.8	26.1	
Delay (s)	89.9	22.0		24.3	25.5		59.4	61.7		65.5	44.2	
Level of Service	F	C		C	C		E	E		E	D	
Approach Delay (s)		50.5			25.3			61.5			44.8	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	48.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

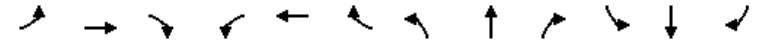


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	85	496	76	16	824	105	51	0	24	46	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98			0.96		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1711	3353		1711	3363			1666		1711	1531	
Flt Permitted	0.16	1.00		0.35	1.00			0.76		0.70	1.00	
Satd. Flow (perm)	284	3353		628	3363			1313		1268	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	539	83	17	896	114	55	0	26	50	0	187
RTOR Reduction (vph)	0	16	0	0	13	0	0	14	0	0	55	0
Lane Group Flow (vph)	92	606	0	17	997	0	0	67	0	50	132	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.6	31.6		31.6	31.6			35.4		35.4	35.4	
Effective Green, g (s)	31.6	31.6		31.6	31.6			35.4		35.4	35.4	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.46		0.46	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	116	1376		257	1380			603		582	703	
v/s Ratio Prot		0.18			0.30						c0.09	
v/s Ratio Perm	c0.32			0.03				0.05		0.04		
v/c Ratio	0.79	0.44		0.07	0.72			0.11		0.09	0.19	
Uniform Delay, d1	19.8	16.3		13.8	19.0			11.8		11.7	12.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	30.0	0.2		0.1	1.9			0.4		0.1	0.1	
Delay (s)	49.8	16.6		13.9	20.9			12.2		11.8	12.4	
Level of Service	D	B		B	C			B		B	B	
Approach Delay (s)		20.8			20.8			12.2			12.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015

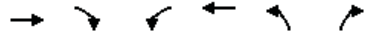


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	47	129	0	0	1016	111	539	336	541	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frbp, ped/bikes		1.00			1.00		1.00	1.00				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			0.99		1.00	0.91				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3376			5056		1711	3105				2694
Flt Permitted		0.74			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2515			5056		1711	3105				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	48	132	0	0	1037	113	550	343	552	0	0	618
RTOR Reduction (vph)	0	0	0	0	15	0	0	325	0	0	0	115
Lane Group Flow (vph)	0	180	0	0	1135	0	550	570	0	0	0	503
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		48.5			27.5		32.0	32.0				17.5
Effective Green, g (s)		48.5			27.5		32.0	32.0				17.5
Actuated g/C Ratio		0.54			0.31		0.36	0.36				0.19
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1522			1544		608	1104				523
v/s Ratio Prot		0.02			c0.22		c0.32	0.18				c0.19
v/s Ratio Perm		0.04										
v/c Ratio		0.12			0.73		0.90	0.52				0.96
Uniform Delay, d1		10.2			28.0		27.6	22.9				35.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.2			3.1		19.4	1.7				30.9
Delay (s)		10.4			31.1		46.9	24.6				66.8
Level of Service		B			C		D	C				E
Approach Delay (s)		10.4			31.1		33.1					66.8
Approach LOS		B			C		C					E

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

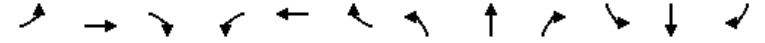
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	176	430	1404	757	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.93	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1581	1424	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1581	1424	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	181	443	1447	780	0	0
RTOR Reduction (vph)	4	4	0	0	0	0
Lane Group Flow (vph)	323	293	1447	780	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	21.5	21.5	38.5	70.0		
Effective Green, g (s)	21.5	21.5	38.5	70.0		
Actuated g/C Ratio	0.31	0.31	0.55	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	485	437	1825	1801		
v/s Ratio Prot	0.20		c0.44	0.43		
v/s Ratio Perm		c0.21				
v/c Ratio	0.67	0.67	0.79	0.43		
Uniform Delay, d1	21.1	21.2	12.6	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	4.0	2.5	0.2		
Delay (s)	24.6	25.2	15.0	0.2		
Level of Service	C	C	B	A		
Approach Delay (s)	24.8			9.8	0.0	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			66.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	227	168	188	9	312	39	209	968	29	110	908	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	0.98		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.99	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1529	2496		1448	1569		1540	3056		1540	2899	
Fit Permitted	0.19	1.00		0.53	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	309	2496		809	1569		1540	3056		1540	2899	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	236	175	196	9	325	41	218	1008	30	115	946	282
RTOR Reduction (vph)	0	124	0	0	5	0	0	2	0	0	28	0
Lane Group Flow (vph)	236	247	0	9	361	0	218	1036	0	115	1200	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	36.5	36.5		24.5	24.5		10.0	37.5		9.7	37.2	
Effective Green, g (s)	36.5	36.5		24.5	24.5		10.0	37.5		9.7	37.2	
Actuated g/C Ratio	0.36	0.36		0.24	0.24		0.10	0.38		0.10	0.37	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	911		198	384		154	1146		149	1078	
v/s Ratio Prot	c0.08	0.10			0.23		c0.14	0.34		0.07	c0.41	
v/s Ratio Perm	c0.36			0.01								
v/c Ratio	1.22	0.27		0.05	0.94		1.42	0.90		0.77	1.11	
Uniform Delay, d1	30.0	22.4		28.8	37.0		45.0	29.6		44.1	31.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.92	0.90	
Incremental Delay, d2	135.0	0.2		0.1	31.2		220.7	11.7		20.7	63.6	
Delay (s)	165.0	22.5		28.9	68.2		265.7	41.2		61.5	91.7	
Level of Service	F	C		C	E		F	D		E	F	
Approach Delay (s)		77.9			67.3			80.2			89.2	
Approach LOS		E			E			F			F	
Intersection Summary												
HCM 2000 Control Delay			81.8								F	
HCM 2000 Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			105.3%							G		
Analysis Period (min)			15									
c Critical Lane Group												

2040 CUMULATIVE WITH PROJECT – BASKETBALL GAME
SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	662	674	232	651	618	102	74	691	268	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.96		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	2882		2987	2966			5503	1237			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	2882		2987	2966			5503	1237			
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)	736	749	258	723	687	113	82	768	298	0	0	0
RTOR Reduction (vph)	0	31	0	0	11	0	0	0	219	0	0	0
Lane Group Flow (vph)	736	976	0	723	789	0	0	850	79	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)		10				10			10			
Turn Type	Prot	NA		Prot	NA	Perm	NA	Perm				
Protected Phases	5	2		1	6		8					
Permitted Phases						8		8				
Actuated Green, G (s)	21.5	38.7		23.3	40.5		29.1	29.1				
Effective Green, g (s)	21.5	38.7		23.3	40.5		29.1	29.1				
Actuated g/C Ratio	0.20	0.35		0.21	0.37		0.26	0.26				
Clearance Time (s)	6.8	5.3		6.8	5.3		6.8	6.8				
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0				
Lane Grp Cap (vph)	875	1013		632	1092		1455	327				
v/s Ratio Prot	0.16	c0.34		c0.24	0.27							
v/s Ratio Perm							0.15	0.06				
v/c Ratio	0.84	0.96		1.14	0.72		0.58	0.24				
Uniform Delay, d1	42.6	35.0		43.4	29.9		35.2	31.8				
Progression Factor	0.80	0.68		0.75	0.51		1.37	5.58				
Incremental Delay, d2	3.3	11.7		77.7	1.6		0.5	0.3				
Delay (s)	37.3	35.4		110.3	17.0		48.7	177.6				
Level of Service	D	D		F	B		D	F				
Approach Delay (s)		36.2			61.3		82.2			0.0		
Approach LOS		D			E		F			A		

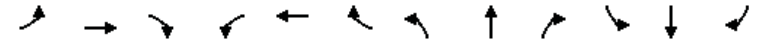
Intersection Summary

HCM 2000 Control Delay	56.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	348	1439	114	64	572	56	16	178	42	87	817	199
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.97		1.00	0.94			1.00	0.64	1.00	0.99	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00	0.74	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4253		1296	2415			1599	858	1141	2902	581
Fit Permitted	0.95	1.00		0.95	1.00			0.74	1.00	0.59	1.00	1.00
Satd. Flow (perm)	1540	4253		1296	2415			1189	858	703	2902	581
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	370	1531	121	68	609	60	17	189	45	93	869	212
RTOR Reduction (vph)	0	7	0	0	6	0	0	0	30	0	1	115
Lane Group Flow (vph)	370	1645	0	68	663	0	0	206	15	93	889	76
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)		10				10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA	Perm	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2		1	6		4		4	7		7
Permitted Phases						4		4		7		7
Actuated Green, G (s)	17.4	41.5		11.4	33.9		37.2	37.2	38.2	38.2	38.2	38.2
Effective Green, g (s)	17.4	41.5		11.4	33.9		37.2	37.2	38.2	38.2	38.2	38.2
Actuated g/C Ratio	0.16	0.38		0.10	0.31		0.34	0.34	0.35	0.35	0.35	0.35
Clearance Time (s)	7.6	6.0		7.1	7.1		6.8	6.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	1604		134	744		402	290	244	1007	201	
v/s Ratio Prot	c0.24	c0.39		0.05	c0.27						c0.31	
v/s Ratio Perm							0.17	0.02	0.13			0.13
v/c Ratio	1.52	1.03		0.51	0.89		0.51	0.05	0.38	0.88		0.38
Uniform Delay, d1	46.3	34.2		46.6	36.3		29.1	24.5	27.0	33.8		27.0
Progression Factor	0.90	1.11		0.76	0.74		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	251.2	26.8		2.1	9.7		1.1	0.1	1.0	9.2		1.2
Delay (s)	293.0	64.9		37.6	36.7		30.2	24.6	28.0	43.0		28.2
Level of Service	F	E		D	D		C	C	C	D		C
Approach Delay (s)		106.6			36.7		29.2			39.4		
Approach LOS		F			D		C			D		

Intersection Summary

HCM 2000 Control Delay	70.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	137.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↑	↑
Volume (vph)	1748	91	0	787	35	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.91			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	4388			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	4388			3079	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1921	100	0	865	38	168
RTOR Reduction (vph)	3	0	0	0	0	8
Lane Group Flow (vph)	2018	0	0	865	38	160
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)	1					
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	80.4			80.4	18.3	18.3
Effective Green, g (s)	80.4			80.4	18.3	18.3
Actuated g/C Ratio	0.73			0.73	0.17	0.17
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3207			2250	256	225
v/s Ratio Prot	c0.46			0.28	0.02	
v/s Ratio Perm						c0.12
v/c Ratio	0.63			0.38	0.15	0.71
Uniform Delay, d1	7.4			5.5	39.2	43.3
Progression Factor	1.00			0.22	1.00	1.00
Incremental Delay, d2	0.9			0.1	0.3	9.8
Delay (s)	8.3			1.3	39.5	53.2
Level of Service	A			A	D	D
Approach Delay (s)	8.3			1.3	50.6	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay		9.2			HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio		0.64				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	11.3
Intersection Capacity Utilization		73.9%			ICU Level of Service	D
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR	
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑	
Volume (vph)	246	1136	135	65	529	548	292	504	1371	455	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0	
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86	
Frbp, ped/bikes		0.99			1.00	0.95			1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00	
Frt		0.99			1.00	0.95			1.00	0.85	
Fit Protected		0.99			0.99	1.00			0.95	1.00	
Satd. Flow (prot)		6059			3025	2544			4324	1185	
Fit Permitted		0.99			0.59	1.00			0.95	1.00	
Satd. Flow (perm)		6059			1800	2544			4324	1185	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	254	1171	139	67	545	565	301	520	1413	469	
RTOR Reduction (vph)	0	19	0	0	0	1	0	0	0	0	
Lane Group Flow (vph)	0	1545	0	0	612	865	0	0	1980	422	
Confl. Peds. (#/hr)	50		100	100			100	50	100	100	
Confl. Bikes (#/hr)			10				10			10	
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0	
Parking (#/hr)		10				10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot	
Protected Phases		6			4	4		7	7	7	
Permitted Phases	6			4							
Actuated Green, G (s)		21.5			23.0	23.0			28.0	28.0	
Effective Green, g (s)		23.5			26.0	26.0			31.0	31.0	
Actuated g/C Ratio		0.26			0.29	0.29			0.34	0.34	
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		1582			520	734			1489	408	
v/s Ratio Prot						c0.34			c0.46	0.36	
v/s Ratio Perm		0.25			0.34						
v/c Ratio		0.98			1.18	1.18			1.33	1.03	
Uniform Delay, d1		33.0			32.0	32.0			29.5	29.5	
Progression Factor		1.55			1.00	1.00			1.00	1.00	
Incremental Delay, d2		12.3			98.3	94.3			153.1	53.7	
Delay (s)		63.4			130.3	126.3			182.6	83.2	
Level of Service		E			F	F			F	F	
Approach Delay (s)		63.4			130.3	126.3			165.1		
Approach LOS		E			F	F			F		
Intersection Summary											
HCM 2000 Control Delay			125.8							HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.22								
Actuated Cycle Length (s)			90.0							Sum of lost time (s)	12.5
Intersection Capacity Utilization			126.4%							ICU Level of Service	H
Analysis Period (min)			15								
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	335	189	510	120	259	41	292	236	77	985
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.98		0.90		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.97		0.95		0.85		1.00	1.00
Fit Protected		0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)		2186	3343		2346		1161		1327	2558
Fit Permitted		0.95	1.00		1.00		1.00		0.28	0.95
Satd. Flow (perm)		2186	3343		2346		1161		384	2444
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	414	233	630	148	320	51	360	291	95	1216
RTOR Reduction (vph)	0	0	35	0	44	0	179	0	0	0
Lane Group Flow (vph)	0	565	825	0	460	0	48	0	376	1226
Confl. Peds. (#/hr)	25			60	200					
Confl. Bikes (#/hr)				10	10	10				
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	Perm	pm+pt	pm+pt	NA		
Protected Phases	2	2	2	8		7	7	4		
Permitted Phases					8	4	4			
Actuated Green, G (s)		18.5	18.5	16.0	16.0		31.0	31.0		
Effective Green, g (s)		18.5	21.0	17.5	16.0		32.5	32.5		
Actuated g/C Ratio		0.25	0.28	0.23	0.21		0.43	0.43		
Clearance Time (s)		4.5	4.5	4.0	4.0		4.0	4.0		
Lane Grp Cap (vph)		539	936	547	247		323	1078		
v/s Ratio Prot		c0.26	0.25	0.20			0.19	c0.19		
v/s Ratio Perm					0.04		c0.31	0.30		
v/c Ratio		1.58dl	0.88	0.84	0.20		1.16	1.14		
Uniform Delay, d1		28.2	25.8	27.4	24.2		24.3	21.2		
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		52.0	11.8	14.4	1.8		102.4	73.4		
Delay (s)		80.3	37.6	41.8	26.0		126.7	94.7		
Level of Service		F	D	D	C		F	F		
Approach Delay (s)			54.5	36.9				102.2		
Approach LOS			D	D				F		
Intersection Summary										
HCM 2000 Control Delay			71.4							E
HCM 2000 Volume to Capacity ratio			0.92							
Actuated Cycle Length (s)			75.0		Sum of lost time (s)			13.5		
Intersection Capacity Utilization			79.0%		ICU Level of Service			D		
Analysis Period (min)			15							
dl Defacto Left Lane. Recode with 1 though lane as a left lane. c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	50	993	197	12	12	16	18	524	84	164	339	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	0.97		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	0.98		1.00	0.99	
Fit Protected		1.00	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1615	1352		1490		1540	2926		1540	3055	
Fit Permitted		0.98	1.00		0.54		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1593	1352		820		1540	2926		1540	3055	
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)	52	1024	203	12	12	16	19	540	87	169	349	15
RTOR Reduction (vph)	0	0	65	0	7	0	0	11	0	0	2	0
Lane Group Flow (vph)	0	1076	138	0	33	0	19	616	0	169	362	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		70.1	70.1		70.1		2.5	23.5		13.6	34.9	
Effective Green, g (s)		70.1	70.1		70.1		2.5	23.5		13.6	34.9	
Actuated g/C Ratio		0.57	0.57		0.57		0.02	0.19		0.11	0.28	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		907	769		466		31	558		170	866	
v/s Ratio Prot							0.01	c0.21		c0.11	0.12	
v/s Ratio Perm		c0.68	0.10		0.04							
v/c Ratio		1.19	0.18		0.07		0.61	1.10		0.99	0.42	
Uniform Delay, d1		26.5	12.7		11.9		59.8	49.8		54.7	35.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		95.0	0.1		0.1		22.6	70.1		66.9	0.3	
Delay (s)		121.5	12.8		12.0		82.4	119.9		121.6	36.2	
Level of Service		F	B		B		F	F		F	D	
Approach Delay (s)		104.3			12.0			118.8			63.3	
Approach LOS		F			B			F			E	
Intersection Summary												
HCM 2000 Control Delay			97.8					HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			123.1		Sum of lost time (s)					15.9		
Intersection Capacity Utilization			106.0%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	15	836	14	5	14	26	13	89	4	400	271	34
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	0.96	
Flpb, ped/bikes		1.00			1.00	1.00	0.77	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2592			1430	1191	1062	1436		1377	1364	
Fit Permitted		0.95			0.84	1.00	0.55	1.00		0.95	1.00	
Satd. Flow (perm)		2469			1213	1191	616	1436		1377	1364	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	17	961	16	6	16	30	15	102	5	460	311	39
RTOR Reduction (vph)	0	1	0	0	0	10	0	3	0	0	6	0
Lane Group Flow (vph)	0	993	0	0	22	20	15	104	0	460	344	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		30.3			30.3	49.5	9.0	9.0		19.2	33.2	
Effective Green, g (s)		30.3			30.3	49.5	9.0	9.0		19.2	33.2	
Actuated g/C Ratio		0.41			0.41	0.67	0.12	0.12		0.26	0.45	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		1017			500	883	75	175		359	616	
v/s Ratio Prot						0.01		0.07		c0.33	c0.25	
v/s Ratio Perm		c0.40			0.02	0.01	0.02					
v/c Ratio		0.98			0.04	0.02	0.20	0.60		1.28	0.56	
Uniform Delay, d1		21.2			12.9	4.0	29.0	30.5		27.1	14.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		22.4			0.0	0.0	1.3	5.4		146.4	1.1	
Delay (s)		43.6			13.0	4.0	30.3	35.9		173.5	15.9	
Level of Service		D			B	A	C	D		F	B	
Approach Delay (s)		43.6			7.8			35.2			105.4	
Approach LOS		D			A			D			F	

Intersection Summary			
HCM 2000 Control Delay	67.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



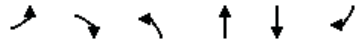
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	109	203	249	62	966	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.89	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	2366	2431	1232	1540	1621
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1540	2366	2431	1232	1540	1621
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	125	233	286	71	1110	193
RTOR Reduction (vph)	0	202	0	46	0	0
Lane Group Flow (vph)	125	31	286	25	1110	193
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	13.4	13.4	15.8	15.8	57.1	77.9
Effective Green, g (s)	13.4	13.4	15.8	15.8	57.1	77.9
Actuated g/C Ratio	0.13	0.13	0.16	0.16	0.56	0.77
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	203	312	379	192	868	1246
v/s Ratio Prot	c0.08		c0.12		c0.72	0.12
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.62	0.10	0.75	0.13	1.28	0.15
Uniform Delay, d1	41.5	38.6	40.9	36.8	22.1	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.1	8.3	0.3	134.3	0.1
Delay (s)	47.0	38.8	49.2	37.2	156.4	3.1
Level of Service	D	D	D	D	F	A
Approach Delay (s)	41.6		46.8			133.7
Approach LOS	D		D			F

Intersection Summary			
HCM 2000 Control Delay	102.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	13	31	227	166	147	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.94		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.90		1.00	1.00	1.00	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1515		1670	1531	3150	
Fit Permitted	0.99		0.64	1.00	1.00	
Satd. Flow (perm)	1515		1123	1531	3150	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	15	37	270	198	175	4
RTOR Reduction (vph)	35	0	0	0	1	0
Lane Group Flow (vph)	17	0	270	198	178	0
Confl. Peds. (#/hr)	50	50			50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.3		27.8	27.8	27.8	
Effective Green, g (s)	2.3		27.8	27.8	27.8	
Actuated g/C Ratio	0.06		0.69	0.69	0.69	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	86		778	1061	2183	
v/s Ratio Prot	c0.01			0.13	0.06	
v/s Ratio Perm			c0.24			
v/c Ratio	0.20		0.35	0.19	0.08	
Uniform Delay, d1	18.0		2.5	2.2	2.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.1		0.3	0.1	0.0	
Delay (s)	19.2		2.8	2.3	2.0	
Level of Service	B		A	A	A	
Approach Delay (s)	19.2		2.5	2.0		
Approach LOS	B		A	A		

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	40.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	11	53	542	54	310	474
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.94	0.99		1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1628	1437	3339		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1628	1437	3339		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	12	57	583	58	333	510
RTOR Reduction (vph)	0	53	6	0	0	0
Lane Group Flow (vph)	12	4	635	0	333	510
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	4.1	4.1	30.3		15.2	50.6
Effective Green, g (s)	4.1	4.1	30.3		15.2	50.6
Actuated g/C Ratio	0.06	0.06	0.47		0.23	0.78
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	102	90	1558		400	2667
v/s Ratio Prot			c0.19		c0.19	0.15
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.12	0.04	0.41		0.83	0.19
Uniform Delay, d1	28.7	28.6	11.4		23.6	1.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.2	0.8		13.8	0.2
Delay (s)	29.2	28.7	12.2		37.4	2.0
Level of Service	C	C	B		D	A
Approach Delay (s)	28.8		12.2			16.0
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	15.3
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	17	16	353	162	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1353		2879	2840	
Flt Permitted	0.95	1.00		0.94	1.00	
Satd. Flow (perm)	1540	1353		2698	2840	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	20	19	415	191	19
RTOR Reduction (vph)	0	19	0	0	14	0
Lane Group Flow (vph)	47	1	0	434	196	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.6	2.6		13.5	13.5	
Effective Green, g (s)	2.6	2.6		13.5	13.5	
Actuated g/C Ratio	0.05	0.05		0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	77	67		703	740	
v/s Ratio Prot	c0.03				0.07	
v/s Ratio Perm		0.00		c0.16		
v/c Ratio	0.61	0.01		0.62	0.26	
Uniform Delay, d1	24.1	23.4		16.9	15.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.5	0.1		1.6	0.2	
Delay (s)	37.6	23.5		18.5	15.4	
Level of Service	D	C		B	B	
Approach Delay (s)	33.4			18.5	15.4	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			19.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.27			
Actuated Cycle Length (s)			51.8		Sum of lost time (s)	15.0
Intersection Capacity Utilization			35.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	129	32	32	4	18	10	48	222	15	10	53	38
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	140	41	41	5	23	11	61	241	19	11	58	41
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	140	81	5	34	321	68	41					
Volume Left (vph)	140	0	5	0	61	11	0					
Volume Right (vph)	0	41	0	11	19	0	41					
Hadj (s)	0.53	-0.32	0.53	-0.19	0.04	0.11	-0.67					
Departure Headway (s)	6.3	5.4	6.6	5.8	5.4	5.7	5.0					
Degree Utilization, x	0.24	0.12	0.01	0.05	0.48	0.11	0.06					
Capacity (veh/h)	542	625	503	564	648	592	682					
Control Delay (s)	10.1	8.0	8.4	8.0	13.3	8.2	7.1					
Approach Delay (s)	9.3		8.0		13.3	7.8						
Approach LOS	A		A		B	A						
Intersection Summary												
Delay					10.9							
Level of Service					B							
Intersection Capacity Utilization				42.6%		ICU Level of Service				A		
Analysis Period (min)					15							

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	172	159	116	8	74	18	79	400	17	14	384	82
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1267	1365	1129	1288	1365	1109	2515	2573		1296	2513	
Fit Permitted	0.70	1.00	1.00	0.64	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	938	1365	1129	873	1365	1109	2515	2573		1296	2513	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	193	179	130	9	83	20	89	449	19	16	431	92
RTOR Reduction (vph)	0	0	91	0	0	14	0	3	0	0	17	0
Lane Group Flow (vph)	193	179	39	9	83	6	89	465	0	16	506	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	19.4	19.4	19.4	19.4	19.4	19.4	6.2	27.0		1.9	22.7	
Effective Green, g (s)	19.4	19.4	19.4	19.4	19.4	19.4	6.2	27.0		1.9	22.7	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.10	0.42		0.03	0.35	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	413	342	264	413	336	243	1085		38	891	
v/s Ratio Prot		0.13			0.06		0.04	c0.18		0.01	c0.20	
v/s Ratio Perm	c0.21		0.03	0.01		0.01						
v/c Ratio	0.68	0.43	0.12	0.03	0.20	0.02	0.37	0.43		0.42	0.57	
Uniform Delay, d1	19.6	17.9	16.1	15.7	16.5	15.6	27.1	13.1		30.5	16.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.3	0.7	0.2	0.1	0.2	0.0	0.9	0.3		7.4	0.8	
Delay (s)	25.9	18.6	16.3	15.8	16.8	15.6	28.0	13.3		37.9	17.5	
Level of Service	C	B	B	B	B	B	C	B		D	B	
Approach Delay (s)		20.8			16.5			15.7			18.1	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	162	387	2	14	186	37	4	11		48	11	96
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1238	1621	1572		1487	1382	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1238	1169	1572		1162	1382	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	169	403	2	15	194	39	4	11	12	50	11	100
RTOR Reduction (vph)	0	0	1	0	0	27	0	9	0	0	75	0
Lane Group Flow (vph)	169	403	1	15	194	12	4	14	0	50	36	0
Confl. Peds. (#/hr)	50				50				50			50
Confl. Bikes (#/hr)					10							10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	21.5	45.6	45.6	2.7	26.8	26.8	21.6	21.6		21.6	21.6	
Effective Green, g (s)	21.5	45.6	45.6	2.7	26.8	26.8	21.6	21.6		21.6	21.6	
Actuated g/C Ratio	0.25	0.54	0.54	0.03	0.32	0.32	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	410	916	778	51	538	390	297	399		295	351	
v/s Ratio Prot	c0.10	c0.24		0.01	0.11			0.01			0.03	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.41	0.44	0.00	0.29	0.36	0.03	0.01	0.04		0.17	0.10	
Uniform Delay, d1	26.4	11.9	9.1	40.2	22.4	20.1	23.7	23.8		24.7	24.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.5	0.0	3.2	0.4	0.0	0.0	0.0		0.3	0.1	
Delay (s)	27.1	13.4	9.1	43.4	22.8	20.1	23.7	23.8		24.9	24.4	
Level of Service	C	B	A	D	C	C	C	C		C	C	
Approach Delay (s)		17.5			23.7			23.8			24.5	
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	0.37		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015

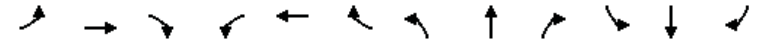


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	27	405	60	16	254	19	31	494	118	30	85	50
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1046	1540	2990			3039	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.67	1.00			0.75	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1046	1085	2990			2301	1072
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	30	455	67	18	285	21	35	555	133	34	96	56
RTOR Reduction (vph)	0	0	29	0	0	11	0	20	0	0	0	38
Lane Group Flow (vph)	30	455	38	18	285	10	35	668	0	0	130	18
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	2.1	37.9	37.9	2.1	36.9	36.9	27.0	27.0			26.0	26.0
Effective Green, g (s)	2.1	37.9	37.9	2.1	36.9	36.9	27.0	27.0			26.0	26.0
Actuated g/C Ratio	0.03	0.47	0.47	0.03	0.46	0.46	0.34	0.34			0.32	0.32
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	31	575	652	40	560	482	366	1009			747	348
v/s Ratio Prot	c0.02	c0.37		0.01	0.23			c0.22				
v/s Ratio Perm			0.03			0.01	0.03				0.06	0.02
v/c Ratio	0.97	0.79	0.06	0.45	0.51	0.02	0.10	0.66			0.17	0.05
Uniform Delay, d1	38.9	17.7	11.4	38.4	15.2	11.7	18.1	22.6			19.3	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	146.8	7.3	0.0	7.9	0.7	0.0	0.1	1.6			0.1	0.1
Delay (s)	185.7	25.1	11.4	46.2	15.9	11.7	18.3	24.3			19.4	18.6
Level of Service	F	C	B	D	B	B	B	C			B	B
Approach Delay (s)		32.1			17.3			24.0			19.2	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	31	365	65	14	242	78	38	120	13	111	41	73
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.95	0.95
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	0.90
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1321	930		1335	1126	870	1070	957	911	1070	963	963
Fit Permitted	0.41	1.00		0.29	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	567	930		409	1126	870	1070	957	911	1070	963	963
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	36	429	76	16	285	92	45	141	15	131	48	86
RTOR Reduction (vph)	0	5	0	0	0	34	0	0	13	0	68	0
Lane Group Flow (vph)	36	500	0	16	285	58	45	141	2	131	66	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	54.1	54.1		53.3	53.3	67.3	17.6	17.5	17.5	14.0	13.9	
Effective Green, g (s)	54.1	54.1		53.3	53.3	67.3	17.6	17.5	17.5	14.0	13.9	
Actuated g/C Ratio	0.51	0.51		0.50	0.50	0.63	0.16	0.16	0.16	0.13	0.13	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	302	469		216	560	587	175	156	148	139	124	
v/s Ratio Prot	0.00	c0.54		0.00	c0.25	0.01	0.04	c0.15		c0.12	0.07	
v/s Ratio Perm	0.06			0.04		0.05			0.00			
v/c Ratio	0.12	1.07		0.07	0.51	0.10	0.26	0.90	0.02	0.94	0.53	
Uniform Delay, d1	14.3	26.5		23.6	18.1	7.9	39.0	44.0	37.6	46.2	43.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	60.0		0.1	0.7	0.1	0.8	44.8	0.0	58.7	4.4	
Delay (s)	14.5	86.5		23.7	18.8	8.0	39.8	88.7	37.6	104.8	47.9	
Level of Service	B	F		C	B	A	D	F	D	F	D	
Approach Delay (s)		81.7			16.5			74.0			76.1	
Approach LOS		F			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	61.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	107.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	229	320	34	32	124	60	29	26	42	10	29	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			0.98	
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.95			0.94			0.92	
Fit Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1685	3107		1690	1690			1648			1370	
Fit Permitted	0.60	1.00		0.48	1.00			0.88			0.97	
Satd. Flow (perm)	1061	3107		855	1690			1480			1332	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	286	400	42	40	155	75	36	32	52	12	36	80
RTOR Reduction (vph)	0	8	0	0	18	0	0	40	0	0	63	0
Lane Group Flow (vph)	286	434	0	40	212	0	0	80	0	0	65	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4			8			
Actuated Green, G (s)	25.8	25.8		25.8	25.8			13.5			13.5	
Effective Green, g (s)	25.8	25.8		25.8	25.8			13.5			13.5	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.21			0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	422	1237		340	672			308			277	
v/s Ratio Prot		0.14			0.13							
v/s Ratio Perm	c0.27			0.05				c0.05			0.05	
v/c Ratio	0.68	0.35		0.12	0.32			0.26			0.23	
Uniform Delay, d1	16.1	13.6		12.3	13.4			21.5			21.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.3	0.2		0.2	0.3			0.5			0.4	
Delay (s)	20.4	13.8		12.5	13.7			21.9			21.8	
Level of Service	C	B		B	B			C			C	
Approach Delay (s)		16.4			13.5			21.9			21.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	79	512	44	40	156	25	42	392	47	27	405	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3			5.1	5.1		5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00		1.00	0.99
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.98		1.00	0.98
Fit Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1669	3371		1697	3327			1260	2474		1260	2449
Fit Permitted	0.62	1.00		0.28	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1092	3371		501	3327			1260	2474		1260	2449
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	91	589	51	46	179	29	48	451	54	31	466	87
RTOR Reduction (vph)	0	6	0	0	13	0	0	9	0	0	15	0
Lane Group Flow (vph)	91	634	0	46	195	0	48	496	0	31	538	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		9.3	40.4		8.2	39.3	
Effective Green, g (s)	30.1	30.1		30.1	30.1		9.3	40.4		8.2	39.3	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.10	0.43		0.09	0.42	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	348	1077		160	1063		124	1061		109	1021	
v/s Ratio Prot		c0.19			0.06		0.04	c0.20		0.02	c0.22	
v/s Ratio Perm	0.08			0.09								
v/c Ratio	0.26	0.59		0.29	0.18		0.39	0.47		0.28	0.53	
Uniform Delay, d1	23.8	26.9		24.0	23.2		39.8	19.2		40.3	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.8		1.0	0.1		2.0	1.5		1.4	0.5	
Delay (s)	24.2	27.7		25.0	23.3		41.8	20.7		41.7	21.0	
Level of Service	C	C		C	C		D	C		D	C	
Approach Delay (s)		27.3			23.6			22.5			22.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	15.5
Intersection Capacity Utilization	104.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



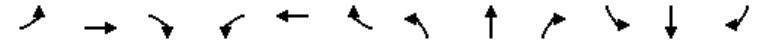
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	28	658	22	8	211	53	27	0	2	7	5	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.99		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3405		1711	3318			1705		1711	1561	
Flt Permitted	0.58	1.00		0.37	1.00			0.72		0.74	1.00	
Satd. Flow (perm)	1037	3405		668	3318			1292		1327	1561	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	715	24	9	229	58	29	0	2	8	5	39
RTOR Reduction (vph)	0	4	0	0	32	0	0	24	0	0	30	0
Lane Group Flow (vph)	30	735	0	9	255	0	0	7	0	8	14	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0			7.9		7.9	7.9	
Effective Green, g (s)	15.0	15.0		15.0	15.0			7.9		7.9	7.9	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.24		0.24	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	472	1552		304	1512			310		318	374	
v/s Ratio Prot		c0.22			0.08						c0.01	
v/s Ratio Perm	0.03			0.01				0.01		0.01		
v/c Ratio	0.06	0.47		0.03	0.17			0.02		0.03	0.04	
Uniform Delay, d1	5.0	6.2		4.9	5.3			9.6		9.6	9.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.1			0.0		0.0	0.0	
Delay (s)	5.1	6.4		5.0	5.3			9.6		9.6	9.6	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		6.4			5.3			9.6			9.6	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



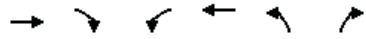
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	37	133	0	0	312	43	219	626	585	0	0	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.98		1.00	0.93				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3385			5038		1711	3173				2694
Flt Permitted		0.83			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2833			5038		1711	3173				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	46	166	0	0	390	54	274	782	731	0	0	172
RTOR Reduction (vph)	0	0	0	0	25	0	0	222	0	0	0	163
Lane Group Flow (vph)	0	212	0	0	419	0	274	1291	0	0	0	9
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1352			1756		697	1294				141
v/s Ratio Prot		c0.01			c0.08		0.16	c0.41				0.00
v/s Ratio Perm		0.06										
v/c Ratio		0.16			0.24		0.39	1.00				0.06
Uniform Delay, d1		11.6			17.6		15.9	22.5				34.2
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.2			0.3		1.7	24.5				0.9
Delay (s)		11.9			17.9		17.5	46.9				35.1
Level of Service		B			B		B	D				D
Approach Delay (s)		11.9			17.9			42.4				35.1
Approach LOS		B			B			D				D

Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	170	128	338	330	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	1.00	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.99	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1690	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1690	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	207	156	412	402	0	0
RTOR Reduction (vph)	3	53	0	0	0	0
Lane Group Flow (vph)	220	87	412	402	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	37.3	37.3	12.7	60.0		
Effective Green, g (s)	37.3	37.3	12.7	60.0		
Actuated g/C Ratio	0.62	0.62	0.21	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1050	887	702	1801		
v/s Ratio Prot	0.13		c0.12	c0.22		
v/s Ratio Perm		0.06				
v/c Ratio	0.21	0.10	0.59	0.22		
Uniform Delay, d1	4.9	4.6	21.3	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	1.3	0.1		
Delay (s)	5.0	4.6	22.5	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	4.9			11.4	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			9.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.34			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			30.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔		↔	↔	↔
Volume (vph)	82	41	109	3	38	0	101	340	0	39	336	114
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1179	1898		1145	1279		1215	2431		1215	2288	
Fit Permitted	0.44	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	544	1898		778	1279		1215	2431		1215	2288	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	92	46	122	3	43	0	113	382	0	44	378	128
RTOR Reduction (vph)	0	85	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	92	83	0	3	43	0	113	382	0	44	480	0
Confl. Peds. (#/hr)			100	100		100			100			100
Confl. Bikes (#/hr)			10	10		10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.2	22.2		8.0	8.0		10.3	24.7		10.0	24.4	
Effective Green, g (s)	22.2	22.2		8.0	8.0		10.3	24.7		10.0	24.4	
Actuated g/C Ratio	0.30	0.30		0.11	0.11		0.14	0.34		0.14	0.33	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	575		85	139		170	820		165	762	
v/s Ratio Prot	c0.05	0.04			0.03		c0.09	0.16		0.04	c0.21	
v/s Ratio Perm	c0.07			0.00								
v/c Ratio	0.38	0.14		0.04	0.31		0.66	0.47		0.27	0.63	
Uniform Delay, d1	19.5	18.6		29.1	30.1		29.8	19.1		28.3	20.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.2	1.3		9.4	0.4		0.9	1.6	
Delay (s)	20.5	18.7		29.3	31.3		39.2	19.5		29.2	22.2	
Level of Service	C	B		C	C		D	B		C	C	
Approach Delay (s)		19.3			31.2		24.0				22.8	
Approach LOS		B			C		C				C	
Intersection Summary												
HCM 2000 Control Delay			22.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			73.2				Sum of lost time (s)			21.6		
Intersection Capacity Utilization			72.5%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO TSP – WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	889	733	12	174	907	36	53	1073	291	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	0.99			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5481	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5481	942			
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)	916	756	12	179	935	37	55	1106	300	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	201	0	0	0
Lane Group Flow (vph)	916	767	0	179	972	0	0	1161	99	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.1		13.2	36.6			36.3	36.3			
Effective Green, g (s)	18.2	40.1		13.2	36.6			36.3	36.3			
Actuated g/C Ratio	0.17	0.36		0.12	0.33			0.33	0.33			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1114		358	1005			1808	310			
v/s Ratio Prot	c0.20	0.25		0.06	c0.32							
v/s Ratio Perm								0.21	0.11			
v/c Ratio	1.24	0.69		0.50	0.97			0.64	0.32			
Uniform Delay, d1	45.9	29.6		45.3	36.1			31.3	27.6			
Progression Factor	1.38	1.60		1.53	1.02			0.90	2.83			
Incremental Delay, d2	111.8	1.6		0.4	9.8			0.7	0.6			
Delay (s)	175.4	49.1		69.5	46.5			29.0	78.7			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		117.8			50.1			39.2			0.0	
Approach LOS		F			D			D			A	

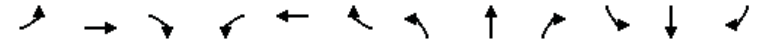
Intersection Summary

HCM 2000 Control Delay	72.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



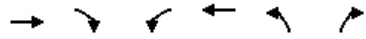
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	326	304
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.87	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.96	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3693		1296	2553			1587	858	1044	2462	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1296	3693		1296	2553			1541	858	778	2462	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	333	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	28	127
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	417	71
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	169	1540		70	833			535	297	277	877	207
v/s Ratio Prot	0.12	c0.43		0.02	c0.37						c0.17	
v/s Ratio Perm								0.05	0.03	0.04		0.12
v/c Ratio	0.91	1.02		0.34	1.14			0.14	0.09	0.13	0.48	0.34
Uniform Delay, d1	47.2	32.0		50.1	37.0			24.6	24.2	23.9	27.4	25.9
Progression Factor	0.58	1.24		0.88	0.90			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	14.2		1.0	70.4			0.1	0.1	0.2	0.4	1.0
Delay (s)	34.6	53.9		45.1	103.7			24.8	24.4	24.1	27.8	26.9
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		52.2			102.3			24.6			27.4	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	69.5			0.9	0.7	0.0
Delay (s)	93.5			10.8	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.8	26.6	
Approach LOS	F			B	C	

Intersection Summary

HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑	↑
Volume (vph)	272	1171	161	52	302	537	219	231	799	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4090	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4090	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	251	859	285
RTOR Reduction (vph)	0	22	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	809	0	0	1139	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1227	293
v/s Ratio Prot						c0.33			c0.28	
v/s Ratio Perm		0.30			0.20					0.26
v/c Ratio		0.92			0.65	1.06			0.93	0.87
Uniform Delay, d1		29.4			26.7	31.0			30.6	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	48.5			13.4	28.4
Delay (s)		50.1			2.1	79.5			44.0	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	79.5			46.6	
Approach LOS		D			A	E			D	

Intersection Summary

HCM 2000 Control Delay	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	111.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



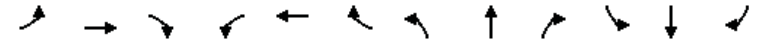
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↔↔
Volume (vph)	16	506	568	45	338	362	24	255	129	656
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1912		2130		1163		1327	2543
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.66
Satd. Flow (perm)		1313	1912		2130		1163		207	1680
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	544	611	48	363	389	26	274	139	705
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	479	734	0	755	0	6	0	316	802
Confl. Peds. (#/hr)		25		60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0			23.0	42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5			23.0	43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27			0.26	0.48	0.48
Clearance Time (s)		4.5	4.5		4.0			4.0	4.0	4.0
Lane Grp Cap (vph)		328	531		579			297	305	970
v/s Ratio Prot		0.36	c0.38		c0.35				c0.19	0.15
v/s Ratio Perm							0.01		0.31	0.25
v/c Ratio		1.46	1.38		1.42dr		0.02		1.04	0.83
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	20.0
Progression Factor		1.00	1.00		1.00		1.00		1.08	1.12
Incremental Delay, d2		223.3	183.3		149.0		0.1		35.1	2.1
Delay (s)		257.1	215.8		181.8		25.2		68.6	24.4
Level of Service		F	F		F		C		E	C
Approach Delay (s)			232.0		177.1					36.9
Approach LOS			F		F					D

Intersection Summary			
HCM 2000 Control Delay	148.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔↔		↔	↔↔		↔	↔↔	
Volume (vph)	17	153	80	19	10	67	20	946	52	25	183	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	0.99		1.00	0.99	
Fit Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611	1353		1426		1272	2508		1540	3037	
Fit Permitted		0.97	1.00		0.93		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1571	1353		1341		1272	2508		1540	3037	
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)	18	161	84	20	11	71	21	996	55	26	193	16
RTOR Reduction (vph)	0	0	57	0	48	0	0	4	0	0	6	0
Lane Group Flow (vph)	0	179	27	0	54	0	21	1047	0	26	203	0
Confl. Peds. (#/hr)		15		5		5		15		64		14
Confl. Bikes (#/hr)				2		1				16		14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Effective Green, g (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.14	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		504	434		430		175	965		207	1169	
v/s Ratio Prot							0.02	c0.42		0.02	c0.07	
v/s Ratio Perm		c0.11	0.02		0.04							
v/c Ratio		0.36	0.06		0.13		0.12	1.09		0.13	0.17	
Uniform Delay, d1		26.0	23.5		24.0		37.8	30.8		38.1	20.3	
Progression Factor		1.00	1.00		1.00		1.22	0.26		1.00	1.00	
Incremental Delay, d2		2.0	0.3		0.6		1.1	51.7		1.2	0.3	
Delay (s)		28.0	23.8		24.6		47.0	59.5		39.3	20.6	
Level of Service		C	C		C		D	E		D	C	
Approach Delay (s)		26.6			24.6			59.3			22.7	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	46.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	130	10	3	12	30	7	84	6	115	131	19
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.99	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2702			1436	1217	1150	1432		1377	1383	
Fit Permitted		0.92			0.91	1.00	0.82	1.00		0.95	1.00	
Satd. Flow (perm)		2494			1318	1217	988	1432		1377	1383	
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)	20	140	11	3	13	32	8	90	6	124	141	20
RTOR Reduction (vph)	0	7	0	0	0	16	0	4	0	0	7	0
Lane Group Flow (vph)	0	164	0	0	16	16	8	92	0	124	154	0
Confl. Peds. (#/hr)	28		3	3		28	213		19		213	
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		6.9			6.9	20.9	4.9	4.9		14.0	23.9	
Effective Green, g (s)		6.9			6.9	20.9	4.9	4.9		14.0	23.9	
Actuated g/C Ratio		0.17			0.17	0.51	0.12	0.12		0.34	0.59	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		421			222	772	118	171		472	810	
v/s Ratio Prot						0.01		c0.06		c0.09	0.11	
v/s Ratio Perm	c0.07				0.01	0.01	0.01					
v/c Ratio	0.39				0.07	0.02	0.07	0.54		0.26	0.19	
Uniform Delay, d1	15.1				14.3	4.9	15.9	16.9		9.7	3.9	
Progression Factor	1.00				1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6				0.1	0.0	0.2	3.2		0.3	0.1	
Delay (s)	15.7				14.4	4.9	16.2	20.1		10.0	4.1	
Level of Service	B				B	A	B	C		A	A	
Approach Delay (s)	15.7				8.1			19.8			6.6	
Approach LOS	B				A			B			A	

Intersection Summary

HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	40.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (vph)	34	242	784	29	195	235
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1742	1535	847	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1742	1535	847	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	263	852	32	212	255
RTOR Reduction (vph)	0	238	0	6	0	0
Lane Group Flow (vph)	37	25	852	26	212	255
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.8	8.8	47.0	42.0	20.0	72.0
Effective Green, g (s)	8.8	8.8	47.0	42.0	20.0	72.0
Actuated g/C Ratio	0.10	0.10	0.52	0.46	0.22	0.79
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	109	168	794	438	249	946
v/s Ratio Prot	c0.03		c0.55	0.01	c0.19	0.21
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.34	0.15	1.07	0.06	0.85	0.27
Uniform Delay, d1	38.3	37.6	21.9	13.5	34.0	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.4	53.4	0.1	23.3	0.2
Delay (s)	40.1	38.0	75.3	13.5	57.3	2.6
Level of Service	D	D	E	B	E	A
Approach Delay (s)	38.3		73.0			27.5
Approach LOS	D		E			C

Intersection Summary

HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	19	43	60	192	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1539		1678	1531	3061	
Fit Permitted	0.99		0.58	1.00	1.00	
Satd. Flow (perm)	1539		1026	1531	3061	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	67	213	232	46
RTOR Reduction (vph)	43	0	0	0	16	0
Lane Group Flow (vph)	26	0	67	213	262	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	3.6		23.3	23.3	23.3	
Effective Green, g (s)	3.6		23.3	23.3	23.3	
Actuated g/C Ratio	0.10		0.63	0.63	0.63	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	150		647	966	1932	
v/s Ratio Prot	c0.02			c0.14	0.09	
v/s Ratio Perm			0.07			
v/c Ratio	0.17		0.10	0.22	0.14	
Uniform Delay, d1	15.3		2.7	2.9	2.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.1	0.1	0.0	
Delay (s)	15.8		2.8	3.0	2.8	
Level of Service	B		A	A	A	
Approach Delay (s)	15.8			3.0	2.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	189	153	894	53	45	488
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3378		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3378		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	170	993	59	50	542
RTOR Reduction (vph)	0	121	4	0	0	0
Lane Group Flow (vph)	210	49	1048	0	50	542
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	48.1		7.9	61.1
Effective Green, g (s)	28.7	28.7	48.1		7.9	61.1
Actuated g/C Ratio	0.29	0.29	0.48		0.08	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1624		135	2090
v/s Ratio Prot			c0.31		c0.03	0.16
v/s Ratio Perm	c0.13	0.03				
v/c Ratio	0.46	0.12	0.65		0.37	0.26
Uniform Delay, d1	29.3	26.3	19.5		43.7	9.0
Progression Factor	1.00	1.00	1.78		1.06	1.34
Incremental Delay, d2	0.7	0.1	1.2		1.7	0.1
Delay (s)	30.1	26.4	35.9		48.0	12.1
Level of Service	C	C	D		D	B
Approach Delay (s)	28.4		35.9			15.1
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	12	22	242	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Flpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1346		3063	2948	
Flt Permitted	0.95	1.00		0.90	1.00	
Satd. Flow (perm)	1540	1346		2773	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	14	26	285	226	71
RTOR Reduction (vph)	0	14	0	0	55	0
Lane Group Flow (vph)	12	0	0	311	242	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	1.3	1.3		10.3	10.3	
Effective Green, g (s)	1.3	1.3		10.3	10.3	
Actuated g/C Ratio	0.03	0.03		0.22	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	42	37		606	644	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.11		
v/c Ratio	0.29	0.01		0.51	0.38	
Uniform Delay, d1	22.4	22.3		16.2	15.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.1		0.7	0.4	
Delay (s)	26.2	22.4		16.9	16.0	
Level of Service	C	C		B	B	
Approach Delay (s)	24.1			16.9	16.0	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	52	8	67	49	28	5	130	47	9	5	167	124
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	57	9	77	56	32	5	149	51	10	5	182	135
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	57	86	56	38	211	187	135					
Volume Left (vph)	57	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	135					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.15	0.05	-0.67					
Departure Headway (s)	6.6	5.4	6.6	6.0	5.7	5.5	4.8					
Degree Utilization, x	0.10	0.13	0.10	0.06	0.33	0.29	0.18					
Capacity (veh/h)	508	610	500	548	607	628	719					
Control Delay (s)	9.1	8.0	9.2	8.2	11.5	9.5	7.6					
Approach Delay (s)	8.5		8.8		11.5	8.7						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	9.5		
Level of Service	A		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	191	91	266	3	232	47	269	709	18	18	472	187
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1267	1365	1126	1283	1365	1099	2515	2580		1296	2464	
Fit Permitted	0.51	1.00	1.00	0.69	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	678	1365	1126	935	1365	1099	2515	2580		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	210	100	292	3	255	52	296	779	20	20	519	205
RTOR Reduction (vph)	0	0	191	0	0	34	0	2	0	0	42	0
Lane Group Flow (vph)	210	100	101	3	255	18	296	797	0	20	682	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	233	470	388	322	470	379	352	975		155	882	
v/s Ratio Prot		0.07			0.19		0.12	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.31		0.09	0.00		0.02						
v/c Ratio	0.90	0.21	0.26	0.01	0.54	0.05	0.84	0.82		0.13	0.77	
Uniform Delay, d1	31.1	23.2	23.6	21.5	26.4	21.8	41.9	28.0		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.76		1.15	1.19	
Incremental Delay, d2	38.0	1.0	1.6	0.1	4.4	0.2	8.4	2.8		1.7	6.3	
Delay (s)	69.1	24.2	25.2	21.6	30.8	22.0	35.3	24.1		47.0	40.4	
Level of Service	E	C	C	C	C	C	D	C		D	D	
Approach Delay (s)		40.4			29.3			27.1			40.6	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	103	474	8	6	650	33	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	515	9	7	707	36	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	20	0	28	0	0	85	0
Lane Group Flow (vph)	112	515	5	7	707	16	36	36	0	45	32	0
Confl. Peds. (#/hr)		50				50			10			50
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.07	c0.30		0.00	c0.41			0.02			0.02	
v/s Ratio Perm			0.00			0.01	0.03					
v/c Ratio	0.55	0.55	0.01	0.14	0.92	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.9	12.9	9.0	41.1	22.4	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	2.4	0.0	1.3	15.7	0.0	0.2	0.1		0.3	0.1	
Delay (s)	39.1	15.2	9.0	42.4	38.1	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	D	B	C	C		C	C	
Approach Delay (s)		19.4			37.0			25.3			25.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015

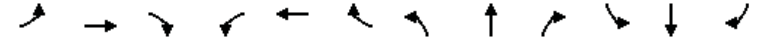


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	123	402	18	22	685	81	49	211	70	112	62	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1050	1540	2964			2983	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.65	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1050	1032	2964			1992	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	128	419	19	23	714	84	51	220	73	117	65	152
RTOR Reduction (vph)	0	0	6	0	0	22	0	39	0	0	0	129
Lane Group Flow (vph)	128	419	13	23	714	62	51	254	0	0	182	23
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	7.0	57.2	57.2	2.3	51.5	51.5	14.1	14.1			13.1	13.1
Effective Green, g (s)	7.0	57.2	57.2	2.3	51.5	51.5	14.1	14.1			13.1	13.1
Actuated g/C Ratio	0.08	0.66	0.66	0.03	0.59	0.59	0.16	0.16			0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	98	802	910	40	722	624	168	482			301	162
v/s Ratio Prot	c0.11	0.34		0.01	c0.59			0.09				
v/s Ratio Perm			0.01			0.06	0.05				c0.09	0.02
v/c Ratio	1.31	0.52	0.01	0.57	0.99	0.10	0.30	0.53			1.04	0.14
Uniform Delay, d1	39.8	7.6	5.0	41.7	17.3	7.6	31.9	33.2			34.3	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	193.5	2.4	0.0	18.4	30.4	0.1	1.0	1.0			3.4	0.4
Delay (s)	233.3	10.0	5.1	60.1	47.6	7.6	32.9	34.2			37.7	32.3
Level of Service	F	B	A	E	D	A	C	C			D	C
Approach Delay (s)		60.4			43.9			34.1			35.3	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	45.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	47	422	70	33	479	368	61	249	30	91	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	931		1336	1126	858	1070	957	918	1070	1068	
Fit Permitted	0.18	1.00		0.27	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	250	931		386	1126	858	1070	957	918	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	449	74	35	510	391	65	265	32	97	147	46
RTOR Reduction (vph)	0	5	0	0	0	123	0	0	25	0	11	0
Lane Group Flow (vph)	50	518	0	35	510	268	65	265	7	97	182	0
Confl. Peds. (#/hr)				6	6			28		4		11
Confl. Bikes (#/hr)				9		50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	55.4	55.4		54.6	54.6	62.6	9.9	24.0	24.0	8.0	22.1	
Effective Green, g (s)	55.4	55.4		54.6	54.6	62.6	9.9	24.0	24.0	8.0	22.1	
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.57	0.09	0.22	0.22	0.07	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	157	469		212	559	528	96	209	200	77	214	
v/s Ratio Prot	0.01	c0.56		0.00	c0.45	0.04	0.06	c0.28		c0.09	0.17	
v/s Ratio Perm	0.15			0.08		0.28			0.01			
v/c Ratio	0.32	1.10		0.17	0.91	0.51	0.68	1.27	0.03	1.26	0.85	
Uniform Delay, d1	18.6	27.2		25.8	25.4	14.3	48.4	42.9	33.8	50.9	42.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	72.8		0.4	19.3	0.8	17.3	152.7	0.1	187.5	25.6	
Delay (s)	19.7	100.0		26.2	44.7	15.0	65.7	195.6	33.9	238.4	67.9	
Level of Service	B	F		C	D	B	E	F	C	F	E	
Approach Delay (s)		93.0			31.6			158.0			124.9	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	81.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	66	139	39	45	162	2	31	116	78	11	51	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.98		1.00	1.00			1.00	0.85		0.89	
Fit Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1721		1691	1797			1779	1499		1577	
Fit Permitted		0.86		0.56	1.00			0.87	1.00		0.99	
Satd. Flow (perm)		1501		1004	1797			1556	1499		1556	
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)	73	154	43	50	180	2	34	129	87	12	57	242
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	65	0	176	0
Lane Group Flow (vph)	0	262	0	50	181	0	0	163	22	0	135	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		15.9		15.9	15.9			13.4	13.4		13.4	
Effective Green, g (s)		15.9		15.9	15.9			13.4	13.4		13.4	
Actuated g/C Ratio		0.29		0.29	0.29			0.25	0.25		0.25	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		441		295	528			385	371		385	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.17		0.05				c0.10	0.01		0.09	
v/c Ratio		0.59		0.17	0.34			0.42	0.06		0.35	
Uniform Delay, d1		16.3		14.2	15.0			17.1	15.5		16.8	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		2.2		0.3	0.4			0.8	0.1		0.6	
Delay (s)		18.5		14.5	15.4			17.9	15.6		17.3	
Level of Service		B		B	B			B	B		B	
Approach Delay (s)		18.5			15.2			17.1			17.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕		↕	↕	↕	↕	↕	↕
Volume (vph)	146	174	51	66	322	23	42	826	53	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3278		1681	3377		1260	2491		1260	2331	
Fit Permitted	0.49	1.00		0.60	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	872	3278		1067	3377		1260	2491		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	185	54	70	343	24	45	879	56	17	453	318
RTOR Reduction (vph)	0	27	0	0	5	0	0	5	0	0	127	0
Lane Group Flow (vph)	155	212	0	70	362	0	45	930	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	302	1137		370	1171		149	869		187	883	
v/s Ratio Prot		0.06			0.11		0.04	c0.37		0.01	c0.28	
v/s Ratio Perm	c0.18			0.07								
v/c Ratio	0.51	0.19		0.19	0.31		0.30	1.07		0.09	0.73	
Uniform Delay, d1	25.9	22.8		22.8	23.9		40.3	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.81		1.55	0.62	
Incremental Delay, d2	6.1	0.4		1.1	0.7		4.0	48.0		0.7	3.8	
Delay (s)	32.1	23.2		24.0	24.6		40.7	74.3		57.6	20.3	
Level of Service	C	C		C	C		D	E		E	C	
Approach Delay (s)		26.7			24.5			72.7			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	6	325	38	4	716	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3368		1711	3420			1678		1711	1531	
Flt Permitted	0.27	1.00		0.52	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	491	3368		935	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	353	41	4	778	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	15	0	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	379	0	4	780	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	196	1347		374	1368			635		563	663	
v/s Ratio Prot		0.11			c0.23						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.04	0.28		0.01	0.57			0.05		0.02	0.01	
Uniform Delay, d1	11.0	12.2		10.8	14.0			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.1	1.7			0.2		0.1	0.0	
Delay (s)	11.3	12.7		10.9	15.7			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.7			15.7			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

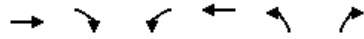
4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	13	86	0	0	825	18	382	205	287	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frbp, ped/bikes		1.00			1.00		1.00	1.00				1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00				1.00
Frt		1.00			1.00		1.00	0.91				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3399			5116		1711	3122				2694
Flt Permitted		0.88			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3020			5116		1711	3122				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	13	88	0	0	842	18	390	209	293	0	0	130
RTOR Reduction (vph)	0	0	0	0	2	0	0	152	0	0	0	121
Lane Group Flow (vph)	0	101	0	0	858	0	390	350	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1329			1697		824	1504				183
v/s Ratio Prot		c0.01			c0.17		c0.23	0.11				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.51		0.47	0.23				0.05
Uniform Delay, d1		18.4			29.5		19.1	16.6				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.1		1.9	0.4				0.5
Delay (s)		18.5			30.6		21.1	17.0				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.5			30.6		18.8					48.4
Approach LOS		B			C		B					D

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

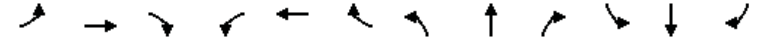
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔	0	0
Volume (vph)	99	566	785	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1507	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1507	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	102	584	809	566	0	0
RTOR Reduction (vph)	31	31	0	0	0	0
Lane Group Flow (vph)	322	302	809	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	37.4	37.4	22.6	70.0		
Effective Green, g (s)	37.4	37.4	22.6	70.0		
Actuated g/C Ratio	0.53	0.53	0.32	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	805	761	1071	1801		
v/s Ratio Prot	c0.21		c0.24	0.31		
v/s Ratio Perm		0.21				
v/c Ratio	0.40	0.40	0.76	0.31		
Uniform Delay, d1	9.7	9.6	21.2	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.3	3.1	0.1		
Delay (s)	10.0	10.0	24.3	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	10.0			14.3	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			54.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	203	135	181	7	204	13	176	589	16	17	570	169
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2414		1215	2289	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2414		1215	2289	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	211	141	189	7	212	14	183	614	17	18	594	176
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	211	203	0	7	224	0	183	629	0	18	742	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Effective Green, g (s)	32.9	32.9		21.9	21.9		17.3	46.8		4.0	33.5	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.47		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	639		144	275		210	1129		48	766	
v/s Ratio Prot	c0.06	0.10		0.18			c0.15	0.26		0.01	c0.32	
v/s Ratio Perm	c0.30			0.01								
v/c Ratio	1.10	0.32		0.05	0.81		0.87	0.56		0.38	0.97	
Uniform Delay, d1	34.2	25.1		30.8	37.1		40.3	19.1		46.8	32.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.81	
Incremental Delay, d2	95.9	0.3		0.1	16.6		30.2	2.0		3.9	22.6	
Delay (s)	130.1	25.4		31.0	53.7		70.5	21.1		52.3	49.0	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		66.3			53.0			32.2			49.1	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			47.6							HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			100.0							Sum of lost time (s)	21.6	
Intersection Capacity Utilization			99.4%							ICU Level of Service	F	
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO TSP – WEEKDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	808	695	17	445	920	53	44	891	269	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3046		2987	2999			5481	941			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3046		2987	2999			5481	941			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	878	755	18	484	1000	58	48	968	292	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	203	0	0	0
Lane Group Flow (vph)	878	772	0	484	1057	0	0	1016	89	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	38.7		19.0	39.5			33.4	33.4			
Effective Green, g (s)	18.2	38.7		19.0	39.5			33.4	33.4			
Actuated g/C Ratio	0.17	0.35		0.17	0.36			0.30	0.30			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1071		515	1076			1664	285			
v/s Ratio Prot	c0.20	0.25		0.16	c0.35							
v/s Ratio Perm								0.19	0.09			
v/c Ratio	1.18	0.72		0.94	0.98			0.61	0.31			
Uniform Delay, d1	45.9	31.0		44.9	34.9			32.7	29.5			
Progression Factor	0.97	0.97		0.78	0.59			1.47	5.45			
Incremental Delay, d2	90.5	2.2		19.6	18.7			0.6	0.6			
Delay (s)	134.9	32.1		54.4	39.4			48.6	161.1			
Level of Service	F	C		D	D			D	F			
Approach Delay (s)		86.8			44.1			73.8			0.0	
Approach LOS		F			D			E			A	

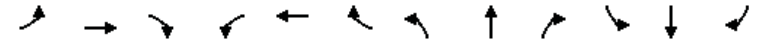
Intersection Summary

HCM 2000 Control Delay	68.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



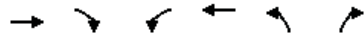
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	187	1389	24	31	902	31	26	87	80	51	721	458
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.64	1.00	0.94	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00	0.70	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.98	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1296	3692		1296	2527			1562	858	1077	2708	581
Fit Permitted	0.95	1.00		0.95	1.00			0.55	1.00	0.68	1.00	1.00
Satd. Flow (perm)	1296	3692		1296	2527			864	858	768	2708	581
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	1526	26	34	991	34	29	96	88	56	792	503
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	57	0	10	160
Lane Group Flow (vph)	205	1550	0	34	1023	0	0	125	31	56	893	232
Confl. Peds. (#/hr)			761			695	1648		678	678	1648	1648
Confl. Bikes (#/hr)			10			10			10		10	10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	11.4	48.5		3.4	38.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	11.4	48.5		3.4	38.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.10	0.44		0.03	0.35			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	134	1627		40	893			300	297	273	965	207
v/s Ratio Prot	c0.16	0.42		0.03	c0.40						0.33	
v/s Ratio Perm								0.14	0.04	0.07		c0.40
v/c Ratio	1.53	0.95		0.85	1.15			0.42	0.10	0.21	0.93	1.12
Uniform Delay, d1	49.3	29.6		53.0	35.5			27.4	24.3	24.6	34.0	35.4
Progression Factor	0.70	1.12		0.65	0.57			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	241.9	1.9		38.7	70.3			0.9	0.2	0.4	14.2	98.3
Delay (s)	276.6	35.0		73.2	90.7			28.3	24.5	25.0	48.2	133.7
Level of Service	F	C		E	F			C	C	C	D	F
Approach Delay (s)		63.1			90.1			26.7			72.1	
Approach LOS		E			F			C			E	

Intersection Summary

HCM 2000 Control Delay	70.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	118.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1581	199	2	1384	74	19
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2937			2998	1540	1357
Fit Permitted	1.00			0.93	0.95	1.00
Satd. Flow (perm)	2937			2789	1540	1357
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1664	209	2	1457	78	20
RTOR Reduction (vph)	9	0	0	0	0	11
Lane Group Flow (vph)	1864	0	0	1459	78	9
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1658			1574	512	451
v/s Ratio Prot	c0.63				c0.05	
v/s Ratio Perm				0.52		0.01
v/c Ratio	1.12			0.93	0.15	0.02
Uniform Delay, d1	23.9			21.9	25.8	24.7
Progression Factor	1.00			0.80	1.00	1.00
Incremental Delay, d2	64.5			1.3	0.6	0.1
Delay (s)	88.5			18.9	26.4	24.7
Level of Service	F			B	C	C
Approach Delay (s)	88.5			18.9	26.1	
Approach LOS	F			B	C	

Intersection Summary

HCM 2000 Control Delay		57.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio		0.76		
Actuated Cycle Length (s)		110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization		97.4%	ICU Level of Service	F
Analysis Period (min)		15		
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	122	1129	155	29	278	527	260	466	1298	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.95			1.00	0.85
Fit Protected		1.00			1.00	1.00			0.95	1.00
Satd. Flow (prot)		5773			2869	2440			4103	1122
Fit Permitted		1.00			0.75	1.00			0.95	1.00
Satd. Flow (perm)		5773			2150	2440			4103	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	139	1283	176	33	316	599	295	530	1475	293
RTOR Reduction (vph)	0	29	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1569	0	0	349	893	0	0	2034	264
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases			6			4	4		7	7
Permitted Phases		6			4					
Actuated Green, G (s)		20.5			22.0	22.0			15.0	15.0
Effective Green, g (s)		22.5			25.0	25.0			18.0	18.0
Actuated g/C Ratio		0.30			0.33	0.33			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1731			716	813			984	269
v/s Ratio Prot						c0.37			c0.50	0.24
v/s Ratio Perm		0.27			0.16					
v/c Ratio		0.91			0.49	1.10			2.07	0.98
Uniform Delay, d1		25.2			19.9	25.0			28.5	28.3
Progression Factor		1.00			1.00	1.00			1.00	1.00
Incremental Delay, d2		7.2			0.5	62.1			483.7	49.5
Delay (s)		32.4			20.4	87.1			512.2	77.8
Level of Service		C			C	F			F	E
Approach Delay (s)		32.4			20.4	87.1			462.3	
Approach LOS		C			C	F			F	

Intersection Summary

HCM 2000 Control Delay		233.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio		1.36		
Actuated Cycle Length (s)		75.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization		108.7%	ICU Level of Service	G
Analysis Period (min)		15		
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



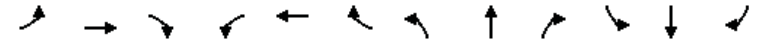
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔
Volume (vph)	29	509	654	48	278	283	30	212	105	798
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0	4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor	1.00	0.81	0.81		0.91		0.91		0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.99		0.85		0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00
Frt	1.00	1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected	0.95	0.95	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)	810	1313	1910		2182		1161		1327	2557
Fit Permitted	0.95	0.95	1.00		1.00		1.00		0.20	0.95
Satd. Flow (perm)	810	1313	1910		2182		1161		279	2444
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	536	688	51	293	298	32	223	111	840
RTOR Reduction (vph)	0	0	9	0	1	0	23	0	0	0
Lane Group Flow (vph)	31	482	784	0	593	0	6	0	323	851
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)	18.5	18.5	18.5		16.0		16.0	31.0	31.0	31.0
Effective Green, g (s)	21.0	18.5	21.0		17.5		16.0	32.5	32.5	32.5
Actuated g/C Ratio	0.27	0.24	0.27		0.23		0.21	0.42	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5		4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	220	315	520		495		241	287	1049	
v/s Ratio Prot	0.04	0.37	c0.41		c0.27			c0.18	0.13	
v/s Ratio Perm							0.01	0.29	0.21	
v/c Ratio	0.14	1.53	1.51		1.28dr		0.03	1.13	0.81	
Uniform Delay, d1	21.2	29.2	28.0		29.8		24.3	26.8	19.6	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3	254.1	238.5		107.5		0.2	91.3	6.8	
Delay (s)	22.5	283.3	266.5		137.3		24.5	118.1	26.4	
Level of Service	C	F	F		F		C	F	C	
Approach Delay (s)			266.9		132.0				51.6	
Approach LOS			F		F				D	

Intersection Summary			
HCM 2000 Control Delay	158.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	31	920	210	12	2	26	20	859	81	107	325	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	0.99		1.00	0.98	
Fit Protected		1.00	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1617	1352		1428		1272	2480		1540	3020	
Fit Permitted		0.99	1.00		0.48		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1603	1352		696		1272	2480		1540	3020	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	38	1136	259	15	2	32	25	1060	100	132	401	47
RTOR Reduction (vph)	0	0	71	0	18	0	0	6	0	0	6	0
Lane Group Flow (vph)	0	1174	188	0	31	0	25	1154	0	132	442	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		55.1	55.1		55.1		6.1	35.5		16.3	46.0	
Effective Green, g (s)		55.1	55.1		55.1		6.1	35.5		16.3	46.0	
Actuated g/C Ratio		0.45	0.45		0.45		0.05	0.29		0.13	0.37	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		719	606		312		63	716		204	1131	
v/s Ratio Prot							0.02	c0.47		c0.09	0.15	
v/s Ratio Perm		c0.73	0.14		0.05							
v/c Ratio		1.63	0.31		0.10		0.40	1.61		0.65	0.39	
Uniform Delay, d1		33.8	21.7		19.5		56.6	43.6		50.5	28.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		291.1	0.3		0.1		4.1	281.9		6.9	0.2	
Delay (s)		324.9	22.0		19.7		60.6	325.6		57.4	28.4	
Level of Service		F	C		B		E	F		E	C	
Approach Delay (s)		270.2			19.7			320.0			35.0	
Approach LOS		F			B			F			C	

Intersection Summary			
HCM 2000 Control Delay	242.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	122.8	Sum of lost time (s)	15.9
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	9	749	8	4	23	33	13	54	4	408	252	63
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	0.94	
Flpb, ped/bikes		1.00			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	0.99		1.00	0.97	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2597			1439	1192	1139	1430		1377	1323	
Fit Permitted		0.95			0.92	1.00	0.58	1.00		0.95	1.00	
Satd. Flow (perm)		2476			1327	1192	695	1430		1377	1323	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	9	780	8	4	24	34	14	56	4	425	262	66
RTOR Reduction (vph)	0	1	0	0	0	14	0	3	0	0	14	0
Lane Group Flow (vph)	0	796	0	0	28	20	14	57	0	425	314	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		22.8			22.8	31.9	6.9	6.9		9.1	21.0	
Effective Green, g (s)		22.8			22.8	31.9	6.9	6.9		9.1	21.0	
Actuated g/C Ratio		0.42			0.42	0.59	0.13	0.13		0.17	0.39	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1049			562	817	89	183		232	516	
v/s Ratio Prot						0.00		0.04		c0.31	c0.24	
v/s Ratio Perm		c0.32			0.02	0.01	0.02					
v/c Ratio		0.76			0.05	0.02	0.16	0.31		1.83	0.61	
Uniform Delay, d1		13.2			9.1	4.5	20.9	21.3		22.3	13.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.2			0.0	0.0	0.8	1.0		390.7	2.0	
Delay (s)		16.4			9.2	4.5	21.7	22.2		413.1	15.1	
Level of Service		B			A	A	C	C		F	B	
Approach Delay (s)		16.4			6.6			22.1			239.7	
Approach LOS		B			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	116.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



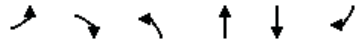
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	53	264	528	19	1022	329
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	846	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	846	1134	1194
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	57	284	568	20	1099	354
RTOR Reduction (vph)	0	253	0	5	0	0
Lane Group Flow (vph)	57	31	568	15	1099	354
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.2	10.2	47.1	42.1	20.0	72.1
Effective Green, g (s)	10.2	10.2	47.1	42.1	20.0	72.1
Actuated g/C Ratio	0.11	0.11	0.51	0.46	0.22	0.78
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	125	192	783	431	245	932
v/s Ratio Prot	c0.05		c0.37	0.01	c0.97	0.30
v/s Ratio Perm		0.02		0.01		
v/c Ratio	0.46	0.16	0.73	0.03	4.49	0.38
Uniform Delay, d1	38.5	37.2	17.6	13.9	36.1	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	0.4	3.4	0.0	1578.0	0.3
Delay (s)	41.1	37.6	20.9	13.9	1614.1	3.4
Level of Service	D	D	C	B	F	A
Approach Delay (s)	38.2		20.7			1221.7
Approach LOS	D		C			F

Intersection Summary			
HCM 2000 Control Delay	755.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.77		
Actuated Cycle Length (s)	92.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	130.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	20	24	270	123	126	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.93		1.00	1.00	0.98	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1562		1668	1531	3076	
Fit Permitted	0.98		0.64	1.00	1.00	
Satd. Flow (perm)	1562		1129	1531	3076	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	28	318	145	148	24
RTOR Reduction (vph)	26	0	0	0	7	0
Lane Group Flow (vph)	26	0	318	145	165	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	2.4		29.5	29.5	29.5	
Effective Green, g (s)	2.4		29.5	29.5	29.5	
Actuated g/C Ratio	0.06		0.70	0.70	0.70	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	89		794	1077	2165	
v/s Ratio Prot	c0.02			0.09	0.05	
v/s Ratio Perm			c0.28			
v/c Ratio	0.29		0.40	0.13	0.08	
Uniform Delay, d1	18.9		2.6	2.0	1.9	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.8		0.3	0.1	0.0	
Delay (s)	20.7		2.9	2.1	2.0	
Level of Service	C		A	A	A	
Approach Delay (s)	20.7			2.6	2.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	132	189	872	109	349	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.95	0.99		1.00	1.00
Flpb, ped/bikes	0.91	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1558	1457	3332		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1558	1457	3332		1711	3421
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	148	212	980	122	392	455
RTOR Reduction (vph)	0	161	8	0	0	0
Lane Group Flow (vph)	148	51	1094	0	392	455
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	52.1		23.9	81.1
Effective Green, g (s)	28.7	28.7	52.1		23.9	81.1
Actuated g/C Ratio	0.24	0.24	0.43		0.20	0.68
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	372	348	1446		340	2312
v/s Ratio Prot			c0.33		c0.23	0.13
v/s Ratio Perm	c0.09	0.03				
v/c Ratio	0.40	0.15	0.76		1.15	0.20
Uniform Delay, d1	38.4	36.0	28.6		48.0	7.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2	3.7		97.1	0.0
Delay (s)	39.1	36.2	32.3		145.2	7.3
Level of Service	D	D	C		F	A
Approach Delay (s)	37.4		32.3			71.1
Approach LOS	D		C			E

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	7	12	383	120	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1518	1341		2881	2969	
Flt Permitted	0.95	1.00		0.94	1.00	
Satd. Flow (perm)	1518	1341		2723	2969	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	14	451	141	35
RTOR Reduction (vph)	0	8	0	0	25	0
Lane Group Flow (vph)	12	0	0	465	151	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5		
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		13.8	13.8	
Effective Green, g (s)	0.6	0.6		13.8	13.8	
Actuated g/C Ratio	0.01	0.01		0.28	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	18	16		753	821	
v/s Ratio Prot	c0.01				0.05	
v/s Ratio Perm		0.00		c0.17		
v/c Ratio	0.67	0.01		0.62	0.18	
Uniform Delay, d1	24.6	24.4		15.7	13.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.1	0.1		1.5	0.1	
Delay (s)	90.6	24.5		17.3	13.9	
Level of Service	F	C		B	B	
Approach Delay (s)	64.2			17.3	13.9	
Approach LOS	E			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	162	3	61	23	16	5	86	268	7	5	113	92
Peak Hour Factor	0.92	0.81	0.81	0.81	0.81	0.92	0.81	0.92	0.81	0.92	0.92	0.92
Hourly flow rate (vph)	176	4	75	28	20	5	106	291	9	5	123	100
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	176	79	28	25	406	128	100					
Volume Left (vph)	176	0	28	0	106	5	0					
Volume Right (vph)	0	75	0	5	9	0	100					
Hadj (s)	0.53	-0.63	0.53	-0.12	0.07	0.06	-0.67					
Departure Headway (s)	6.9	5.7	7.3	6.7	5.8	6.1	5.4					
Degree Utilization, x	0.34	0.13	0.06	0.05	0.66	0.22	0.15					
Capacity (veh/h)	489	583	438	478	598	558	629					
Control Delay (s)	12.2	8.4	9.6	8.8	19.3	9.6	8.1					
Approach Delay (s)	11.0		9.2		19.3	8.9						
Approach LOS	B		A		C	A						

Intersection Summary			
Delay	14.0		
Level of Service	B		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	192	219	2	159	33	210	676	24	10	337	189
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1262	1365	1126	1285	1365	1099	2515	2575		1296	2429	
Fit Permitted	0.61	1.00	1.00	0.55	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	805	1365	1126	750	1365	1099	2515	2575		1296	2429	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	313	221	252	2	183	38	241	777	28	11	387	217
RTOR Reduction (vph)	0	0	165	0	0	25	0	2	0	0	77	0
Lane Group Flow (vph)	313	221	87	2	183	13	241	803	0	11	527	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	277	470	388	258	470	379	352	973		155	869	
v/s Ratio Prot		0.16			0.13		0.10	c0.31		0.01	c0.22	
v/s Ratio Perm	c0.39		0.08	0.00		0.01						
v/c Ratio	1.13	0.47	0.22	0.01	0.39	0.03	0.68	0.82		0.07	0.61	
Uniform Delay, d1	32.8	25.6	23.2	21.5	24.8	21.7	40.9	28.1		39.1	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.80		1.00	1.00	
Incremental Delay, d2	93.7	3.4	1.3	0.1	2.4	0.2	5.5	4.3		0.9	3.1	
Delay (s)	126.5	29.0	24.6	21.6	27.2	21.9	40.8	26.8		39.9	29.5	
Level of Service	F	C	C	C	C	C	D	C		D	C	
Approach Delay (s)		66.4			26.2			30.1			29.6	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	623	9	19	496	43	23	14	13	46	10	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.84	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	0.86	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1224	1621	1582		1476	1373	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00		0.74	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1224	1114	1582		1145	1373	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	186	724	10	22	577	50	27	16	15	53	12	133
RTOR Reduction (vph)	0	0	5	0	0	32	0	10	0	0	90	0
Lane Group Flow (vph)	186	724	5	22	577	18	27	21	0	53	55	0
Confl. Peds. (#/hr)						50				50		50
Confl. Bikes (#/hr)						10				10		10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8				4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	15.0	42.0	42.0	6.0	33.0	33.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	15.0	42.0	42.0	6.0	33.0	33.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.16	0.45	0.45	0.06	0.35	0.35	0.32	0.32		0.32	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	770	654	104	605	434	359	510		369	442	
v/s Ratio Prot	c0.11	c0.42		0.01	0.34		0.01	0.02		0.01	0.04	
v/s Ratio Perm			0.00			0.01	0.02					
v/c Ratio	0.71	0.94	0.01	0.21	0.95	0.04	0.08	0.04		0.14	0.12	
Uniform Delay, d1	37.0	24.3	14.0	41.3	29.3	19.6	21.9	21.6		22.4	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.9	20.8	0.0	1.0	25.4	0.0	0.1	0.0		0.2	0.1	
Delay (s)	45.8	45.1	14.0	42.3	54.7	19.7	22.0	21.7		22.6	22.4	
Level of Service	D	D	B	D	D	B	C	C		C	C	
Approach Delay (s)		44.9			51.5			21.8			22.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	93.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	80	607	41	66	517	51	31	542	91	94	181	106
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1500	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1044	1540	3013			3027	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.53	1.00			0.54	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1044	851	3013			1651	1072
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	660	45	72	562	55	34	589	99	102	197	115
RTOR Reduction (vph)	0	0	21	0	0	28	0	13	0	0	0	83
Lane Group Flow (vph)	87	660	24	72	562	27	34	675	0	0	299	32
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	58.2	58.2	5.0	53.2	53.2	30.9	30.9			29.9	29.9
Effective Green, g (s)	9.0	58.2	58.2	5.0	53.2	53.2	30.9	30.9			29.9	29.9
Actuated g/C Ratio	0.08	0.54	0.54	0.05	0.50	0.50	0.29	0.29			0.28	0.28
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	102	660	748	71	603	518	245	869			460	299
v/s Ratio Prot	c0.07	c0.54		0.05	0.46			c0.22				
v/s Ratio Perm			0.02			0.03	0.04				0.18	0.03
v/c Ratio	0.85	1.00	0.03	1.01	0.93	0.05	0.14	0.78		1.19	dl	0.11
Uniform Delay, d1	48.4	24.4	11.4	51.0	25.3	13.9	28.2	34.9			34.0	28.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	45.9	35.0	0.0	110.8	21.4	0.0	0.3	4.4			3.3	0.2
Delay (s)	94.3	59.5	11.4	161.8	46.6	14.0	28.5	39.4			37.3	28.8
Level of Service	F	E	B	F	D	B	C	D			D	C
Approach Delay (s)		60.6			56.1			38.8			34.9	
Approach LOS		E			E			D			C	

Intersection Summary

HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	107.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	23	541	77	38	364	252	69	230	17	170	109	36
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.91	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	934		1337	1126	866	1070	957	918	1070	1064	
Fit Permitted	0.25	1.00		0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	350	934		122	1126	866	1070	957	918	1070	1064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	588	84	41	396	274	75	250	18	185	118	39
RTOR Reduction (vph)	0	4	0	0	0	119	0	0	14	0	12	0
Lane Group Flow (vph)	25	668	0	41	396	155	75	250	4	185	145	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	49.1	49.1		49.1	49.1	61.1	16.9	24.1	24.1	12.0	19.2	
Effective Green, g (s)	49.1	49.1		49.1	49.1	61.1	16.9	24.1	24.1	12.0	19.2	
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.57	0.16	0.22	0.22	0.11	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	185	424		88	511	529	167	213	204	118	188	
v/s Ratio Prot	0.00	c0.71		0.01	c0.35	0.03	0.07	c0.26		c0.17	0.14	
v/s Ratio Perm	0.06			0.20		0.15			0.00			
v/c Ratio	0.14	1.57		0.47	0.77	0.29	0.45	1.17	0.02	1.57	0.77	
Uniform Delay, d1	18.8	29.5		46.7	24.8	12.2	41.4	42.0	32.8	48.0	42.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	269.7		3.9	7.2	0.3	1.9	116.5	0.0	292.3	17.1	
Delay (s)	19.1	299.2		50.6	32.1	12.6	43.3	158.5	32.8	340.4	59.5	
Level of Service	B	F		D	C	B	D	F	C	F	E	
Approach Delay (s)		289.2			25.6			126.7			211.4	
Approach LOS		F			C			F			F	

Intersection Summary

HCM 2000 Control Delay	160.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015

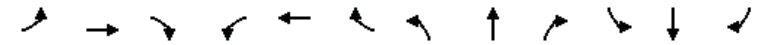


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	6	39	↔	↔	8	↔	
Volume (vph)	280	358	59	47	105	1900	1900	1900	1900	1900	29	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.97		0.97	
Flpb, ped/bikes		0.99		0.99	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	0.99			1.00	0.85		0.89	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1461		1698	1780			1762	1489		1327	
Fit Permitted		0.81		0.39	1.00			0.76	1.00		0.99	
Satd. Flow (perm)		1214		689	1780			1362	1489		1310	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	308	393	65	52	115	7	43	81	58	9	32	153
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	47	0	123	0
Lane Group Flow (vph)	0	763	0	52	120	0	0	124	11	0	71	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4		4	8			
Actuated Green, G (s)		52.3		52.3	52.3			18.7	18.7		18.7	
Effective Green, g (s)		52.3		52.3	52.3			18.7	18.7		18.7	
Actuated g/C Ratio		0.55		0.55	0.55			0.20	0.20		0.20	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		666		378	977			267	292		257	
v/s Ratio Prot					0.07							
v/s Ratio Perm	c0.63		0.08			c0.09	0.01				0.05	
v/c Ratio	1.15	0.14	0.12			0.46	0.04				0.28	
Uniform Delay, d1	21.5	10.5	10.4			33.8	31.0				32.5	
Progression Factor	1.00	1.00	1.00			1.00	1.00				1.00	
Incremental Delay, d2	82.6	0.2	0.1			1.3	0.1				0.6	
Delay (s)	104.1		10.6	10.4		35.1	31.0				33.1	
Level of Service	F		B	B		D	C				C	
Approach Delay (s)	104.1			10.5		33.8					33.1	
Approach LOS	F			B		C					C	

Intersection Summary			
HCM 2000 Control Delay	71.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	95.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	
Volume (vph)	308	627	48	21	250	11	35	592	47	25	362	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	3376		1700	3393		1260	2485		1260	2373	
Fit Permitted	0.55	1.00		0.19	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	969	3376		337	3393		1260	2485		1260	2373	
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)	342	697	53	23	278	12	39	658	52	28	402	190
RTOR Reduction (vph)	0	6	0	0	3	0	0	6	0	0	56	0
Lane Group Flow (vph)	342	744	0	23	287	0	39	704	0	28	536	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		16.9	39.9		14.9	37.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.17	0.40		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	287	1002		100	1007		212	991		187	899	
v/s Ratio Prot		0.22			0.08		0.03	c0.28		0.02	c0.23	
v/s Ratio Perm	c0.35			0.07								
v/c Ratio	1.19	0.74		0.23	0.29		0.18	0.71		0.15	0.60	
Uniform Delay, d1	35.1	31.7		26.5	27.0		35.6	25.2		37.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00		0.84	0.73		1.49	0.63	
Incremental Delay, d2	115.4	5.0		5.3	0.7		1.2	2.8		1.4	2.4	
Delay (s)	150.5	36.7		31.8	27.7		31.2	21.2		56.6	18.1	
Level of Service	F	D		C	C		C	C		E	B	
Approach Delay (s)		72.3			28.0			21.7			19.9	
Approach LOS		E			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



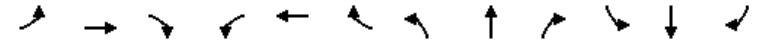
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕		↖	↗	
Volume (vph)	20	873	55	6	480	9	36	0	5	17	1	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3391		1711	3412			1698		1711	1541	
Flt Permitted	0.44	1.00		0.19	1.00			0.81		0.73	1.00	
Satd. Flow (perm)	785	3391		345	3412			1441		1312	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	949	60	7	522	10	39	0	5	18	1	24
RTOR Reduction (vph)	0	8	0	0	2	0	0	22	0	0	15	0
Lane Group Flow (vph)	22	1001	0	7	530	0	0	22	0	18	10	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0			23.0		23.0	23.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.38		0.38	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	353	1525		155	1535			552		502	590	
v/s Ratio Prot		c0.30			0.16						0.01	
v/s Ratio Perm	0.03			0.02			c0.02			0.01		
v/c Ratio	0.06	0.66		0.05	0.35			0.04		0.04	0.02	
Uniform Delay, d1	9.3	12.9		9.3	10.7			11.6		11.6	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.2		0.5	0.6			0.1		0.1	0.1	
Delay (s)	9.7	15.1		9.8	11.4			11.7		11.7	11.5	
Level of Service	A	B		A	B			B		B	B	
Approach Delay (s)		15.0			11.3			11.7			11.6	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



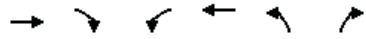
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				↔
Volume (vph)	20	92	0	0	567	32	308	666	758	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.92				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3391			5091		1711	3148				2694
Flt Permitted		0.86			1.00		0.95	1.00				1.00
Satd. Flow (perm)		2928			5091		1711	3148				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	23	107	0	0	659	37	358	774	881	0	0	86
RTOR Reduction (vph)	0	0	0	0	8	0	0	242	0	0	0	80
Lane Group Flow (vph)	0	130	0	0	688	0	358	1413	0	0	0	6
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		40.5			29.5		35.0	35.0				6.0
Effective Green, g (s)		40.5			29.5		35.0	35.0				6.0
Actuated g/C Ratio		0.48			0.35		0.41	0.41				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1427			1766		704	1296				190
v/s Ratio Prot		c0.01			c0.14		0.21	c0.45				0.00
v/s Ratio Perm		0.04										
v/c Ratio		0.09			0.39		0.51	1.09				0.03
Uniform Delay, d1		12.2			21.0		18.6	25.0				36.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.6		2.6	53.3				0.3
Delay (s)		12.3			21.6		21.2	78.3				37.1
Level of Service		B			C		C	E				D
Approach Delay (s)		12.3			21.6			68.1				37.1
Approach LOS		B			C			E				D

Intersection Summary

HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

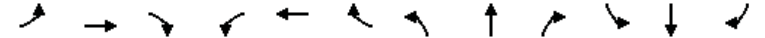
4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔		
Volume (vph)	112	444	487	461	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.91	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1537	1427	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1537	1427	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	133	529	580	549	0	0
RTOR Reduction (vph)	52	52	0	0	0	0
Lane Group Flow (vph)	287	271	580	549	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	34.2	34.2	15.8	60.0		
Effective Green, g (s)	34.2	34.2	15.8	60.0		
Actuated g/C Ratio	0.57	0.57	0.26	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	876	813	874	1801		
v/s Ratio Prot	0.19		c0.17	c0.30		
v/s Ratio Perm		0.19				
v/c Ratio	0.33	0.33	0.66	0.30		
Uniform Delay, d1	6.8	6.8	19.7	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	1.9	0.1		
Delay (s)	7.0	7.1	21.6	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	7.1			11.2	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			9.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			41.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	215	121	165	6	127	150	122	459	13	17	339	144
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.97	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1175	1943		1137	1253		1215	2414		1215	2246	
Fit Permitted	0.43	1.00		0.56	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	538	1943		670	1253		1215	2414		1215	2246	
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)	239	134	183	7	141	11	136	510	14	19	377	160
RTOR Reduction (vph)	0	119	0	0	3	0	0	2	0	0	47	0
Lane Group Flow (vph)	239	198	0	7	149	0	136	522	0	19	490	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.9	34.9		17.1	17.1		16.4	43.4		5.4	32.4	
Effective Green, g (s)	34.9	34.9		17.1	17.1		16.4	43.4		5.4	32.4	
Actuated g/C Ratio	0.35	0.35		0.17	0.17		0.16	0.43		0.05	0.32	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	678		114	214		199	1047		65	727	
v/s Ratio Prot	c0.11	0.10			0.12		c0.11	0.22		0.02	c0.22	
v/s Ratio Perm	c0.20			0.01								
v/c Ratio	0.90	0.29		0.06	0.69		0.68	0.50		0.29	0.67	
Uniform Delay, d1	29.0	23.6		34.7	39.0		39.4	20.4		45.5	29.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.07	1.00	
Incremental Delay, d2	29.3	0.2		0.2	9.4		9.3	1.7		1.8	3.6	
Delay (s)	58.2	23.8		35.0	48.4		48.7	22.1		50.4	32.7	
Level of Service	E	C		C	D		D	C		D	C	
Approach Delay (s)		38.6			47.8			27.6			33.3	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.1									C
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			91.4%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
NO TSP – WEEKDAY LATE EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	478	420	8	108	764	52	37	599	446	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3064		2987	3027			5531	1238			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3064		2987	3027			5531	1238			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	576	506	10	130	920	63	45	722	537	0	0	0
RTOR Reduction (vph)	0	1	0	0	4	0	0	0	263	0	0	0
Lane Group Flow (vph)	576	515	0	130	979	0	0	767	274	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	48.9		10.1	40.8			32.1	32.1			
Effective Green, g (s)	18.2	48.9		10.1	40.8			32.1	32.1			
Actuated g/C Ratio	0.17	0.44		0.09	0.37			0.29	0.29			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1362		274	1122			1614	361			
v/s Ratio Prot	c0.13	0.17		0.04	c0.32							
v/s Ratio Perm								0.14	c0.22			
v/c Ratio	0.78	0.38		0.47	0.87			0.48	0.76			
Uniform Delay, d1	44.0	20.4		47.4	32.2			32.0	35.4			
Progression Factor	0.54	0.27		0.96	0.43			1.00	1.00			
Incremental Delay, d2	4.5	0.7		0.4	2.5			0.2	8.8			
Delay (s)	28.4	6.3		46.1	16.2			32.2	44.2			
Level of Service	C	A		D	B			C	D			
Approach Delay (s)		17.9			19.7			37.2			0.0	
Approach LOS		B			B			D			A	

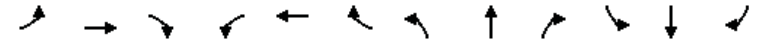
Intersection Summary

HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	78	837	21	40	725	36	12	30	30	39	211	171
Ideal Flow (vphpl)	1400	1400	1400	1400	1400	1400	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.63	1.00	0.89	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.91	1.00	0.67	1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85	1.00	0.97	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1134	3218		1134	2186			1455	854	1027	2548	580
Fit Permitted	0.95	1.00		0.95	1.00			0.83	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1134	3218		1134	2186			1230	854	783	2548	580
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	93	996	25	48	863	43	14	36	36	46	251	204
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	30	0	25	115
Lane Group Flow (vph)	93	1019	0	48	904	0	0	50	6	46	291	24
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.5	60.2		11.9	56.0			18.0	18.0	19.0	19.0	19.0
Effective Green, g (s)	14.5	60.2		11.9	56.0			18.0	18.0	19.0	19.0	19.0
Actuated g/C Ratio	0.13	0.55		0.11	0.51			0.16	0.16	0.17	0.17	0.17
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	149	1761		122	1112			201	139	135	440	100
v/s Ratio Prot	0.08	c0.32		0.04	c0.41						c0.11	
v/s Ratio Perm								0.04	0.01	0.06		0.04
v/c Ratio	0.62	0.58		0.39	0.81			0.25	0.04	0.34	0.66	0.24
Uniform Delay, d1	45.2	16.5		45.7	22.6			40.1	38.7	40.0	42.5	39.3
Progression Factor	0.86	1.09		0.59	0.32			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.9		1.0	2.4			0.7	0.1	1.5	3.7	1.2
Delay (s)	43.9	18.9		28.2	9.7			40.8	38.9	41.5	46.2	40.5
Level of Service	D	B		C	A			D	D	D	D	D
Approach Delay (s)		21.0			10.6			40.0			44.2	
Approach LOS		C			B			D			D	

Intersection Summary

HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	925	62	0	908	28	11
Ideal Flow (vphpl)	1100	1100	1000	1000	1000	1000
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1764			1621	810	714
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1764			1621	810	714
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1101	74	0	1081	33	13
RTOR Reduction (vph)	2	0	0	0	0	12
Lane Group Flow (vph)	1173	0	0	1081	33	1
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1462			1343	55	48
v/s Ratio Prot	0.67			c0.67	c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.80			0.80	0.60	0.02
Uniform Delay, d1	4.8			4.8	49.8	47.8
Progression Factor	1.00			1.50	1.00	1.00
Incremental Delay, d2	4.7			2.5	16.4	0.2
Delay (s)	9.6			9.7	66.2	48.0
Level of Service	A			A	E	D
Approach Delay (s)	9.6			9.7	61.0	
Approach LOS	A			A	E	
Intersection Summary						
HCM 2000 Control Delay		10.7			HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio		0.79				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	11.3
Intersection Capacity Utilization		70.6%			ICU Level of Service	C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015

	↖	←	↗	↖	↑	↓	↘	↙	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↖↑	↗↑			↖↖↖	↗↗↗
Volume (vph)	143	771	99	35	123	323	194	105	240	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.94			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5762			2834	2410			4083	1122
Fit Permitted		0.99			0.77	1.00			0.95	1.00
Satd. Flow (perm)		5762			2209	2410			4083	1122
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	168	907	116	41	145	380	228	124	282	108
RTOR Reduction (vph)	0	24	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	1167	0	0	186	588	0	0	417	97
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		23.5			21.2	21.2			12.8	12.8
Effective Green, g (s)		25.5			24.2	24.2			15.8	15.8
Actuated g/C Ratio		0.34			0.32	0.32			0.21	0.21
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1959			712	777			860	236
v/s Ratio Prot						c0.24			c0.10	0.09
v/s Ratio Perm		0.20			0.08					
v/c Ratio		0.60			0.26	0.76			0.48	0.41
Uniform Delay, d1		20.5			18.8	22.8			26.0	25.6
Progression Factor		1.00			0.49	1.00			1.00	1.00
Incremental Delay, d2		0.5			0.1	4.2			0.4	1.2
Delay (s)		21.0			9.3	27.0			26.5	26.7
Level of Service		C			A	C			C	C
Approach Delay (s)		21.0			9.3	27.0			26.5	
Approach LOS		C			A	C			C	
Intersection Summary										
HCM 2000 Control Delay			22.7			HCM 2000 Level of Service C				
HCM 2000 Volume to Capacity ratio			0.66							
Actuated Cycle Length (s)			75.0			Sum of lost time (s)			12.5	
Intersection Capacity Utilization			70.4%			ICU Level of Service			C	
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015

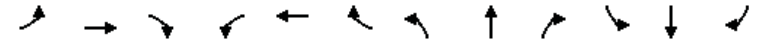


Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↕	↕	↔	↔	↕
Volume (vph)	27	944	210	22	131	112	14	170	20	381
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	1.00		0.87		1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.93		0.85		1.00	1.00
Fit Protected		0.95	0.97		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1214	1875		2248		1188		1327	2554
Fit Permitted		0.95	0.97		1.00		1.00		0.52	0.95
Satd. Flow (perm)		1214	1875		2248		1188		720	2437
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	994	221	23	138	118	15	179	21	401
RTOR Reduction (vph)	0	0	5	0	1	0	10	0	0	0
Lane Group Flow (vph)	0	684	577	0	257	0	3	0	184	417
Confl. Peds. (#/hr)		25		60		200				
Bus Blockages (#/hr)		0	0	8	0	5	0	0	0	5
Parking (#/hr)			10	10						10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		299	525		524		253		413	1075
v/s Ratio Prot		c0.56	0.31		c0.11				c0.07	0.06
v/s Ratio Perm							0.00		0.12	0.10
v/c Ratio		2.29	1.94dl		0.49		0.01		0.45	0.39
Uniform Delay, d1		28.2	27.0		24.9		23.3		17.3	14.5
Progression Factor		1.00	1.00		1.00		1.00		1.05	1.03
Incremental Delay, d2		589.9	69.1		3.3		0.1		2.7	0.8
Delay (s)		618.2	96.1		28.2		23.3		20.8	15.8
Level of Service		F	F		C		C		C	B
Approach Delay (s)			378.2		27.9					17.3
Approach LOS			F		C					B

Intersection Summary			
HCM 2000 Control Delay	232.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕	↕		↕	↕	↔	↔	↔
Volume (vph)	140	10	67	73	854	314	5	454	4	1	75	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.96		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1548	1354		2933		1272	2537		1540	3043	
Fit Permitted		0.09	1.00		0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		150	1354		2698		1272	2537		1540	3043	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	171	12	82	89	1041	383	6	554	5	1	91	6
RTOR Reduction (vph)	0	0	37	0	33	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	183	45	0	1480	0	6	558	0	1	93	0
Confl. Peds. (#/hr)		15		5		15				64		14
Confl. Bikes (#/hr)			2			1				16		14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		47.4	47.4		47.4		0.9	22.3		0.9	22.6	
Effective Green, g (s)		47.4	47.4		47.4		0.9	22.3		0.9	22.6	
Actuated g/C Ratio		0.55	0.55		0.55		0.01	0.26		0.01	0.26	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		82	741		1478		13	654		16	795	
v/s Ratio Prot							0.00	c0.22		0.00	c0.03	
v/s Ratio Perm		c1.22	0.03		0.55							
v/c Ratio		2.23	0.06		1.00		0.46	0.85		0.06	0.12	
Uniform Delay, d1		19.6	9.1		19.6		42.6	30.5		42.4	24.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		591.5	0.0		23.7		9.1	10.5		0.6	0.1	
Delay (s)		611.1	9.2		43.3		51.7	41.1		43.0	24.4	
Level of Service		F	A		D		D	D		D	C	
Approach Delay (s)		424.8			43.3			41.2			24.6	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	83.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.77		
Actuated Cycle Length (s)	86.5	Sum of lost time (s)	15.9
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	5	77	3	1	854	9	2	20	61	78	47	8
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.95	1.00	0.95		1.00	0.94	
Flpb, ped/bikes		1.00			1.00	1.00	0.67	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.89		1.00	0.98	
Fit Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2579			1450	1173	924	1219		1377	1339	
Fit Permitted		0.88			1.00	1.00	0.71	1.00		0.95	1.00	
Satd. Flow (perm)		2270			1450	1173	692	1219		1377	1339	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	6	97	4	1	1081	11	3	25	77	99	59	10
RTOR Reduction (vph)	0	2	0	0	0	3	0	70	0	0	8	0
Lane Group Flow (vph)	0	105	0	0	1082	8	3	32	0	99	61	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		44.2			44.2	49.7	6.8	6.8		5.5	17.3	
Effective Green, g (s)		44.2			44.2	49.7	6.8	6.8		5.5	17.3	
Actuated g/C Ratio		0.62			0.62	0.70	0.10	0.10		0.08	0.24	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		1403			896	897	65	115		105	323	
v/s Ratio Prot						0.00		c0.03		c0.07	0.05	
v/s Ratio Perm		0.05			0.75	0.01	0.00					
v/c Ratio		0.08			1.21	0.01	0.05	0.28		0.94	0.19	
Uniform Delay, d1		5.5			13.6	3.3	29.4	30.1		32.8	21.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			103.9	0.0	0.3	1.3		68.7	0.3	
Delay (s)		5.5			117.6	3.3	29.7	31.4		101.6	21.8	
Level of Service		A			F	A	C	C		F	C	
Approach Delay (s)		5.5			116.4			31.4			68.8	
Approach LOS		A			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	96.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	6	898	605	11	97	86
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1746	1535	841	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1746	1535	841	1134	1194
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	7	1069	720	13	115	102
RTOR Reduction (vph)	0	417	0	3	0	0
Lane Group Flow (vph)	7	652	720	10	115	102
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	47.0	47.0	47.0	42.0	16.6	68.6
Effective Green, g (s)	47.0	47.0	47.0	42.0	16.6	68.6
Actuated g/C Ratio	0.37	0.37	0.37	0.33	0.13	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	424	653	574	314	149	652
v/s Ratio Prot	0.01		c0.47	0.00	c0.10	0.09
v/s Ratio Perm		c0.37		0.01		
v/c Ratio	0.02	1.00	1.25	0.03	0.77	0.16
Uniform Delay, d1	24.7	39.3	39.3	28.1	52.7	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	34.6	128.3	0.0	21.5	0.1
Delay (s)	24.8	73.9	167.6	28.2	74.2	14.3
Level of Service	C	E	F	C	E	B
Approach Delay (s)	73.6		165.1			46.0
Approach LOS	E		F			D

Intersection Summary			
HCM 2000 Control Delay	103.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	125.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	
Volume (vph)	207	323	152	61	70	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.95	
Flpb, ped/bikes	1.00		0.97	1.00	1.00	
Frt	0.92		1.00	1.00	0.90	
Fit Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1554		1652	1531	2697	
Fit Permitted	0.98		0.57	1.00	1.00	
Satd. Flow (perm)	1554		984	1531	2697	
Peak-hour factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Adj. Flow (vph)	309	482	227	91	104	201
RTOR Reduction (vph)	72	0	0	0	137	0
Lane Group Flow (vph)	719	0	227	91	168	0
Confl. Peds. (#/hr)	50	50	50			50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	37.7		22.3	22.3	22.3	
Effective Green, g (s)	37.7		22.3	22.3	22.3	
Actuated g/C Ratio	0.54		0.32	0.32	0.32	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	836		313	487	859	
v/s Ratio Prot	c0.46			0.06	0.06	
v/s Ratio Perm			c0.23			
v/c Ratio	0.86		0.73	0.19	0.20	
Uniform Delay, d1	13.9		21.1	17.3	17.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	9.0		8.1	0.2	0.1	
Delay (s)	22.9		29.2	17.5	17.4	
Level of Service	C		C	B	B	
Approach Delay (s)	22.9			25.9	17.4	
Approach LOS	C			C	B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Volume (vph)	0	0	0	0	0	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.9
Lane Util. Factor						0.95
Frbp, ped/bikes						1.00
Flpb, ped/bikes						1.00
Frt						1.00
Fit Protected						1.00
Satd. Flow (prot)						3421
Fit Permitted						1.00
Satd. Flow (perm)						3421
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	0	0	376
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	376
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm			Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)						49.9
Effective Green, g (s)						49.9
Actuated g/C Ratio						1.00
Clearance Time (s)						4.9
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)						3421
v/s Ratio Prot						c0.11
v/s Ratio Perm						
v/c Ratio						0.11
Uniform Delay, d1						0.0
Progression Factor						1.00
Incremental Delay, d2						0.1
Delay (s)						0.1
Level of Service						A
Approach Delay (s)	0.0		0.0			0.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	0.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	15.3
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	5	0	203	393	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	0.99	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)	1518	1341		2887	2887	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1518	1341		2887	2887	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	6	0	239	462	0
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	12	0	0	239	462	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		12.9	12.9	
Effective Green, g (s)	0.6	0.6		12.9	12.9	
Actuated g/C Ratio	0.01	0.01		0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	18	16		760	760	
v/s Ratio Prot	c0.01			0.08	c0.16	
v/s Ratio Perm		0.00				
v/c Ratio	0.67	0.00		0.31	0.61	
Uniform Delay, d1	24.1	23.9		14.5	15.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.1	0.1		0.2	1.4	
Delay (s)	90.2	24.0		14.7	17.2	
Level of Service	F	C		B	B	
Approach Delay (s)	68.1			14.7	17.2	
Approach LOS	E			B	B	
Intersection Summary						
HCM 2000 Control Delay			17.7	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.24			
Actuated Cycle Length (s)			49.0	Sum of lost time (s)		15.0
Intersection Capacity Utilization			26.3%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	0	0	0	0	0	0	29	0	0	0	320	339
Peak Hour Factor	0.92	0.83	0.83	0.83	0.83	0.92	0.83	0.92	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	35	0	0	0	348	368
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	0	0	0	0	35	348	368					
Volume Left (vph)	0	0	0	0	35	0	0					
Volume Right (vph)	0	0	0	0	0	0	368					
Hadj (s)	0.00	0.00	0.00	0.00	0.23	0.03	-0.67					
Departure Headway (s)	5.9	5.9	5.9	5.9	5.3	4.6	3.9					
Degree Utilization, x	0.00	0.00	0.00	0.00	0.05	0.44	0.40					
Capacity (veh/h)	562	562	562	562	670	779	923					
Control Delay (s)	7.7	7.7	7.7	7.7	8.5	9.9	8.2					
Approach Delay (s)	0.0	0.0	0.0	0.0	8.5	9.0						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			9.0									
Level of Service			A									
Intersection Capacity Utilization			42.2%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	0	0	130	0	368	0	121	0	0	0	200	127
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			5.5		5.5		5.0				5.2	
Lane Util. Factor			1.00		1.00		0.97				0.95	
Frbp, ped/bikes			0.97		1.00		1.00				0.99	
Flpb, ped/bikes			1.00		1.00		1.00				1.00	
Frt			0.85		1.00		1.00				0.94	
Fit Protected			1.00		1.00		0.95				1.00	
Satd. Flow (prot)			1130		1365		2515				2410	
Fit Permitted			1.00		1.00		0.95				1.00	
Satd. Flow (perm)			1130		1365		2515				2410	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	153	0	433	0	142	0	0	0	235	149
RTOR Reduction (vph)	0	0	86	0	0	0	0	0	0	0	120	0
Lane Group Flow (vph)	0	0	67	0	433	0	142	0	0	0	264	0
Confl. Peds. (#/hr)	41		14	14		41		39			8	
Confl. Bikes (#/hr)			9			10		4			14	
Turn Type	Perm		Perm	Perm	NA	Perm	Prot			Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)			30.2		30.2		9.3				13.4	
Effective Green, g (s)			30.2		30.2		9.3				13.4	
Actuated g/C Ratio			0.44		0.44		0.14				0.20	
Clearance Time (s)			5.5		5.5		5.0				5.2	
Vehicle Extension (s)			3.0		3.0		3.0				3.0	
Lane Grp Cap (vph)			497		600		340				470	
v/s Ratio Prot					c0.32		c0.06				c0.11	
v/s Ratio Perm			0.06									
v/c Ratio			0.14		0.72		0.42				0.56	
Uniform Delay, d1			11.4		15.8		27.2				24.9	
Progression Factor			1.00		1.00		1.00				1.00	
Incremental Delay, d2			0.1		4.3		0.8				1.5	
Delay (s)			11.6		20.0		28.0				26.5	
Level of Service			B		C		C				C	
Approach Delay (s)		11.6			20.0			28.0			26.5	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.1									
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			68.6			Sum of lost time (s)		15.7				
Intersection Capacity Utilization			61.0%			ICU Level of Service					B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	98	118	3	4	602	10	5	6	1	11	2	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	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	1.00	0.92	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	0.86	1.00	0.86
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1621	1706	1450	1621	1706	1251	1621	1674	1490	1359	1800	1800
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00	0.75	1.00	1.00	1.00
Satd. Flow (perm)	1621	1706	1450	1621	1706	1251	1229	1674	1180	1359	1800	1800
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	110	133	3	4	676	11	6	7	1	12	2	54
RTOR Reduction (vph)	0	0	1	0	0	6	0	1	0	0	44	0
Lane Group Flow (vph)	110	133	2	4	676	5	6	7	0	12	12	0
Confl. Peds. (#/hr)	50				50					50		50
Confl. Bikes (#/hr)					10					10		10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	11.6	48.8	48.8	2.5	39.7	39.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	11.6	48.8	48.8	2.5	39.7	39.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.14	0.60	0.60	0.03	0.49	0.49	0.18	0.18		0.18	0.18	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	1024	870	49	833	610	226	308		217	250	
v/s Ratio Prot	c0.07	0.08		0.00	c0.40			0.00			0.01	
v/s Ratio Perm			0.00			0.00	0.00				c0.01	
v/c Ratio	0.48	0.13	0.00	0.08	0.81	0.01	0.03	0.02		0.06	0.05	
Uniform Delay, d1	32.1	7.0	6.5	38.3	17.6	10.7	27.2	27.2		27.3	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.3	0.0	0.7	6.0	0.0	0.0	0.0		0.1	0.1	
Delay (s)	33.6	7.3	6.5	39.0	23.7	10.7	27.2	27.2		27.4	27.4	
Level of Service	C	A	A	D	C	B	C	C		C	C	
Approach Delay (s)		19.1			23.6			27.2			27.4	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay					22.8							
HCM 2000 Volume to Capacity ratio					0.58							
Actuated Cycle Length (s)					81.3					15.0		
Intersection Capacity Utilization					83.4%					E		
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



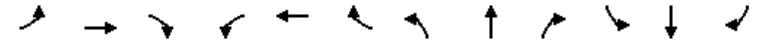
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	23	171	6	11	630	13	12	67	14	33	530	98
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1045	1540	3000			3070	1071
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.19	1.00			0.93	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1045	316	3000			2861	1071
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	28	209	7	13	768	16	15	82	17	40	646	120
RTOR Reduction (vph)	0	0	3	0	0	7	0	12	0	0	0	87
Lane Group Flow (vph)	28	209	4	13	768	9	15	87	0	0	686	33
Confl. Peds. (#/hr)						17						3
Confl. Bikes (#/hr)						36						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	3.1	70.2	70.2	1.5	67.6	67.6	32.9	32.9			31.9	31.9
Effective Green, g (s)	3.1	70.2	70.2	1.5	67.6	67.6	32.9	32.9			31.9	31.9
Actuated g/C Ratio	0.03	0.60	0.60	0.01	0.57	0.57	0.28	0.28			0.27	0.27
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	32	725	822	19	698	600	88	839			776	290
v/s Ratio Prot	c0.02	c0.17		0.01	c0.63			0.03				
v/s Ratio Perm			0.00			0.01	0.05				c0.24	0.03
v/c Ratio	0.88	0.29	0.01	0.68	1.10	0.02	0.17	0.10			0.88	0.11
Uniform Delay, d1	57.1	11.5	9.6	57.8	25.0	10.7	32.0	31.4			41.1	32.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	107.3	0.2	0.0	69.9	64.8	0.0	0.9	0.1			11.7	0.2
Delay (s)	164.3	11.8	9.6	127.7	89.8	10.7	33.0	31.5			52.8	32.4
Level of Service	F	B	A	F	F	B	C	C			D	C
Approach Delay (s)		29.2			88.9			31.7			49.7	
Approach LOS		C			F			C			D	

Intersection Summary

HCM 2000 Control Delay	62.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	133	56	14	299	426	15	145	12	55	23	6
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.92	1.00	1.00	0.96	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	1.00	0.97
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1333	903	1330	1126	877	1070	957	922	1070	1080	1080	1080
Fit Permitted	0.18	1.00	0.59	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	254	903	820	1126	877	1070	957	922	1070	1080	1080	1080
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	24	160	67	17	360	513	18	175	14	66	28	7
RTOR Reduction (vph)	0	14	0	0	0	227	0	0	10	0	5	0
Lane Group Flow (vph)	24	213	0	17	360	286	18	175	4	66	30	0
Confl. Peds. (#/hr)	28		6	6	28		4		4			11
Confl. Bikes (#/hr)			9		50		7					15
Parking (#/hr)		10	10				10					
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				4
Actuated Green, G (s)	31.8	31.8		33.0	33.0	44.7	5.0	25.6	25.6	11.7	32.3	
Effective Green, g (s)	31.8	31.8		33.0	33.0	44.7	5.0	25.6	25.6	11.7	32.3	
Actuated g/C Ratio	0.35	0.35		0.36	0.36	0.49	0.05	0.28	0.28	0.13	0.35	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	103	313		309	405	475	58	267	257	136	380	
v/s Ratio Prot	0.00	c0.24		0.00	c0.32	c0.08	0.02	c0.18		0.06	0.03	
v/s Ratio Perm	0.08			0.02		0.25			0.00			
v/c Ratio	0.23	0.68		0.06	0.89	0.60	0.31	0.66	0.02	0.49	0.08	
Uniform Delay, d1	22.0	25.5		19.1	27.6	17.0	41.6	29.1	23.9	37.2	19.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	5.8		0.1	20.4	2.1	3.0	5.7	0.0	2.7	0.1	
Delay (s)	23.2	31.3		19.2	48.0	19.1	44.7	34.8	23.9	39.9	19.8	
Level of Service	C	C		B	D	B	D	C	C	D	B	
Approach Delay (s)		30.5			30.8		34.9			32.9		
Approach LOS		C			C		C			C		

Intersection Summary

HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	3	175	19	374	47	1	5	17	9	0	11	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.98		0.97	
Flpb, ped/bikes		1.00		0.98	1.00			1.00	1.00		1.00	
Frt		0.99		1.00	1.00			1.00	0.85		0.87	
Fit Protected		1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1503		1683	1795			1779	1494		1293	
Fit Permitted		1.00		0.59	1.00			0.60	1.00		1.00	
Satd. Flow (perm)		1500		1046	1795			1073	1494		1293	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	4	224	24	479	60	1	6	22	12	0	14	418
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	9	0	329	0
Lane Group Flow (vph)	0	249	0	479	60	0	0	28	3	0	103	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10		10							10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm		NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4		4		8		
Actuated Green, G (s)		32.6		32.6	32.6			15.4	15.4		15.4	
Effective Green, g (s)		32.6		32.6	32.6			15.4	15.4		15.4	
Actuated g/C Ratio		0.45		0.45	0.45			0.21	0.21		0.21	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		675		470	808			228	317		275	
v/s Ratio Prot					0.03						c0.08	
v/s Ratio Perm		0.17		c0.46				0.03	0.00			
v/c Ratio		0.37		1.02	0.07			0.12	0.01		0.37	
Uniform Delay, d1		13.1		19.9	11.3			23.0	22.5		24.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3		46.4	0.0			0.2	0.0		0.9	
Delay (s)		13.5		66.3	11.4			23.3	22.5		25.2	
Level of Service		B		E	B			C	C		C	
Approach Delay (s)		13.5			60.1			23.0			25.2	
Approach LOS		B			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Volume (vph)	35	124	25	25	339	14	82	72	9	64	134	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	0.93	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1683	3316		1682	3394		1260	2466		1260	2295	
Fit Permitted	0.45	1.00		0.64	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	795	3316		1131	3394		1260	2466		1260	2295	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	42	149	30	30	408	17	99	87	11	77	161	158
RTOR Reduction (vph)	0	19	0	0	3	0	0	7	0	0	100	0
Lane Group Flow (vph)	42	160	0	30	422	0	99	91	0	77	219	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	29.7	29.7		29.7	29.7		11.9	32.9		11.9	32.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7		11.9	32.9		11.9	32.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.13	0.37		0.13	0.37	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	1094		373	1120		166	901		166	838	
v/s Ratio Prot		0.05			c0.12		c0.08	0.04		c0.06	c0.10	
v/s Ratio Perm		0.05		0.03								
v/c Ratio		0.16		0.08	0.38		0.60	0.10		0.46	0.26	
Uniform Delay, d1		21.3		20.8	23.1		36.8	18.8		36.1	20.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		0.1	0.2		5.7	0.2		2.0	0.2	
Delay (s)		21.6		21.3	23.3		42.4	19.0		38.1	20.2	
Level of Service		C		C	C		D	B		D	C	
Approach Delay (s)		21.4			23.1		30.8			23.7		
Approach LOS		C			C		C			C		

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕		↖	↗	
Volume (vph)	6	187	11	3	637	3	13	0	4	6	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3393		1711	3419			1681		1711	1531	
Flt Permitted	0.39	1.00		0.62	1.00			0.80		0.75	1.00	
Satd. Flow (perm)	698	3393		1111	3419			1402		1343	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	203	12	3	692	3	14	0	4	7	0	11
RTOR Reduction (vph)	0	7	0	0	1	0	0	14	0	0	8	0
Lane Group Flow (vph)	7	208	0	3	694	0	0	4	0	7	3	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.6	13.6		13.6	13.6			7.8		7.8	7.8	
Effective Green, g (s)	13.6	13.6		13.6	13.6			7.8		7.8	7.8	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1469		481	1480			348		333	380	
v/s Ratio Prot		0.06			c0.20						0.00	
v/s Ratio Perm	0.01			0.00				0.00		c0.01		
v/c Ratio	0.02	0.14		0.01	0.47			0.01		0.02	0.01	
Uniform Delay, d1	5.1	5.4		5.1	6.3			8.9		8.9	8.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.0	0.2			0.0		0.0	0.0	
Delay (s)	5.1	5.4		5.1	6.6			8.9		8.9	8.9	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		5.4			6.6			8.9			8.9	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.31	A
Actuated Cycle Length (s)	31.4	Sum of lost time (s)
Intersection Capacity Utilization	33.7%	ICU Level of Service
Analysis Period (min)	15	A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



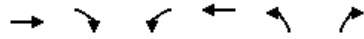
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗		↕		↖	↗	↖
Volume (vph)	12	75	0	0	578	14	65	31	165	0	0	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.87				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3398			5114		1711	2989				2694
Flt Permitted		0.89			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3048			5114		1711	2989				2694
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	14	87	0	0	672	16	76	36	192	0	0	742
RTOR Reduction (vph)	0	0	0	0	3	0	0	114	0	0	0	703
Lane Group Flow (vph)	0	101	0	0	685	0	76	114	0	0	0	39
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1442			1783		697	1219				141
v/s Ratio Prot		0.00			c0.13		c0.04	0.04				c0.01
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.38		0.11	0.09				0.28
Uniform Delay, d1		11.2			18.6		13.9	13.9				34.6
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.6		0.3	0.2				4.8
Delay (s)		11.3			19.2		14.3	14.0				39.4
Level of Service		B			B		B	B				D
Approach Delay (s)		11.3			19.2			14.1				39.4
Approach LOS		B			B			B				D

Intersection Summary		
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.24	C
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	54.2%	ICU Level of Service
Analysis Period (min)	15	A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	87	144	1032	248	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.96	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1629	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1629	1426	3319	1801		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	104	171	1229	295	0	0
RTOR Reduction (vph)	6	6	0	0	0	0
Lane Group Flow (vph)	139	124	1229	295	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	22.1	22.1	27.9	60.0		
Effective Green, g (s)	22.1	22.1	27.9	60.0		
Actuated g/C Ratio	0.37	0.37	0.46	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	600	525	1543	1801		
v/s Ratio Prot	0.09		c0.37	0.16		
v/s Ratio Perm		c0.09				
v/c Ratio	0.23	0.24	0.80	0.16		
Uniform Delay, d1	13.1	13.1	13.6	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	2.9	0.0		
Delay (s)	13.3	13.3	16.6	0.0		
Level of Service	B	B	B	A		
Approach Delay (s)	13.3			13.4	0.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔		↔	↔↔		↔	↔↔	
Volume (vph)	39	69	111	4	66	3	120	116	2	5	201	83
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.95		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1183	1959		1152	1267		1215	2422		1215	2268	
Fit Permitted	0.44	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	551	1959		759	1267		1215	2422		1215	2268	
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)	43	77	123	4	73	3	133	129	2	6	223	92
RTOR Reduction (vph)	0	83	0	0	2	0	0	1	0	0	37	0
Lane Group Flow (vph)	43	117	0	4	74	0	133	130	0	6	278	0
Confl. Peds. (#/hr)			100	100		100			100			100
Confl. Bikes (#/hr)			10	10		10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.6	22.6		11.2	11.2		10.9	26.3		4.1	19.5	
Effective Green, g (s)	22.6	22.6		11.2	11.2		10.9	26.3		4.1	19.5	
Actuated g/C Ratio	0.33	0.33		0.16	0.16		0.16	0.38		0.06	0.28	
Clearance Time (s)	6.7	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	222	638		122	204		191	919		71	638	
v/s Ratio Prot	0.01	c0.06			c0.06		c0.11	0.05		0.00	c0.12	
v/s Ratio Perm	0.05			0.01								
v/c Ratio	0.19	0.18		0.03	0.36		0.70	0.14		0.08	0.44	
Uniform Delay, d1	16.7	16.7		24.5	25.9		27.6	14.1		30.8	20.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	1.1		10.5	0.1		0.5	0.5	
Delay (s)	17.1	16.9		24.6	27.0		38.1	14.2		31.3	20.9	
Level of Service	B	B		C	C		D	B		C	C	
Approach Delay (s)		16.9			26.9			26.3			21.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	23.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

EXISTING 2015 PLUS PROJECT – BASKETBALL GAME
No TSP – SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	484	569	78	43	523	174	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3017		2987	2982			5518	1234			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3017		2987	2982			5518	1234			
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)	708	744	64	538	632	87	48	581	193	0	0	0
RTOR Reduction (vph)	0	6	0	0	8	0	0	0	156	0	0	0
Lane Group Flow (vph)	708	802	0	538	711	0	0	629	37	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.3	38.7		31.3	44.7			21.1	21.1			
Effective Green, g (s)	25.3	38.7		31.3	44.7			21.1	21.1			
Actuated g/C Ratio	0.23	0.35		0.28	0.41			0.19	0.19			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1030	1061		849	1211			1058	236			
v/s Ratio Prot	0.16	c0.27		0.18	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.69	0.76		0.63	0.59			0.59	0.16			
Uniform Delay, d1	38.7	31.5		34.3	25.5			40.5	37.0			
Progression Factor	0.63	0.54		0.72	0.32			1.15	3.59			
Incremental Delay, d2	1.4	3.6		0.7	0.3			0.8	0.3			
Delay (s)	25.9	20.7		25.4	8.6			47.5	133.3			
Level of Service	C	C		C	A			D	F			
Approach Delay (s)		23.1			15.8			67.6			0.0	
Approach LOS		C			B			E			A	

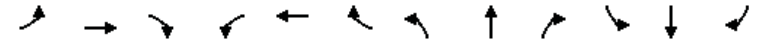
Intersection Summary

HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

4/27/2015



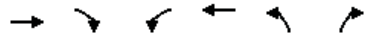
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	663	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.64	1.00	0.99	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2436			1581	857	1033	2922	581
Fit Permitted	0.95	1.00		0.95	1.00			0.91	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2436			1441	857	781	2922	581
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	705	103
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	21	0	1	64
Lane Group Flow (vph)	162	1438	0	54	591	0	0	59	9	64	714	29
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.9	47.5		9.6	40.6			33.0	33.0	34.0	34.0	34.0
Effective Green, g (s)	14.9	47.5		9.6	40.6			33.0	33.0	34.0	34.0	34.0
Actuated g/C Ratio	0.14	0.43		0.09	0.37			0.30	0.30	0.31	0.31	0.31
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	208	1851		113	899			432	257	241	903	179
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						c0.24	
v/s Ratio Perm								0.04	0.01	0.08		0.05
v/c Ratio	0.78	0.78		0.48	0.66			0.14	0.04	0.27	0.79	0.16
Uniform Delay, d1	46.0	26.7		47.8	28.9			28.1	27.2	28.6	34.8	27.6
Progression Factor	0.92	1.23		0.85	0.71			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.2	2.5		2.6	1.5			0.1	0.1	0.6	4.8	0.4
Delay (s)	55.5	35.3		43.2	21.9			28.2	27.3	29.2	39.5	28.0
Level of Service	E	D		D	C			C	C	C	D	C
Approach Delay (s)		37.4			23.7			27.9			37.6	
Approach LOS		D			C			C			D	

Intersection Summary

HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.15	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			0.4	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			0.4	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			5.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			69.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/27/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	262	1267	145	34	172	356	188	481	1138	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.95			1.00	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2844	2411			4105	1122
Fit Permitted		0.99			0.78	1.00			0.95	1.00
Satd. Flow (perm)		5749			2224	2411			4105	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	496	1173	270
RTOR Reduction (vph)	0	18	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1707	0	0	212	560	0	0	1696	243
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		24.0			21.5	21.5			27.0	27.0
Effective Green, g (s)		26.0			24.5	24.5			30.0	30.0
Actuated g/C Ratio		0.29			0.27	0.27			0.33	0.33
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1660			605	656			1368	374
v/s Ratio Prot						c0.23			c0.41	0.22
v/s Ratio Perm		0.30			0.10					
v/c Ratio		1.03			0.35	0.85			1.24	0.65
Uniform Delay, d1		32.0			26.3	31.0			30.0	25.5
Progression Factor		1.55			1.00	1.00			1.00	1.00
Incremental Delay, d2		25.9			0.4	10.4			114.3	3.9
Delay (s)		75.5			26.7	41.5			144.3	29.4
Level of Service		E			C	D			F	C
Approach Delay (s)		75.5			26.7	41.5			129.9	
Approach LOS		E			C	D			F	
Intersection Summary										
HCM 2000 Control Delay			92.6						HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.09							
Actuated Cycle Length (s)			90.0						Sum of lost time (s)	12.5
Intersection Capacity Utilization			107.3%						ICU Level of Service	G
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/27/2015



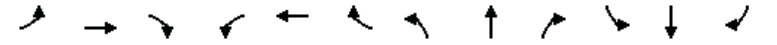
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	51	342	276	49	155	105	14	231	55	813
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2619		2297		1161		1327	2558
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.95
Satd. Flow (perm)		1700	2619		2297		1161		621	2444
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	422	341	60	191	130	17	285	68	1004
RTOR Reduction (vph)	0	0	18	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	350	518	0	322	0	3	0	346	1011
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		419	733		535		247		386	1078
v/s Ratio Prot		c0.21	0.20		0.14				0.15	c0.16
v/s Ratio Perm							0.00		0.24	c0.25
v/c Ratio		0.84	0.71		0.60		0.01		0.90	0.94
Uniform Delay, d1		26.8	24.2		25.6		23.3		21.1	20.3
Progression Factor		1.00	1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2		17.6	5.7		5.0		0.1		25.9	16.0
Delay (s)		44.4	29.9		30.6		23.4		47.0	36.3
Level of Service		D	C		C		C		D	D
Approach Delay (s)			35.6		30.3					39.0
Approach LOS			D		C					D

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↕	↕	↔	↕	↕
Volume (vph)	10	1198	145	8	4	14	9	381	83	165	262	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	0.96		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	0.97		1.00	0.99	
Fit Protected		1.00	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1620	1353		1455		1272	2388		1540	3056	
Fit Permitted		1.00	1.00		0.62		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1618	1353		911		1272	2388		1540	3056	
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)	10	1235	149	8	4	14	9	393	86	170	270	11
RTOR Reduction (vph)	0	0	60	0	6	0	0	17	0	0	3	0
Lane Group Flow (vph)	0	1245	89	0	20	0	9	462	0	170	278	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		61.1	61.1		61.1		1.0	23.5		12.7	35.5	
Effective Green, g (s)		61.1	61.1		61.1		1.0	23.5		12.7	35.5	
Actuated g/C Ratio		0.54	0.54		0.54		0.01	0.21		0.11	0.31	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		873	730		491		11	495		172	958	
v/s Ratio Prot							0.01	c0.19		c0.11	0.09	
v/s Ratio Perm		c0.77	0.07		0.02							
v/c Ratio		1.43	0.12		0.04		0.82	0.93		0.99	0.29	
Uniform Delay, d1		26.1	12.8		12.3		56.0	44.1		50.2	29.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		198.4	0.1		0.0		162.4	24.6		64.4	0.2	
Delay (s)		224.5	12.9		12.3		218.4	68.7		114.6	29.5	
Level of Service		F	B		B		F	E		F	C	
Approach Delay (s)		201.9			12.3		71.5				61.6	
Approach LOS		F			B		E				E	

Intersection Summary			
HCM 2000 Control Delay	146.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	113.2	Sum of lost time (s)	15.9
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	
Volume (vph)	7	995	7	2	6	16	5	29	1	355	200	15
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00	1.00	0.75	1.00		1.00	1.00	
Frt		1.00			1.00	0.85	1.00	1.00		1.00	0.99	
Fit Protected		1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2599			1434	1190	1035	1440		1377	1399	
Fit Permitted		0.95			0.88	1.00	0.89	1.00		0.95	1.00	
Satd. Flow (perm)		2480			1283	1190	969	1440		1377	1399	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	8	1144	8	2	7	18	6	33	1	408	230	17
RTOR Reduction (vph)	0	1	0	0	0	5	0	1	0	0	4	0
Lane Group Flow (vph)	0	1159	0	0	9	13	6	33	0	408	243	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		32.3			32.3	49.5	4.5	4.5		17.2	26.7	
Effective Green, g (s)		32.3			32.3	49.5	4.5	4.5		17.2	26.7	
Actuated g/C Ratio		0.47			0.47	0.72	0.07	0.07		0.25	0.39	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		1160			600	939	63	93		343	541	
v/s Ratio Prot						0.00		0.02		c0.30	c0.17	
v/s Ratio Perm		c0.47			0.01	0.01	0.01					
v/c Ratio		1.00			0.01	0.01	0.10	0.36		1.19	0.45	
Uniform Delay, d1		18.3			9.8	2.8	30.3	30.9		25.9	15.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		26.1			0.0	0.0	0.7	2.3		110.7	0.6	
Delay (s)		44.4			9.8	2.8	31.0	33.2		136.6	16.3	
Level of Service		D			A	A	C	C		F	B	
Approach Delay (s)		44.4			5.1			32.9			91.2	
Approach LOS		D			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	59.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	20	129	216	25	1044	170
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.93	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1741	1535	809	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1741	1535	809	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	148	248	29	1200	195
RTOR Reduction (vph)	0	136	0	22	0	0
Lane Group Flow (vph)	23	12	248	7	1200	195
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.0	8.0	20.0	15.0	53.0	78.0
Effective Green, g (s)	8.0	8.0	20.0	15.0	53.0	78.0
Actuated g/C Ratio	0.08	0.08	0.21	0.16	0.55	0.81
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	94	145	319	168	626	970
v/s Ratio Prot	c0.02		c0.16	0.00	c1.06	0.16
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.24	0.09	0.78	0.04	1.92	0.20
Uniform Delay, d1	41.2	40.6	35.9	34.4	21.5	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	11.3	0.1	418.5	0.1
Delay (s)	42.5	40.9	47.2	34.5	440.0	2.1
Level of Service	D	D	D	C	F	A
Approach Delay (s)	41.1		45.9			378.8
Approach LOS	D		D			F

Intersection Summary			
HCM 2000 Control Delay	297.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.57		
Actuated Cycle Length (s)	96.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/27/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	3	1	242	96	43	3
Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	0.97		0.97	1.00	1.00	
Frt	0.97		1.00	1.00	0.99	
Fit Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1589		1668	1531	3119	
Fit Permitted	0.96		0.72	1.00	1.00	
Satd. Flow (perm)	1589		1263	1531	3119	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	4	1	288	114	51	4
RTOR Reduction (vph)	1	0	0	0	1	0
Lane Group Flow (vph)	4	0	288	114	54	0
Confl. Peds. (#/hr)	50	50	50			50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	0.8		25.4	25.4	25.4	
Effective Green, g (s)	0.8		25.4	25.4	25.4	
Actuated g/C Ratio	0.02		0.70	0.70	0.70	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	35		886	1074	2188	
v/s Ratio Prot	c0.00			0.07	0.02	
v/s Ratio Perm			c0.23			
v/c Ratio	0.11		0.33	0.11	0.02	
Uniform Delay, d1	17.4		2.1	1.7	1.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.5		0.2	0.0	0.0	
Delay (s)	18.8		2.3	1.8	1.6	
Level of Service	B		A	A	A	
Approach Delay (s)	18.8			2.2	1.6	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	36.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Third St. & South St.

4/27/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	10	105	368	59	351	226
Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.95	0.98		1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1452	3295		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1626	1452	3295		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	113	396	63	377	243
RTOR Reduction (vph)	0	103	11	0	0	0
Lane Group Flow (vph)	11	10	448	0	377	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	5.9	5.9	30.3		15.1	50.5
Effective Green, g (s)	5.9	5.9	30.3		15.1	50.5
Actuated g/C Ratio	0.09	0.09	0.45		0.23	0.76
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	128	1499		387	2594
v/s Ratio Prot			c0.14		c0.22	0.07
v/s Ratio Perm	0.01	c0.01				
v/c Ratio	0.08	0.08	0.30		0.97	0.09
Uniform Delay, d1	27.8	27.9	11.4		25.6	2.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.3	0.5		38.6	0.1
Delay (s)	28.1	28.1	12.0		64.2	2.2
Level of Service	C	C	B		E	A
Approach Delay (s)	28.1		12.0			39.9
Approach LOS	C		B			D

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	15.3
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	7	7	328	34	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1518	1341		2883	2768	
Flt Permitted	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1518	1341		2742	2768	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	8	8	386	40	12
RTOR Reduction (vph)	0	8	0	0	9	0
Lane Group Flow (vph)	12	0	0	394	43	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		12.2	12.2	
Effective Green, g (s)	0.6	0.6		12.2	12.2	
Actuated g/C Ratio	0.01	0.01		0.25	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	18	16		692	699	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.14		
v/c Ratio	0.67	0.01		0.57	0.06	
Uniform Delay, d1	23.8	23.6		15.8	13.7	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.1	0.2		1.1	0.0	
Delay (s)	89.8	23.7		16.8	13.7	
Level of Service	F	C		B	B	
Approach Delay (s)	63.4			16.8	13.7	
Approach LOS	E			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	48.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th

4/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	150	1	20	4	2	5	28	256	8	5	92	66
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	163	1	25	5	3	5	35	278	10	5	100	72
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	163	27	5	8	324	105	72					
Volume Left (vph)	163	0	5	0	35	5	0					
Volume Right (vph)	0	25	0	5	10	0	72					
Hadj (s)	0.53	-0.63	0.53	-0.44	0.04	0.06	-0.67					
Departure Headway (s)	6.4	5.2	6.7	5.7	5.4	5.5	4.8					
Degree Utilization, x	0.29	0.04	0.01	0.01	0.48	0.16	0.10					
Capacity (veh/h)	531	645	488	566	653	618	708					
Control Delay (s)	10.7	7.2	8.6	7.6	13.3	8.4	7.1					
Approach Delay (s)	10.2		8.0		13.3	7.9						
Approach LOS	B		A		B	A						

Intersection Summary			
Delay	11.0		
Level of Service	B		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	165	153	99	1	89	6	69	256	17	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1274	1365	1131	1290	1365	1116	2515	2563		1296	2454	
Fit Permitted	0.69	1.00	1.00	0.65	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	929	1365	1131	880	1365	1116	2515	2563		1296	2454	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	185	172	111	1	100	7	78	288	19	1	183	80
RTOR Reduction (vph)	0	0	75	0	0	5	0	5	0	0	53	0
Lane Group Flow (vph)	185	172	36	1	100	2	78	302	0	1	210	0
Confl. Peds. (#/hr)	41		14	14		4			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	16.1	16.1	16.1	16.1	16.1	16.1	4.0	17.0		0.8	13.8	
Effective Green, g (s)	16.1	16.1	16.1	16.1	16.1	16.1	4.0	17.0		0.8	13.8	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.08	0.34		0.02	0.28	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	443	367	285	443	362	202	878		20	682	
v/s Ratio Prot		0.13			0.07		0.03	c0.12		0.00	c0.09	
v/s Ratio Perm	c0.20		0.03	0.00		0.00						
v/c Ratio	0.61	0.39	0.10	0.00	0.23	0.01	0.39	0.34		0.05	0.31	
Uniform Delay, d1	14.1	12.9	11.7	11.3	12.2	11.3	21.6	12.1		24.0	14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.6	0.1	0.0	0.3	0.0	1.2	0.2		1.0	0.3	
Delay (s)	17.8	13.5	11.8	11.3	12.5	11.3	22.9	12.4		25.1	14.4	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		14.8			12.4			14.5			14.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	15.7
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	161	399	1	2	207	18	3	5	1	17	1	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1248	1621	1663		1489	1354	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1248	1239	1663		1181	1354	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	168	416	1	2	216	19	3	5	1	18	1	46
RTOR Reduction (vph)	0	0	0	0	0	11	0	1	0	0	37	0
Lane Group Flow (vph)	168	416	1	2	216	8	3	5	0	18	10	0
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8				4	
Actuated Green, G (s)	15.8	49.1	49.1	2.5	35.8	35.8	15.3	15.3		15.3	15.3	
Effective Green, g (s)	15.8	49.1	49.1	2.5	35.8	35.8	15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.19	0.60	0.60	0.03	0.44	0.44	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	312	1022	869	49	745	545	231	310		220	252	
v/s Ratio Prot	c0.10	c0.24		0.00	0.13			0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					
v/c Ratio	0.54	0.41	0.00	0.04	0.29	0.02	0.01	0.02		0.08	0.04	
Uniform Delay, d1	29.8	8.7	6.6	38.5	14.9	13.1	27.1	27.2		27.5	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.2	0.0	0.3	0.2	0.0	0.0	0.0		0.2	0.1	
Delay (s)	31.6	9.9	6.6	38.9	15.1	13.1	27.2	27.2		27.7	27.3	
Level of Service	C	A	A	D	B	B	C	C		C	C	
Approach Delay (s)		16.1			15.1			27.2			27.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	16	423	3	5	245	5	11	549	118	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1046	1540	2997			2989	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1046	1182	2997			2218	1072
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	18	475	3	6	275	6	12	617	133	24	16	44
RTOR Reduction (vph)	0	0	2	0	0	3	0	17	0	0	0	29
Lane Group Flow (vph)	18	475	1	6	275	3	12	733	0	0	40	15
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	2.2	40.9	40.9	1.0	38.7	38.7	28.9	28.9			27.9	27.9
Effective Green, g (s)	2.2	40.9	40.9	1.0	38.7	38.7	28.9	28.9			27.9	27.9
Actuated g/C Ratio	0.03	0.49	0.49	0.01	0.46	0.46	0.34	0.34			0.33	0.33
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	31	593	672	18	561	483	407	1033			738	356
v/s Ratio Prot	c0.01	c0.39		0.00	0.23			c0.24				
v/s Ratio Perm			0.00			0.00	0.01				0.02	0.01
v/c Ratio	0.58	0.80	0.00	0.33	0.49	0.01	0.03	0.71			0.05	0.04
Uniform Delay, d1	40.3	18.0	11.0	41.1	15.7	12.2	18.2	23.8			19.0	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	24.7	7.7	0.0	10.6	0.7	0.0	0.0	2.3			0.0	0.0
Delay (s)	65.1	25.7	11.0	51.7	16.4	12.2	18.2	26.1			19.0	19.0
Level of Service	E	C	B	D	B	B	B	C			B	B
Approach Delay (s)		27.0			17.0			25.9			19.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	320	60	8	208	79	31	91	8	114	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.95	1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.94
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1317	928	1335	1126	874	1070	957	911	1070	1033		
Fit Permitted	0.45	1.00	0.35	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	625	928	491	1126	874	1070	957	911	1070	1033		
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	376	71	9	245	93	36	107	9	134	47	28
RTOR Reduction (vph)	0	6	0	0	0	34	0	0	8	0	22	0
Lane Group Flow (vph)	24	441	0	9	245	59	36	107	1	134	53	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10	10					10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	51.4	51.4		50.6	50.6	64.8	13.9	16.4	16.4	14.2	16.7	
Effective Green, g (s)	51.4	51.4		50.6	50.6	64.8	13.9	16.4	16.4	14.2	16.7	
Actuated g/C Ratio	0.50	0.50		0.49	0.49	0.63	0.14	0.16	0.16	0.14	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	322	464		247	554	594	144	152	145	147	167	
v/s Ratio Prot	0.00	c0.48		0.00	c0.22	0.01	0.03	c0.11		c0.13	0.05	
v/s Ratio Perm	0.04			0.02		0.05			0.00			
v/c Ratio	0.07	0.95		0.04	0.44	0.10	0.25	0.70	0.01	0.91	0.32	
Uniform Delay, d1	13.6	24.4		20.0	16.9	7.5	39.7	40.9	36.3	43.6	38.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	29.5		0.1	0.6	0.1	0.9	13.8	0.0	48.6	1.1	
Delay (s)	13.7	53.9		20.1	17.5	7.5	40.6	54.6	36.3	92.3	39.1	
Level of Service	B	D		C	B	A	D	D	D	F	D	
Approach Delay (s)		51.9			14.9			50.2			73.2	
Approach LOS		D			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	258	303	27	26	54	7	22	24	30	5	24	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.97		1.00	
Flpb, ped/bikes		0.99		0.99	1.00			0.99	1.00		1.00	
Frt		0.99		1.00	0.98			1.00	0.85		0.90	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1467		1697	1759			1746	1489		1331	
Fit Permitted		0.82		0.40	1.00			0.80	1.00		0.99	
Satd. Flow (perm)		1233		719	1759			1434	1489		1321	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	322	379	34	32	68	9	28	30	38	6	30	124
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	31	0	102	0
Lane Group Flow (vph)	0	734	0	32	74	0	0	58	7	0	58	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4			4	8		
Actuated Green, G (s)		52.5		52.5	52.5			16.6	16.6		16.6	
Effective Green, g (s)		52.5		52.5	52.5			16.6	16.6		16.6	
Actuated g/C Ratio		0.56		0.56	0.56			0.18	0.18		0.18	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		693		404	989			255	264		235	
v/s Ratio Prot				0.04				0.04	0.00		c0.04	
v/s Ratio Perm	c0.60			0.04				0.04	0.00		c0.04	
v/c Ratio	1.06			0.08	0.07			0.23	0.03		0.25	
Uniform Delay, d1	20.4			9.3	9.3			32.9	31.7		33.0	
Progression Factor	1.00			1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	50.8			0.1	0.0			0.5	0.0		0.6	
Delay (s)	71.2			9.4	9.3			33.3	31.7		33.5	
Level of Service	E			A	A			C	C		C	
Approach Delay (s)	71.2			9.4				32.7			33.5	
Approach LOS	E			A				C			C	

Intersection Summary	
HCM 2000 Control Delay	56.2 HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.75
Actuated Cycle Length (s)	93.3 Sum of lost time (s) 14.0
Intersection Capacity Utilization	72.0% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	
Volume (vph)	46	532	21	25	137	13	16	283	43	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	3397		1697	3363		1260	2458		1260	2390	
Fit Permitted	0.64	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1129	3397		518	3363		1260	2458		1260	2390	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	611	24	29	157	15	18	325	49	14	206	83
RTOR Reduction (vph)	0	3	0	0	7	0	0	10	0	0	40	0
Lane Group Flow (vph)	53	632	0	29	165	0	18	364	0	14	249	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Effective Green, g (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.07	0.48		0.03	0.43	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	368	1110		169	1099		93	1171		35	1030	
v/s Ratio Prot		c0.19			0.05		0.01	c0.15		0.01	c0.10	
v/s Ratio Perm	0.05			0.06								
v/c Ratio	0.14	0.57		0.17	0.15		0.19	0.31		0.40	0.24	
Uniform Delay, d1	21.9	25.6		22.1	21.9		40.1	14.8		44.0	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.5	0.1		1.0	0.7		7.3	0.1	
Delay (s)	22.1	26.3		22.6	22.0		41.1	15.5		51.3	16.8	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		26.0			22.1			16.7			18.4	
Approach LOS		C			C			B			B	

Intersection Summary	
HCM 2000 Control Delay	21.7 HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.42
Actuated Cycle Length (s)	92.1 Sum of lost time (s) 15.5
Intersection Capacity Utilization	80.1% ICU Level of Service D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/27/2015



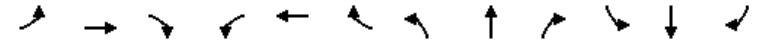
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	2	622	11	2	220	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3412		1711	3419			1705		1711	1621	
Flt Permitted	0.60	1.00		0.39	1.00			0.78		0.75	1.00	
Satd. Flow (perm)	1085	3412		702	3419			1387		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	676	12	2	239	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	2	0
Lane Group Flow (vph)	2	686	0	2	239	0	0	4	0	2	1	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.2	13.2		13.2	13.2			7.7		7.7	7.7	
Effective Green, g (s)	13.2	13.2		13.2	13.2			7.7		7.7	7.7	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	463	1457		299	1460			345		335	403	
v/s Ratio Prot		c0.20			0.07						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.00	0.47		0.01	0.16			0.01		0.01	0.00	
Uniform Delay, d1	5.1	6.3		5.1	5.5			8.7		8.7	8.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.1			0.0		0.0	0.0	
Delay (s)	5.1	6.6		5.1	5.5			8.7		8.7	8.7	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		6.6			5.5			8.7			8.7	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service A
HCM 2000 Volume to Capacity ratio	0.30	
Actuated Cycle Length (s)	30.9	Sum of lost time (s) 10.0
Intersection Capacity Utilization	33.3%	ICU Level of Service A
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/27/2015



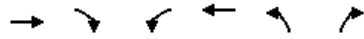
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	11	85	0	0	290	12	155	655	558	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			0.99		1.00	0.93				0.85
Flt Protected		0.99			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3401			5101		1711	3185				2694
Flt Permitted		0.92			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3140			5101		1711	3185				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	14	106	0	0	362	15	194	819	698	0	0	31
RTOR Reduction (vph)	0	0	0	0	6	0	0	203	0	0	0	29
Lane Group Flow (vph)	0	120	0	0	371	0	194	1314	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1480			1778		697	1299				141
v/s Ratio Prot		c0.00			c0.07		0.11	c0.41				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.21		0.28	1.01				0.01
Uniform Delay, d1		11.2			17.4		15.0	22.5				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.3		1.0	27.8				0.1
Delay (s)		11.3			17.7		16.0	50.3				34.3
Level of Service		B			B		B	D				C
Approach Delay (s)		11.3			17.7			46.4				34.3
Approach LOS		B			B			D				C

Intersection Summary		
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.61	
Actuated Cycle Length (s)	76.0	Sum of lost time (s) 14.5
Intersection Capacity Utilization	54.9%	ICU Level of Service A
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/27/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	96	169	231	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1620	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1620	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	117	206	282	291	0	0
RTOR Reduction (vph)	18	52	0	0	0	0
Lane Group Flow (vph)	153	100	282	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	39.6	39.6	10.4	60.0		
Effective Green, g (s)	39.6	39.6	10.4	60.0		
Actuated g/C Ratio	0.66	0.66	0.17	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1069	942	575	1801		
v/s Ratio Prot	0.09		c0.08	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.14	0.11	0.49	0.16		
Uniform Delay, d1	3.8	3.7	22.4	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.1	0.7	0.0		
Delay (s)	3.9	3.8	23.1	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.8			11.4	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			8.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.25			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			24.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena 3/25/2015 2015 Existing Plus Project (Basketball Game, No TSP), Sat Evening, No Giants Game
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HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔		↔	↔		↔	↔	↔
Volume (vph)	62	33	105	2	25	0	85	216	0	6	165	56
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1189	1902		1159	1279		1215	2431		1215	2296	
Fit Permitted	0.40	1.00		0.83	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	496	1902		1017	1279		1215	2431		1215	2296	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	70	37	118	2	28	0	96	243	0	7	185	63
RTOR Reduction (vph)	0	86	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	70	69	0	2	28	0	96	243	0	7	222	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	15.5	15.5		4.8	4.8		6.0	23.7		2.0	19.7	
Effective Green, g (s)	15.5	15.5		4.8	4.8		6.0	23.7		2.0	19.7	
Actuated g/C Ratio	0.27	0.27		0.08	0.08		0.10	0.41		0.03	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	198	512		84	106		126	1001		42	786	
v/s Ratio Prot	c0.03	0.04			0.02		c0.08	0.10		0.01	c0.10	
v/s Ratio Perm	c0.06			0.00								
v/c Ratio	0.35	0.13		0.02	0.26		0.76	0.24		0.17	0.28	
Uniform Delay, d1	16.6	15.9		24.2	24.7		25.1	11.0		26.9	13.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1		0.1	1.3		23.4	0.1		1.9	0.2	
Delay (s)	17.7	16.0		24.3	26.0		48.5	11.2		28.8	14.0	
Level of Service	B	B		C	C		D	B		C	B	
Approach Delay (s)		16.5			25.9			21.7			14.4	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.3									B
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			57.5							21.6		
Intersection Capacity Utilization			70.8%									C
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena 3/25/2015 2015 Existing Plus Project (Basketball Game, No TSP), Sat Evening, No Giants Game
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INTERSECTION MITIGATION DISCUSSION

The proposed project would result in significant impacts at the following 16 study intersections under existing plus project and/or 2040 cumulative impacts.

- (#1) King/Third (2040 cumulative)
- (#2) King/Fourth (existing plus project, 2040 cumulative)
- (#3) King/Fifth/I-280 ramps (existing plus project, 2040 cumulative)
- (#4) Fifth/Harrison/I-80 westbound off-ramp (existing plus project, 2040 cumulative)
- (#5) Fifth/Bryant/I-80 eastbound on-ramp (existing plus project, 2040 cumulative)
- (#6) Third/Channel (existing plus project, 2040 cumulative)
- (#7) Fourth/Channel (existing plus project, 2040 cumulative)
- (#8) Seventh/Mission Bay Drive (existing plus project, 2040 cumulative)
- (#10) Third/South (existing plus project, 2040 cumulative)
- (#13) Third/16th (2040 cumulative)
- (#14) Fourth/16th (existing plus project, 2040 cumulative)
- (#15) Owens/16th (existing plus project, 2040 cumulative)
- (#16) Seventh/Mississippi/16th (existing plus project, 2040 cumulative)
- (#17) Illinois/Mariposa (existing plus project, 2040 cumulative)
- (#20) Mariposa/I-280 northbound off-ramp (existing plus project, 2040 cumulative)
- (#22) Third/Cesar Chavez (2040 cumulative)

Generally, to mitigate poor operating conditions of study intersections, additional travel lane capacity would be needed on one or more of the approaches to the intersection. The provision of additional travel lane capacity by narrowing sidewalks, removal of on-street parking, and/or removal of transit lanes or bicycle lanes would generally be infeasible and inconsistent with the transit, bicycle, and pedestrian environment encouraged by the City's *Transit First* Policy as it would remove space dedicated to transit, pedestrians, and/or bicycles and would increase the distances required for pedestrians to cross the street.

The proposed project would result in significant impacts at one intersection under the No Event scenario during the weekday p.m. peak hour.

- (#16) Seventh/Mississippi/16th – At this intersection, additional travel lane capacity would be required at all approaches to reduce impacts during the weekday p.m. peak hour. Provision of additional capacity at this intersection is constrained by the transit-only lanes on 16th Street (to be implemented as part of the 22 Fillmore Transit Priority Project, which would remove one eastbound and one westbound mixed-flow travel lane), and the bicycle lanes on Mississippi and Seventh Streets (City-designated bicycle route #23).

At the following 13 study intersections, the proposed project would result in significant impacts, primarily during the weekday evening and late evening peak hours for the Basketball Game scenario (the two time periods immediately before and immediately after a basketball game). During overlapping events, the project would result in additional impacts during the weekday p.m. peak and Saturday evening peak hours, as well as during the weekday evening and late evening peak hours. As noted in the EIR discussion, these traffic impacts would be event-related, primarily caused by large attendance events, and SFMTA PCOs would be stationed at a number of these intersections to actively manage traffic flows during pre-event and post-event periods for these scenarios.

- (#2) King/Fourth (Basketball Game scenario)
- (#3) King/Fifth/I-280 ramps (overlapping events)
- (#4) Fifth/Harrison/I-80 westbound off-ramp (Basketball Game scenario, overlapping events)
- (#5) Fifth/Bryant/I-80 eastbound on-ramp (Basketball Game scenario, overlapping events)
- (#6) Third/Channel (Basketball Game scenario)
- (#7) Fourth/Channel (Basketball Game scenario)
- (#8) Seventh/Mission Bay Drive (Basketball Game scenario)
- (#10) Third/South (overlapping events)
- (#14) Fourth/16th (overlapping events)
- (#15) Owens/16th (overlapping events)
- (#17) Illinois/Mariposa (overlapping events)
- (#20) Mariposa/I-280 northbound off-ramp (overlapping events)

To reduce intersection impacts during events to less than significant (i.e., to LOS D or better), additional travel lane capacity would generally be needed on multiple approaches, depending on the peak hour of analysis (e.g., weekday evening attendee arrivals versus weekday late evening attendee departures). Within Mission Bay the roadway network has virtually been built out already per the Mission Bay Infrastructure Plan, and additional right-of-way is not available to provide more travel lanes. Furthermore, many streets (e.g., Third Street, Fourth Street, Seventh Street, King Street, Channel Street, Owens Street, South Street, Mission Bay Drive, Mariposa Street) do not have parking lanes at the approaches to the study intersections that could be converted to a travel lane.

Sidewalk widths within Mission Bay are generally 12 feet wide, including landscaping and utilities near the curb edge; thus, narrowing of sidewalk would remove and limit space currently dedicated to pedestrians. In addition, the existing T Third light rail tracks on Third Street and the transit-only lanes on 16th Street (to be provided as part of the 22 Fillmore Transit Priority Project) constrain the provision of additional travel lanes on these two streets. The analysis of the northbound I-280 off-ramp at Mariposa Street already includes the near-term off-ramp widening at the approach to Mariposa Street to be completed by fall 2015, and additional capacity on the ramp itself is not available due to the columns supporting the I-280 freeway mainline above. At the downtown intersections at Fifth/Harrison/I-80 westbound off-ramp and Fifth/Bryant/I-80 eastbound on-ramp, intersection operations have been optimized to accommodate peak period travel demands. The geometry of the freeway ramps were already maximized a few years ago as part of the Bay Bridge West Approach seismic upgrade project conducted by Caltrans (between 2003 and 2009).

Under 2040 cumulative conditions, the proposed project would result in significant cumulative impacts or have a considerable contribution to LOS E or LOS F conditions at three additional study intersections: King/Fourth, Third/16th, and Third/Cesar Chavez. As noted above, the ability to add additional travel lane capacity on King, Third, 16th and Cesar Chavez Streets is not available.

- (#1) King/Third – additional eastbound, westbound, and northbound travel lane capacity would be required to reduce impacts during the weekday p.m. peak hour and Saturday evening peak hours.
- (#13) Third/16th – additional southbound capacity would be required to reduce impacts during the weekday p.m. peak hour.
- (#22) Third/Cesar Chavez – additional eastbound, westbound, northbound, and southbound capacity would be required to reduce impacts during the weekday p.m. peak hour.

APPENDIX TR-5
PROPOSED PROJECT
FREEWAY MAINLINE AND RAMP ANALYSIS

LEVEL OF SERVICE SUMMARY – ALL SCENARIOS

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
Freeway Analysis, HCM 2000
All scenarios and time periods

Ramp Location	2015 Existing Weekday PM - No Giants			2015 Existing Weekday Evening - No Giants			2015 Existing Weekday Late PM - No Giants			2015 Existing Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,762	35	E	7,273	28	C	4,732	20	B	5,655	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F	6,325	-	F	4,247	30	D	5,018	35	E
3 I-80 WB off-ramp at Fifth/Harrison	6,353	30	D	6,080	28	D	6,118	27	C	5,578	25	C
4 I-280 SB on-ramp at Pennsylvania	4,410	35	E	3,508	27	C	1,746	15	B	1,467	13	B
5 I-280 NB off-ramp at Mariposa	4,418	26	C	4,258	25	C	1,875	13	B	2,634	16	B
6 I-280 SB on-ramp at Mariposa	3,625	31	D	3,023	25	C	1,655	13	B	1,370	12	B

Ramp Location	2015 Existing Weekday PM - With Giants			2015 Existing Weekday Evening - With Giants			2015 Existing Weekday Late PM - With Giants			2015 Existing Saturday Evening - With Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,820	35	E	7,257	28	C	5,104	23	C	6,203	25	C
2 I-80 EB on-ramp at Fifth/Bryant	7,900	-	F	6,426	-	F	4,543	32	D	5,274	-	F
3 I-80 WB off-ramp at Fifth/Harrison	6,445	31	D	6,156	29	D	6,178	27	C	5,743	27	C
4 I-280 SB on-ramp at Pennsylvania	4,600	36	E	3,685	28	D	2,420	21	C	1,921	17	B
5 I-280 NB off-ramp at Mariposa	4,490	29	D	4,997	30	D	1,883	13	B	2,807	18	B
6 I-280 SB on-ramp at Mariposa	3,605	31	D	3,158	26	C	2,081	18	B	1,772	14	B

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Ramp Location	Plus Project No Event Weekday PM - No Giants			Plus Project No Event Weekday Evening - No Giants			Plus Project No Event Weekday Late PM - No Giants			Plus Project No Event Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,796	36	E							5,682	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F							5,018	36	E
3 I-80 WB off-ramp at Fifth/Harrison	6,372	30	D							5,611	26	C
4 I-280 SB on-ramp at Pennsylvania	4,470	35	E							1,558	13	B
5 I-280 NB off-ramp at Mariposa	4,463	26	C							2,702	17	B
6 I-280 SB on-ramp at Mariposa	3,625	32	D							1,370	13	B

Ramp Location	Plus Project with Convention Weekday PM - No Giants			Plus Project with Convention Weekday Evening - No Giants			Plus Project with Convention Weekday Late PM - No Giants			Plus Project with Convention Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,812	36	E									
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F									
3 I-80 WB off-ramp at Fifth/Harrison	6,371	30	D									
4 I-280 SB on-ramp at Pennsylvania	4,565	36	E									
5 I-280 NB off-ramp at Mariposa	4,466	26	C									
6 I-280 SB on-ramp at Mariposa	3,625	33	D									

Ramp Location	Plus Project with Basketball Weekday PM - No Giants			Plus Project with Basketball Weekday Evening - No Giants			Plus Project with Basketball Weekday Late PM - No Giants			Plus Project with Basketball Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,794	36	E	7,301	28	C	5,305	23	C	5,671	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F	6,325	-	F	4,247	34	D	5,018	36	E
3 I-80 WB off-ramp at Fifth/Harrison	6,452	31	D	6,826	36	E	6,157	27	C	6,385	34	D
4 I-280 SB on-ramp at Pennsylvania	4,458	35	E	3,566	28	C	2,532	21	C	1,509	13	B
5 I-280 NB off-ramp at Mariposa	4,594	28	C	5,188	34	D	1,917	13	B	3,591	25	C
6 I-280 SB on-ramp at Mariposa	3,625	32	D	3,023	25	C	1,655	20	B	1,370	12	B

Ramp Location	Plus Project with Basketball Weekday PM - With Giants			Plus Project with Basketball Weekday Evening - With Giants			Plus Project with Basketball Weekday Late PM - With Giants			Plus Project with Basketball Saturday Evening - With Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,852	36	E	7,285	28	C	5,665	27	C	6,219	25	C
2 I-80 EB on-ramp at Fifth/Bryant	7,900	-	F	6,426	-	F	4,543	-	F	5,274	-	F
3 I-80 WB off-ramp at Fifth/Harrison	6,544	32	D	6,901	37	E	6,217	27	C	6,550	35	E
4 I-280 SB on-ramp at Pennsylvania	4,600	36	E	3,743	28	D	3,196	27	C	1,963	17	B
5 I-280 NB off-ramp at Mariposa	4,666	31	D	5,926	-	F	1,925	13	B	3,701	26	C
6 I-280 SB on-ramp at Mariposa	3,605	32	D	3,158	27	C	2,102	24	C	1,772	15	B

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Ramp Location	Alternative - No Project Weekday PM - No Giants			Alternative - No Project Weekday Evening - No Giants			Alternative - No Project Weekday Late PM - No Giants			Alternative - No Project Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,797	36	E							5,657	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F							5,018	35	E
3 I-80 WB off-ramp at Fifth/Harrison	6,358	30	D							5,579	25	C
4 I-280 SB on-ramp at Pennsylvania	4,480	35	E							1,476	13	B
5 I-280 NB off-ramp at Mariposa	4,431	26	C							2,638	16	B
6 I-280 SB on-ramp at Mariposa	3,625	32	D							1,370	12	B

Ramp Location	Alternative - Reduced-Reduced Project Weekday PM - No Giants			Alternative - Reduced-Reduced Project Weekday Evening - No Giants			Alternative - Reduced-Reduced Project Weekday Late PM - No Giants			Alternative - Reduced-Reduced Project Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,783	36	E							5,671	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F							5,018	36	E
3 I-80 WB off-ramp at Fifth/Harrison	6,365	30	D							5,598	25	C
4 I-280 SB on-ramp at Pennsylvania	4,421	35	E							1,521	13	B
5 I-280 NB off-ramp at Mariposa	4,445	26	C							2,675	17	B
6 I-280 SB on-ramp at Mariposa	3,625	32	D							1,370	13	B

Ramp Location	No TSP - Plus Project with Basketball Weekday PM - No Giants			No TSP - Plus Project with Basketball Weekday Evening - No Giants			No TSP - Plus Project with Basketball Weekday Late PM - No Giants			No TSP - Plus Project with Basketball Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,796	36	E	7,329	28	C	5,473	24	C	5,696	22	C
2 I-80 EB on-ramp at Fifth/Bryant	7,673	-	F	6,325	-	F	4,247	36	E	5,018	36	E
3 I-80 WB off-ramp at Fifth/Harrison	6,468	31	D	7,046	38	E	6,205	27	C	6,621	36	E
4 I-280 SB on-ramp at Pennsylvania	4,461	35	E	3,606	28	C	2,652	22	C	1,545	13	B
5 I-280 NB off-ramp at Mariposa	4,605	28	C	5,331	35	E	1,961	13	B	3,736	27	C
6 I-280 SB on-ramp at Mariposa	3,625	32	D	3,023	26	C	1,655	21	C	1,370	13	B

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Ramp Location	2040 Cumulative No Event Weekday PM - No Giants			2040 Cumulative No Event Weekday Evening - No Giants			2040 Cumulative No Event Weekday Late PM - No Giants			2040 Cumulative No Event Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,460	-	F							5,900	24	C
2 I-80 EB on-ramp at Fifth/Bryant	7,760	-	F							5,420	37	E
3 I-80 WB off-ramp at Fifth/Harrison	7,340	40	E							6,300	33	D
4 I-280 SB on-ramp at Pennsylvania	5,480	-	F							1,880	16	B
5 I-280 NB off-ramp at Mariposa	5,470	34	D							2,910	19	B
6 I-280 SB on-ramp at Mariposa	4,270	-	F							1,600	15	B

Ramp Location	2040 Cumulative with Convention Weekday PM - No Giants			2040 Cumulative with Convention Weekday Evening - No Giants			2040 Cumulative with Convention Weekday Late PM - No Giants			2040 Cumulative with Convention Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,480	-	F									
2 I-80 EB on-ramp at Fifth/Bryant	7,760	-	F									
3 I-80 WB off-ramp at Fifth/Harrison	7,340	40	E									
4 I-280 SB on-ramp at Pennsylvania	5,570	-	F									
5 I-280 NB off-ramp at Mariposa	5,470	34	D									
6 I-280 SB on-ramp at Mariposa	4,270	-	F									

Ramp Location	2040 Cumulative with Basketball Weekday PM - No Giants			2040 Cumulative with Basketball Weekday Evening - No Giants			2040 Cumulative with Basketball Weekday Late PM - No Giants			2040 Cumulative with Basketball Saturday Evening - No Giants		
	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS	Volume (vph)	Density (pcplpm)	LOS
1 I-80 EB on-ramp at Sterling/Bryant	8,460	-	F							5,890	24	C
2 I-80 EB on-ramp at Fifth/Bryant	7,760	-	F							5,420	36	E
3 I-80 WB off-ramp at Fifth/Harrison	7,420	-	F							7,070	41	E
4 I-280 SB on-ramp at Pennsylvania	5,470	-	F							1,830	15	B
5 I-280 NB off-ramp at Mariposa	5,600	35	D							3,800	27	C
6 I-280 SB on-ramp at Mariposa	4,270	-	F							1,600	15	B

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				Existing 2015				Plus Project No Event				% Contribution	
				Freeway		Density		Project Trips	Freeway		Density		
				Volume (vph)	Ramp (vph)	(pcplpm)	LOS		Volume (vph)	Ramp (vph)	(pcplpm)	LOS	
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	7,673	1,089	-	F	34	7,673	1,123	-	F	3.0%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	6,325	948	-	F	-	0	0	-	-	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	4,247	485	30	D	-	0	0	-	-	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,018	637	35	E	27	5,018	664	36	E	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	7,900	920	-	F	-	0	0	-	-	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	6,426	831	-	F	-	0	0	-	-	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	4,543	561	32	D	-	0	0	-	-	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	5,274	929	-	F	-	0	0	-	-	
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	8,762	1,089	35	E	17	8,796	1,106	36	
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	7,273	683	28	C	-	0	0	-	-	
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	4,732	347	20	B	-	0	0	-	-	
I-80 EB		Sterling/Bryant on-ramp	Wkend	5,655	352	22	C	14	5,682	366	22	C	
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	8,820	1,031	35	E	-	0	0	-	-	
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	7,257	699	28	C	-	0	0	-	-	
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	5,104	671	23	C	-	0	0	-	-	
I-80 EB		Sterling/Bryant on-ramp	Wkend w/	6,203	633	25	C	-	0	0	-	-	
D1		I-80 WB	Fifth/Harrison off-ramp	Wkday PM	6,353	1,180	30	D	19	6,372	1,199	30	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	6,080	1,056	28	D	-	0	0	-	-	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	6,118	350	27	C	-	0	0	-	-	
	I-80 WB	Fifth/Harrison off-ramp	Wkend	5,578	839	25	C	33	5,611	872	26	C	
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	6,445	1,272	31	D	-	0	0	-	-	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	6,156	1,132	29	D	-	0	0	-	-	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	6,178	410	27	C	-	0	0	-	-	
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	5,743	1,004	27	C	-	0	0	-	-	
	D2	I-280 NB	Mariposa off-ramp	Wkday PM	4,418	688	26	C	45	4,463	733	26	C
I-280 NB		Mariposa off-ramp	Wkday Eve	4,258	658	25	C	-	0	0	-	-	
I-280 NB		Mariposa off-ramp	Wkday Late	1,875	175	13	B	-	0	0	-	-	
I-280 NB		Mariposa off-ramp	Wkend	2,634	266	16	B	68	2,702	334	17	B	
I-280 NB		Mariposa off-ramp	Wkday PM w/	4,490	1,241	29	D	-	0	0	-	-	
I-280 NB		Mariposa off-ramp	Wkday Eve w/	4,997	997	30	D	-	0	0	-	-	
I-280 NB		Mariposa off-ramp	Wkday Late w/	1,883	185	13	B	-	0	0	-	-	
I-280 NB		Mariposa off-ramp	Wkend w/	2,807	420	18	B	-	0	0	-	-	
M3		I-280 SB	Mariposa on-ramp	Wkday PM	3,625	1,231	31	D	129	3,625	1,360	32	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	3,023	833	25	C	-	0	0	-	-	
	I-280 SB	Mariposa on-ramp	Wkday Late	1,655	270	13	B	-	0	0	-	-	
	I-280 SB	Mariposa on-ramp	Wkend	1,370	322	12	B	91	1,370	413	13	B	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3,605	1,272	31	D	-	0	0	-	-	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3,158	905	26	C	-	0	0	-	-	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	2,081	562	18	B	-	0	0	-	-	
	I-280 SB	Mariposa on-ramp	Wkend w/	1,772	344	14	B	-	0	0	-	-	
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,410	1,130	35	E	0	4,470	1,130	35	E
I-280 SB		Penn/25th on-ramp	Wkday Eve	3,508	755	27	C	-	0	0	-	-	
I-280 SB		Penn/25th on-ramp	Wkday Late	1,746	353	15	B	-	0	0	-	-	
I-280 SB		Penn/25th on-ramp	Wkend	1,467	239	13	B	0	1,558	239	13	B	
I-280 SB		Penn/25th on-ramp	Wkday PM w/	4,600	1,139	36	E	-	0	0	-	-	
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	3,685	746	28	D	-	0	0	-	-	
I-280 SB		Penn/25th on-ramp	Wkday Late w/	2,420	635	21	C	-	0	0	-	-	
I-280 SB		Penn/25th on-ramp	Wkend w/	1,921	483	17	B	-	0	0	-	-	

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				Plus Project with Convention					Plus Project with Basketball						
				Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	50	7,673	1,139	-	F	4.4%	32	7,673	1,121	-	F	2.9%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	-	0	0				28	6,325	976	-	F	2.9%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	-	0	0				573	4,247	1,058	34	D	54.2%
	I-80 EB	Fifth/Bryant on-ramp	Wkend	-	0	0				16	5,018	653	36	E	2.5%
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	-	0	0				32	7,900	952	-	F	3.4%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	-	0	0				28	6,426	859	-	F	3.3%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	-	0	0				561	4,543	1,122	-	F	50.0%
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	-	0	0				16	5,274	945	-	F	1.7%
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	25	8,812	1,114	36	E	2.2%	16	8,794	1,105	36	E
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	-	0	0				14	7,301	697	28	C	2.0%
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	-	0	0				286	5,305	633	23	C	45.2%
I-80 EB		Sterling/Bryant on-ramp	Wkend	-	0	0				8	5,671	360	22	C	2.2%
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	-	0	0				26	8,852	1,057	36	E	2.4%
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	-	0	0				14	7,285	713	28	C	1.9%
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	-	0	0				298	5,665	969	27	C	30.7%
I-80 EB		Sterling/Bryant on-ramp	Wkend w/	-	0	0				8	6,219	641	25	C	1.2%
D1		I-80 WB	Fifth/Harrison off-ramp	Wkday PM	18	6,371	1,198	30	D	1.5%	99	6,452	1,279	31	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	-	0	0				746	6,826	1,802	36	E	41.4%
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	-	0	0				38	6,157	388	27	C	9.9%
	I-80 WB	Fifth/Harrison off-ramp	Wkend	-	0	0				807	6,385	1,646	34	D	49.0%
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	-	0	0				99	6,544	1,371	32	D	7.2%
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	-	0	0				745	6,901	1,877	37	E	39.7%
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	-	0	0				38	6,217	448	27	C	8.5%
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	-	0	0				807	6,550	1,811	35	E	44.6%
	D2	I-280 NB	Mariposa off-ramp	Wkday PM	48	4,466	736	26	C	6.5%	176	4,594	864	28	C
I-280 NB		Mariposa off-ramp	Wkday Eve	-	0	0				930	5,188	1,588	34	D	58.6%
I-280 NB		Mariposa off-ramp	Wkday Late	-	0	0				42	1,917	217	13	B	19.4%
I-280 NB		Mariposa off-ramp	Wkend	-	0	0				957	3,591	1,223	25	C	78.3%
I-280 NB		Mariposa off-ramp	Wkday PM w/	-	0	0				176	4,666	1,417	31	D	12.4%
I-280 NB		Mariposa off-ramp	Wkday Eve w/	-	0	0				910	5,926	1,907	-	F	47.7%
I-280 NB		Mariposa off-ramp	Wkday Late w/	-	0	0				42	1,925	227	13	B	18.6%
I-280 NB		Mariposa off-ramp	Wkend w/	-	0	0				894	3,701	1,314	26	C	68.0%
M3		I-280 SB	Mariposa on-ramp	Wkday PM	224	3,625	1,455	33	D	15.4%	117	3,625	1,348	32	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	-	0	0				58	3,023	891	25	C	6.5%
	I-280 SB	Mariposa on-ramp	Wkday Late	-	0	0				786	1,655	1,056	20	B	74.4%
	I-280 SB	Mariposa on-ramp	Wkend	-	0	0				42	1,370	364	12	B	11.5%
	I-280 SB	Mariposa on-ramp	Wkday PM w/	-	0	0				117	3,605	1,389	32	D	8.4%
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	-	0	0				58	3,158	963	27	C	6.0%
	I-280 SB	Mariposa on-ramp	Wkday Late w/	-	0	0				755	2,102	1,317	24	C	57.3%
	I-280 SB	Mariposa on-ramp	Wkend w/	-	0	0				42	1,772	386	15	B	10.9%
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0	4,565	1,130	36	E	0.0%	0	4,458	1,130	35	E
I-280 SB		Penn/25th on-ramp	Wkday Eve	-	0	0				0	3,566	755	28	C	0.0%
I-280 SB		Penn/25th on-ramp	Wkday Late	-	0	0				262	2,532	615	21	C	42.6%
I-280 SB		Penn/25th on-ramp	Wkend	-	0	0				0	1,509	239	13	B	0.0%
I-280 SB		Penn/25th on-ramp	Wkday PM w/	-	0	0				0	4,600	1,139	36	E	0.0%
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	-	0	0				0	3,743	746	28	D	0.0%
I-280 SB		Penn/25th on-ramp	Wkday Late w/	-	0	0				273	3,196	908	27	C	30.0%
I-280 SB		Penn/25th on-ramp	Wkend w/	-	0	0				0	1,963	483	17	B	0.0%

Event Center and Mixed-Use Development at Mission Ba
 Freeway Analysis, HCM 2000
 All scenarios and time periods

	Alternative - No Project					Alternative - Reduced-Reduced Project									
	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	35	7,673	1,124	-	F	3.1%	21	7,673	1,110	-	F	1.9%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	-	0	0				-	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	-	0	0				-	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkend	2	5,018	639	35	E	0.3%	16	5,018	653	36	E	2.5%
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	-	0	0				-	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	-	0	0				-	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	-	0	0				-	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	-	0	0				-	0	0			
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	17	8,797	1,106	36	E	1.5%	10	8,783	1,099	36	E
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	-	0	0				-	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	-	0	0				-	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkend	1	5,657	353	22	C	0.3%	8	5,671	360	22	C	2.2%
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	-	0	0				-	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	-	0	0				-	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	-	0	0				-	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkend w/	-	0	0				-	0	0			
D1		I-80 WB	Fifth/Harrison off-ramp	Wkday PM	5	6,358	1,185	30	D	0.4%	12	6,365	1,192	30	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	-	0	0				-	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	-	0	0				-	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkend	1	5,579	840	25	C	0.1%	20	5,598	859	25	C	2.3%
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	-	0	0				-	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	-	0	0				-	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	-	0	0				-	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	-	0	0				-	0	0			
	D2	I-280 NB	Mariposa off-ramp	Wkday PM	13	4,431	701	26	C	1.9%	27	4,445	715	26	C
I-280 NB		Mariposa off-ramp	Wkday Eve	-	0	0				-	0	0			
I-280 NB		Mariposa off-ramp	Wkday Late	-	0	0				-	0	0			
I-280 NB		Mariposa off-ramp	Wkend	4	2,638	270	16	B	1.5%	41	2,675	307	17	B	13.4%
I-280 NB		Mariposa off-ramp	Wkday PM w/	-	0	0				-	0	0			
I-280 NB		Mariposa off-ramp	Wkday Eve w/	-	0	0				-	0	0			
I-280 NB		Mariposa off-ramp	Wkday Late w/	-	0	0				-	0	0			
I-280 NB		Mariposa off-ramp	Wkend w/	-	0	0				-	0	0			
M3		I-280 SB	Mariposa on-ramp	Wkday PM	139	3,625	1,370	32	D	10.1%	80	3,625	1,311	32	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	-	0	0				-	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Late	-	0	0				-	0	0			
	I-280 SB	Mariposa on-ramp	Wkend	9	1,370	331	12	B	2.7%	54	1,370	376	13	B	14.4%
	I-280 SB	Mariposa on-ramp	Wkday PM w/	-	0	0				-	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	-	0	0				-	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Late w/	-	0	0				-	0	0			
	I-280 SB	Mariposa on-ramp	Wkend w/	-	0	0				-	0	0			
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0	4,480	1,130	35	E	0.0%	0	4,421	1,130	35	E
I-280 SB		Penn/25th on-ramp	Wkday Eve	-	0	0				-	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Late	-	0	0				-	0	0			
I-280 SB		Penn/25th on-ramp	Wkend	0	1,476	239	13	B	0.0%	0	1,521	239	13	B	0.0%
I-280 SB		Penn/25th on-ramp	Wkday PM w/	-	0	0				-	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	-	0	0				-	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Late w/	-	0	0				-	0	0			
I-280 SB		Penn/25th on-ramp	Wkend w/	-	0	0				-	0	0			

Event Center and Mixed-Use Development at Mission Ba
 Freeway Analysis, HCM 2000
 All scenarios and time periods

	No TSP - Plus Project with Basketball									2040 Cumulative No Event					
	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	34	7,673	1,123	-	F	3.0%	34	7,758	705	-	F	4.8%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	56	6,325	1,004	-	F	5.6%	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	741	4,247	1,226	36	E	60.4%	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkend	41	5,018	678	36	E	6.1%	27	5,425	477	37	E	5.7%
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	17	8,796	1,106	36	E	1.5%	17	8,463	1,757	-	F	1.0%
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	28	7,329	711	28	C	3.9%	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	370	5,473	717	24	C	51.6%	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkend	21	5,696	373	22	C	5.5%	14	5,902	644	24	C	2.2%
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	115	6,468	1,295	31	D	8.9%	19	7,340	2,167	40	E	0.9%
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	966	7,046	2,022	38	E	47.8%	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	87	6,205	437	27	C	19.9%	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkend	1042	6,621	1,881	36	E	55.4%	33	6,295	1,556	33	D	2.1%
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
D2	I-280 NB	Mariposa off-ramp	Wkday PM	187	4,605	875	28	C	21.4%	45	5,468	1,285	34	D	3.5%
	I-280 NB	Mariposa off-ramp	Wkday Eve	1073	5,331	1,731	35	E	62.0%	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkday Late	86	1,961	261	13	B	32.9%	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkend	1102	3,736	1,368	27	C	80.6%	68	2,909	541	19	B	12.6%
	I-280 NB	Mariposa off-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 NB	Mariposa off-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
M3	I-280 SB	Mariposa on-ramp	Wkday PM	120	3,625	1,351	32	D	8.9%	129	4,273	1,846	-	F	7.0%
	I-280 SB	Mariposa on-ramp	Wkday Eve	98	3,023	931	26	C	10.6%	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkday Late	906	1,655	1,176	21	C	77.0%	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkend	78	1,370	400	13	B	19.5%	91	1,602	515	15	B	17.7%
	I-280 SB	Mariposa on-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Mariposa on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0	4,461	1,130	35	E	0.0%	0	5,477	1,517	-	F	0.0%
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	3,606	755	28	C	0.0%	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkday Late	302	2,652	655	22	C	46.1%	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkend	0	1,545	239	13	B	0.0%	0	1,880	323	16	B	0.0%
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-
	I-280 SB	Penn/25th on-ramp	Wkend w/	-	0	0	-	-	-	-	0	0	-	-	-

Event Center and Mixed-Use Development at Mission Ba
 Freeway Analysis, HCM 2000
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	2040 Cumulative with Convention					2040 Cumulative with Basketball									
	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution	Project Trips	Freeway Volume (vph)	Density Ramp (vph)	Density (pcplpm)	LOS	% Contribution			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	50	7,758	721	-	F	6.9%	32	7,758	703	-	F	4.6%
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	-	0	0				28	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	-	0	0				573	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkend	-	0	0				16	5,425	466	36	E	3.4%
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	-	0	0				32	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	-	0	0				28	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	-	0	0				561	0	0			
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	-	0	0				16	0	0			
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	25	8,479	1,766	-	F	1.4%	16	8,461	1,756	-	F
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	-	0	0				14	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	-	0	0				286	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkend	-	0	0				8	5,891	638	24	C	1.2%
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	-	0	0				26	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	-	0	0				14	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	-	0	0				298	0	0			
I-80 EB		Sterling/Bryant on-ramp	Wkend w/	-	0	0				8	0	0			
D1		I-80 WB	Fifth/Harrison off-ramp	Wkday PM	18	7,338	2,165	40	E	0.8%	99	7,419	2,246	-	F
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	-	0	0				746	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	-	0	0				38	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkend	-	0	0				807	7,069	2,330	41	E	34.6%
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	-	0	0				99	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	-	0	0				745	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	-	0	0				38	0	0			
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	-	0	0				807	0	0			
	D2	I-280 NB	Mariposa off-ramp	Wkday PM	48	5,472	1,289	34	D	3.7%	176	5,599	1,416	35	D
I-280 NB		Mariposa off-ramp	Wkday Eve	-	0	0				930	0	0			
I-280 NB		Mariposa off-ramp	Wkday Late	-	0	0				42	0	0			
I-280 NB		Mariposa off-ramp	Wkend	-	0	0				957	3,798	1,430	27	C	66.9%
I-280 NB		Mariposa off-ramp	Wkday PM w/	-	0	0				176	0	0			
I-280 NB		Mariposa off-ramp	Wkday Eve w/	-	0	0				910	0	0			
I-280 NB		Mariposa off-ramp	Wkday Late w/	-	0	0				42	0	0			
I-280 NB		Mariposa off-ramp	Wkend w/	-	0	0				894	0	0			
M3		I-280 SB	Mariposa on-ramp	Wkday PM	224	4,273	1,941	-	F	11.5%	117	4,273	1,834	-	F
	I-280 SB	Mariposa on-ramp	Wkday Eve	-	0	0				58	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Late	-	0	0				786	0	0			
	I-280 SB	Mariposa on-ramp	Wkend	-	0	0				42	1,602	466	15	B	9.0%
	I-280 SB	Mariposa on-ramp	Wkday PM w/	-	0	0				117	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	-	0	0				58	0	0			
	I-280 SB	Mariposa on-ramp	Wkday Late w/	-	0	0				755	0	0			
	I-280 SB	Mariposa on-ramp	Wkend w/	-	0	0				42	0	0			
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0	5,572	1,517	-	F	0.0%	0	5,465	1,517	-	F
I-280 SB		Penn/25th on-ramp	Wkday Eve	-	0	0				0	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Late	-	0	0				262	0	0			
I-280 SB		Penn/25th on-ramp	Wkend	-	0	0				0	1,831	323	15	B	0.0%
I-280 SB		Penn/25th on-ramp	Wkday PM w/	-	0	0				0	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	-	0	0				0	0	0			
I-280 SB		Penn/25th on-ramp	Wkday Late w/	-	0	0				273	0	0			
I-280 SB		Penn/25th on-ramp	Wkend w/	-	0	0				0	0	0			

EXISTING – MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Existing 2013/2014 Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		On-Ramp Data									
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
<i>Existing</i>																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,089	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	3	60.0	6,325	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,047	7,047	Left	1	No	60.0	948	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	3	60.0	4,247	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,732	4,732	Left	1	No	60.0	485	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	637	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	3	60.0	7,900	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,802	8,802	Left	1	No	60.0	920	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	3	60.0	6,426	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,159	7,159	Left	1	No	60.0	831	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	3	60.0	4,543	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,061	5,061	Left	1	No	60.0	561	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	3	60.0	5,274	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,876	5,876	Left	1	No	60.0	929	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	5	60.0	8,762	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,762	7,262	Right	1	No	45.0	1,089	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5	60.0	7,273	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,103	5,794	Right	1	No	45.0	683	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	5	60.0	4,732	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,272	4,112	Right	1	No	45.0	347	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend	5	60.0	5,655	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,300	4,788	Right	1	No	45.0	352	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	5	60.0	8,820	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,827	7,327	Right	1	No	45.0	1,031	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	5	60.0	7,257	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,085	5,781	Right	1	No	45.0	699	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	5	60.0	5,104	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,686	4,322	Right	1	No	45.0	671	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	5	60.0	6,203	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,911	5,045	Right	1	No	45.0	633	250	0	250
M3	I-280 SB	Mariposa on-ramp	Wkday PM	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,231	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve	3	60.0	3,023	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,368	3,368	Right	1	No	45.0	833	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late	3	60.0	1,655	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,844	1,844	Right	1	No	45.0	270	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	322	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3	60.0	3,605	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,017	4,017	Right	1	No	45.0	1,272	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3	60.0	3,158	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,519	3,519	Right	1	No	45.0	905	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late w/	3	60.0	2,081	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,318	2,318	Right	1	No	45.0	562	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend w/	3	60.0	1,772	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,974	1,974	Right	1	No	45.0	344	480	0	480
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	3	60.0	4,410	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,913	4,913	Right	1	No	45.0	1,130	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve	3	60.0	3,508	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	3,908	3,908	Right	1	No	45.0	755	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late	3	60.0	1,746	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,945	1,945	Right	1	No	45.0	353	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend	3	60.0	1,467	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,634	1,634	Right	1	No	45.0	239	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	3	60.0	4,600	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	5,125	5,125	Right	1	No	45.0	1,139	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	3	60.0	3,685	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,105	4,105	Right	1	No	45.0	746	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	3	60.0	2,420	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,696	2,696	Right	1	No	45.0	635	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend w/	3	60.0	1,921	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,140	2,140	Right	1	No	45.0	483	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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General Information			On-Ramp Volume Adjustment								Adjacent Upstream Ramp Data													
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,213	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,056	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	540	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	710	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,025	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	926	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	625	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,035	No												
M2	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,213	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	761	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	387	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	392	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,149	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	779	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	748	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	705	No												
M3	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,371	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	928	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	301	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	359	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,417	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,008	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	626	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	383	No												
M4	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	841	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	393	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,269	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	831	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	707	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	538	No												

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	Bus %	RV %	E _T	E _R		f _{HV}	f _P	25-2	25-3	1		2
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No													0.597	0.597	5,717
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No													0.597	0.597	4,713
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No													0.597	0.597	3,165
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No													0.597	0.597	3,739
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No													0.597	0.597	5,886
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No													0.597	0.597	4,788
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No													0.597	0.597	3,385
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No													0.597	0.597	3,929
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No													0.585	0.128	930
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No													0.585	0.185	1,070
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No													0.585	0.231	952
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No													0.585	0.231	1,105
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No													0.585	0.136	998
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No													0.585	0.182	1,054
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No													0.585	0.186	805
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No													0.585	0.192	967
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No													0.591	0.591	2,387
	I-280 SB	Mariposa on-ramp	Wkday Eve	No													0.591	0.591	1,990
	I-280 SB	Mariposa on-ramp	Wkday Late	No													0.591	0.591	1,090
	I-280 SB	Mariposa on-ramp	Wkend	No													0.591	0.591	902
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No													0.591	0.591	2,374
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No													0.591	0.591	2,079
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No													0.591	0.591	1,370
	I-280 SB	Mariposa on-ramp	Wkend w/	No													0.591	0.591	1,167
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No													0.587	0.587	2,886
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No													0.587	0.587	2,295
	I-280 SB	Penn/25th on-ramp	Wkday Late	No													0.587	0.587	1,143
	I-280 SB	Penn/25th on-ramp	Wkend	No													0.587	0.587	960
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No													0.587	0.587	3,010
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No													0.587	0.587	2,411
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No													0.587	0.587	1,583
	I-280 SB	Penn/25th on-ramp	Wkend w/	No													0.587	0.587	1,257

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Merge Ramp Junctions
Capacity Analysis

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General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,762	6,900	Yes	2,832	Yes	No	5,849	7,062	4,600	Yes	1,213	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	7,047	6,900	Yes	8,103	6,900	Yes	2,334	No	No	4,713	5,769	4,600	Yes	1,056	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	4,732	6,900	No	5,272	6,900	No	1,567	No	No	3,165	3,705	4,600	No	540	2,200	No	29.7	D
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,300	6,900	No	1,852	No	No	3,739	4,448	4,600	No	710	2,200	No	35.5	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	8,802	6,900	Yes	9,827	6,900	Yes	2,916	Yes	No	6,102	7,127	4,600	Yes	1,025	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	7,159	6,900	Yes	8,085	6,900	Yes	2,372	No	No	4,788	5,714	4,600	Yes	926	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	5,061	6,900	No	5,686	6,900	No	1,676	No	No	3,385	4,010	4,600	No	625	2,200	No	32.1	D
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	5,876	6,900	No	6,911	6,900	Yes	1,946	No	No	3,929	4,965	4,600	Yes	1,035	2,200	No	-	F
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,262	11,500	No	8,475	11,500	No	3,166	Yes	Yes	2,905	4,118	4,600	No	1,213	2,100	No	35.5	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5,794	11,500	No	6,555	11,500	No	2,362	No	Yes	2,318	3,078	4,600	No	761	2,100	No	27.6	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	4,112	11,500	No	4,499	11,500	No	1,580	No	Yes	1,645	2,032	4,600	No	387	2,100	No	19.6	B
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,788	11,500	No	5,180	11,500	No	1,842	No	Yes	1,915	2,307	4,600	No	392	2,100	No	21.7	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	7,327	11,500	No	8,475	11,500	No	3,165	Yes	Yes	2,931	4,079	4,600	No	1,149	2,100	No	35.2	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	5,781	11,500	No	6,560	11,500	No	2,363	No	Yes	2,312	3,091	4,600	No	779	2,100	No	27.7	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	4,322	11,500	No	5,069	11,500	No	1,758	No	Yes	1,729	2,476	4,600	No	748	2,100	No	22.9	C
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	5,045	11,500	No	5,750	11,500	No	2,039	No	Yes	2,018	2,723	4,600	No	705	2,100	No	24.8	C
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,410	6,900	No	1,652	No	No	2,387	3,758	4,600	No	1,371	2,100	No	31.1	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	3,368	6,900	No	4,296	6,900	No	1,378	No	No	1,990	2,918	4,600	No	928	2,100	No	24.8	C
	I-280 SB	Mariposa on-ramp	Wkday Late	1,844	6,900	No	2,145	6,900	No	754	No	No	1,090	1,391	4,600	No	301	2,100	No	13.2	B
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,885	6,900	No	624	No	No	902	1,261	4,600	No	359	2,100	No	12.1	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	4,017	6,900	No	5,434	6,900	No	1,643	No	No	2,374	3,791	4,600	No	1,417	2,100	No	31.4	D
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3,519	6,900	No	4,527	6,900	No	1,439	No	No	2,079	3,088	4,600	No	1,008	2,100	No	26.1	C
	I-280 SB	Mariposa on-ramp	Wkday Late w/	2,318	6,900	No	2,944	6,900	No	948	No	No	1,370	1,996	4,600	No	626	2,100	No	17.7	B
	I-280 SB	Mariposa on-ramp	Wkend w/	1,974	7,050	No	2,357	7,050	No	808	No	No	1,167	1,550	4,600	No	383	2,100	No	14.4	B
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,913	7,050	No	6,172	7,050	No	2,028	No	No	2,886	4,145	4,600	No	1,259	2,100	No	35.0	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	3,908	7,050	No	4,749	7,050	No	1,613	No	No	2,295	3,136	4,600	No	841	2,100	No	27.4	C
	I-280 SB	Penn/25th on-ramp	Wkday Late	1,945	7,050	No	2,339	7,050	No	803	No	No	1,143	1,536	4,600	No	393	2,100	No	15.1	B
	I-280 SB	Penn/25th on-ramp	Wkend	1,634	7,050	No	1,901	7,050	No	675	No	No	960	1,226	4,600	No	266	2,100	No	12.7	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	5,125	7,050	No	6,394	7,050	No	2,115	No	No	3,010	4,279	4,600	No	1,269	2,100	No	36.1	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	4,105	7,050	No	4,937	7,050	No	1,694	No	No	2,411	3,242	4,600	No	831	2,100	No	28.2	D
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	2,696	7,050	No	3,403	7,050	No	1,113	No	No	1,583	2,291	4,600	No	707	2,100	No	20.8	C
	I-280 SB	Penn/25th on-ramp	Wkend w/	2,140	7,050	No	2,678	7,050	No	883	No	No	1,257	1,795	4,600	No	538	2,100	No	17.0	B

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Existing 2013/2014 Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment										Effective		Off-Ramp Data							
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,353	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,078	7,078	Left	2	Yes	45.0	1,180	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	6,080	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,774	6,774	Left	2	Yes	45.0	1,056	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	6,118	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,817	6,817	Left	2	Yes	45.0	350	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	5,578	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,215	6,215	Left	2	Yes	45.0	839	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	6,445	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,181	7,181	Left	2	Yes	45.0	1,272	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	6,156	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,858	6,858	Left	2	Yes	45.0	1,132	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	6,178	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,883	6,883	Left	2	Yes	45.0	410	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	5,743	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,399	6,399	Left	2	Yes	45.0	1,004	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,418	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,922	4,922	Right	1	Yes	45.0	688	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	4,258	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,744	4,744	Right	1	Yes	45.0	658	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	1,875	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,089	2,089	Right	1	Yes	45.0	175	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	2,634	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,934	2,934	Right	1	Yes	45.0	266	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	4,490	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,002	5,002	Right	1	Yes	45.0	1,241	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	4,997	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,567	5,567	Right	1	Yes	45.0	997	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	1,883	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,098	2,098	Right	1	Yes	45.0	185	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	2,807	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,127	3,127	Right	1	Yes	45.0	420	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information				Off-Ramp Volume Adjustment								Adjacent Upstream Ramp Data													
Freeway/ Direction	Off-ramp	Analysis Time Period		PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																									
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,315	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,177	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	390	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	935	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,417	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,261	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	457	No												
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,119	No												
D2	I-280 NB	Mariposa off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	767	No												
	I-280 NB	Mariposa off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	733	No												
	I-280 NB	Mariposa off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	195	No												
	I-280 NB	Mariposa off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	296	No												
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,383	No												
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,111	No												
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	206	No												
	I-280 NB	Mariposa off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	468	No												

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No															0.523	0.260	3,094
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No															0.537	0.260	2,895
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No															0.572	0.260	2,267
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No															0.562	0.260	2,538
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No															0.515	0.260	3,207
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No															0.531	0.260	2,988
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No															0.567	0.260	2,340
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No															0.549	0.260	2,741
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No															0.602	0.436	2,578
	I-280 NB	Mariposa off-ramp	Wkday Eve	No															0.608	0.436	2,482
	I-280 NB	Mariposa off-ramp	Wkday Late	No															0.699	0.436	1,021
	I-280 NB	Mariposa off-ramp	Wkend	No															0.673	0.436	1,447
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No															0.571	0.436	2,961
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No															0.570	0.436	3,054
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No															0.698	0.436	1,031
	I-280 NB	Mariposa off-ramp	Wkend w/	No															0.660	0.436	1,627

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,078	9,200	No	1,992	No	No	3,094	4,400	No	5,763	6,900	No	1,315	4,100	No	30.0	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	6,774	9,200	No	1,939	No	No	2,895	4,400	No	5,597	6,900	No	1,177	4,100	No	28.2	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	6,817	9,200	No	2,275	No	Yes	2,727	4,400	No	6,427	6,900	No	390	4,100	No	26.8	C
	I-80 WB	Fifth/Harrison off-ramp	Wkend	6,215	9,200	No	1,838	No	No	2,538	4,400	No	5,280	6,900	No	935	4,100	No	25.2	C
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	7,181	9,200	No	1,987	No	No	3,207	4,400	No	5,763	6,900	No	1,417	4,100	No	30.9	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	6,858	9,200	No	1,935	No	No	2,988	4,400	No	5,597	6,900	No	1,261	4,100	No	29.0	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	6,883	9,200	No	2,271	No	Yes	2,753	4,400	No	6,427	6,900	No	457	4,100	No	27.0	C
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	6,399	9,200	No	1,829	No	No	2,741	4,400	No	5,280	6,900	No	1,119	4,100	No	26.9	C
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4,922	9,200	No	1,172	No	No	2,578	4,400	No	4,156	6,900	No	767	2,100	No	26.0	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	4,744	9,200	No	1,131	No	No	2,482	4,400	No	4,011	6,900	No	733	2,100	No	25.1	C
	I-280 NB	Mariposa off-ramp	Wkday Late	2,089	9,200	No	534	No	No	1,021	4,400	No	1,894	6,900	No	195	2,100	No	12.6	B
	I-280 NB	Mariposa off-ramp	Wkend	2,934	9,200	No	744	No	No	1,447	4,400	No	2,638	6,900	No	296	2,100	No	16.2	B
	I-280 NB	Mariposa off-ramp	Wkday PM w/	5,002	9,200	No	1,021	No	No	2,961	4,400	No	3,620	6,900	No	1,383	2,100	No	29.3	D
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	5,567	9,200	No	1,257	No	No	3,054	4,400	No	4,456	6,900	No	1,111	2,100	No	30.1	D
	I-280 NB	Mariposa off-ramp	Wkday Late w/	2,098	9,200	No	534	No	No	1,031	4,400	No	1,892	6,900	No	206	2,100	No	12.7	B
	I-280 NB	Mariposa off-ramp	Wkend w/	3,127	9,200	No	750	No	No	1,627	4,400	No	2,659	6,900	No	468	2,100	No	17.8	B

EXISTING PLUS PROJECT – NO EVENT
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project No Event Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment							Effective		On-Ramp Data									
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,123	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	664	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	5	60.0	8,796	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,800	7,300	Right	1	No	45.0	1,106	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend	5	60.0	5,682	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,330	4,811	Right	1	No	45.0	366	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
M3	I-280 SB	Mariposa on-ramp	Wkday PM	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,360	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	413	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	3	60.0	4,470	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,980	4,980	Right	1	No	45.0	1,130	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend	3	60.0	1,558	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,736	1,736	Right	1	No	45.0	239	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,251	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	740	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,232	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	408	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,515	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	460	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
 Analyst

General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	RV %	E _T	E _R	f _{HV}		f _P	25-2	25-3	1	2		3
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No												0.597	0.597	5,717	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No												0.597	0.597	3,739	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No												0.597	0.597	0	
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No												0.585	0.126	918	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No												0.585	0.229	1,101	
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No												0.585	0.280	0	
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No												0.591	0.591	2,387	
	I-280 SB	Mariposa on-ramp	Wkday Eve	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend	No												0.591	0.591	902	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend w/	No												0.591	0.591	0	
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No												0.587	0.587	2,925	
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend	No												0.587	0.587	1,019	
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend w/	No												0.587	0.587	0	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			Capacity Checks											Results							
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,800	6,900	Yes	2,832	Yes	No	5,849	7,100	4,600	Yes	1,251	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,330	6,900	No	1,852	No	No	3,739	4,478	4,600	No	740	2,200	No	35.7	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,300	11,500	No	8,532	11,500	No	3,191	Yes	Yes	2,920	4,152	4,600	No	1,232	2,100	No	35.7	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,811	11,500	No	5,219	11,500	No	1,855	No	Yes	1,924	2,332	4,600	No	408	2,100	No	21.9	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,554	6,900	No	1,652	No	No	2,387	3,902	4,600	No	1,515	2,100	No	32.2	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,987	6,900	No	624	No	No	902	1,362	4,600	No	460	2,100	No	12.9	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,980	7,050	No	6,239	7,050	No	2,055	No	No	2,925	4,184	4,600	No	1,259	2,100	No	35.3	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	1,736	7,050	No	2,002	7,050	No	716	No	No	1,019	1,286	4,600	No	266	2,100	No	13.2	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project No Event Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,372	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,099	7,099	Left	2	Yes	45.0	1,199	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	5,611	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,252	6,252	Left	2	Yes	45.0	872	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,463	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,972	4,972	Right	1	Yes	45.0	733	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	2,702	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,010	3,010	Right	1	Yes	45.0	334	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information				Off-Ramp Volume Adjustment								Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period		PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,336	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	972	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
D2	I-280 NB	Mariposa off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	817	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	372	No											
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation								
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			P _{FD}	v ₁₂ (pcph)
Existing																						
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No													0.521				0.260	3,118
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No													0.559				0.260	2,579
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No													0.760				0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No													0.598				0.436	2,629
	I-280 NB	Mariposa off-ramp	Wkday Eve	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No													0.668				0.436	1,522
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No													0.760				0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,099	9,200	No	1,991	No	No	3,118	4,400	No	5,763	6,900	No	1,336	4,100	No	30.2	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend	6,252	9,200	No	1,836	No	No	2,579	4,400	No	5,280	6,900	No	972	4,100	No	25.5	C
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4,972	9,200	No	1,172	No	No	2,629	4,400	No	4,156	6,900	No	817	2,100	No	26.4	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend	3,010	9,200	No	744	No	No	1,522	4,400	No	2,638	6,900	No	372	2,100	No	16.9	B
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

EXISTING PLUS PROJECT – CONVENTION EVENT
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project With Convention Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		On-Ramp Data								
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
																						L _{A1}	L _{A2}	L _{Aeff}
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,139	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
M2	I-80 EB	Sterling/Bryant on-ramp	5	60.0	8,812	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,818	7,318	Right	1	No	45.0	1,114	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
M3	I-280 SB	Mariposa on-ramp	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,455	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480	
M4	I-280 SB	Penn/25th on-ramp	3	60.0	4,565	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	5,086	5,086	Right	1	No	45.0	1,130	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,269	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,241	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,621	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analys:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation					
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %			Flow Rate		L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	RV %	E _T	E _R	f _{HV}	f _P	v _p (pcph)	25-2	25-3	1	2		3
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No													0.597	0.597	5,717
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No													0.597	0.597	0
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No													0.585	0.125	912
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No													0.585	0.280	0
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No													0.591	0.591	2,387
	I-280 SB	Mariposa on-ramp	Wkday Eve	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend w/	No													0.591	0.591	0
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No													0.587	0.587	2,987
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend w/	No													0.587	0.587	0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,818	6,900	Yes	2,832	Yes	No	5,849	7,118	4,600	Yes	1,269	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,318	11,500	No	8,559	11,500	No	3,203	Yes	Yes	2,927	4,168	4,600	No	1,241	2,100	No	35.8	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,660	6,900	No	1,652	No	No	2,387	4,008	4,600	No	1,621	2,100	No	33.0	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	5,086	7,050	No	6,345	7,050	No	2,099	No	No	2,987	4,246	4,600	No	1,259	2,100	No	35.8	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project With Convention Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,371	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,098	7,098	Left	2	Yes	45.0	1,198	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,466	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,976	4,976	Right	1	Yes	45.0	736	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information				Off-Ramp Volume Adjustment								Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period		PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,335	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
D2	I-280 NB	Mariposa off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	820	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No													0.521			0.260	3,117
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No													0.760			0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No													0.598			0.436	2,632
	I-280 NB	Mariposa off-ramp	Wkday Eve	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No													0.760			0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,098	9,200	No	1,991	No	No	3,117	4,400	No	5,763	6,900	No	1,335	4,100	No	30.2	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4,976	9,200	No	1,172	No	No	2,632	4,400	No	4,156	6,900	No	820	2,100	No	26.4	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

EXISTING PLUS PROJECT – BASKETBALL GAME
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project With Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		On-Ramp Data									
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,121	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	3	60.0	6,325	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,047	7,047	Left	1	No	60.0	976	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	3	60.0	4,247	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,732	4,732	Left	1	No	60.0	1,058	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	653	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	3	60.0	7,900	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,802	8,802	Left	1	No	60.0	952	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	3	60.0	6,426	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,159	7,159	Left	1	No	60.0	859	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	3	60.0	4,543	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,061	5,061	Left	1	No	60.0	1,122	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	3	60.0	5,274	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,876	5,876	Left	1	No	60.0	945	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	5	60.0	8,794	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,798	7,298	Right	1	No	45.0	1,105	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5	60.0	7,301	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,134	5,816	Right	1	No	45.0	697	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	5	60.0	5,305	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,911	4,492	Right	1	No	45.0	633	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend	5	60.0	5,671	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,318	4,802	Right	1	No	45.0	360	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	5	60.0	8,852	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,862	7,362	Right	1	No	45.0	1,057	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	5	60.0	7,285	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,117	5,803	Right	1	No	45.0	713	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	5	60.0	5,665	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,312	4,797	Right	1	No	45.0	969	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	5	60.0	6,219	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,929	5,058	Right	1	No	45.0	641	250	0	250
M3	I-280 SB	Mariposa on-ramp	Wkday PM	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,348	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve	3	60.0	3,023	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,368	3,368	Right	1	No	45.0	891	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late	3	60.0	1,655	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,844	1,844	Right	1	No	45.0	1,056	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	364	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3	60.0	3,605	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,017	4,017	Right	1	No	45.0	1,389	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3	60.0	3,158	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,519	3,519	Right	1	No	45.0	963	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late w/	3	60.0	2,102	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,342	2,342	Right	1	No	45.0	1,317	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend w/	3	60.0	1,772	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,974	1,974	Right	1	No	45.0	386	480	0	480
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	3	60.0	4,458	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,967	4,967	Right	1	No	45.0	1,130	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve	3	60.0	3,566	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	3,973	3,973	Right	1	No	45.0	755	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late	3	60.0	2,532	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,821	2,821	Right	1	No	45.0	615	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend	3	60.0	1,509	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,681	1,681	Right	1	No	45.0	239	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	3	60.0	4,600	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	5,125	5,125	Right	1	No	45.0	1,139	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	3	60.0	3,743	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,170	4,170	Right	1	No	45.0	746	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	3	60.0	3,196	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	3,560	3,560	Right	1	No	45.0	908	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend w/	3	60.0	1,963	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,187	2,187	Right	1	No	45.0	483	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,249	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,087	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,179	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	728	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,061	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	957	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,251	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,053	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,231	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	776	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	706	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	401	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,177	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	794	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,079	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	714	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,502	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	993	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,177	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	406	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,548	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,073	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,467	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	430	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	841	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	685	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,269	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	831	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,011	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	538	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
 Analyst:

General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	Bus %	RV %	E _T	E _R		f _{HV}	f _p	25-2	25-3	1		2
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No												0.597	0.597	5,717	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No												0.597	0.597	4,713	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No												0.597	0.597	3,165	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No												0.597	0.597	3,739	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No												0.597	0.597	5,886	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No												0.597	0.597	4,788	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No												0.597	0.597	3,385	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No												0.597	0.597	3,929	
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No												0.585	0.126	919	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No												0.585	0.183	1,063	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No												0.585	0.192	860	
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No												0.585	0.230	1,103	
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No												0.585	0.133	976	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No												0.585	0.180	1,047	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No												0.585	0.145	695	
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No												0.585	0.191	964	
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No												0.591	0.591	2,387	
	I-280 SB	Mariposa on-ramp	Wkday Eve	No												0.591	0.591	1,990	
	I-280 SB	Mariposa on-ramp	Wkday Late	No												0.591	0.591	1,090	
	I-280 SB	Mariposa on-ramp	Wkend	No												0.591	0.591	902	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No												0.591	0.591	2,374	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No												0.591	0.591	2,079	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No												0.591	0.591	1,384	
	I-280 SB	Mariposa on-ramp	Wkend w/	No												0.591	0.591	1,167	
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No												0.587	0.587	2,917	
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No												0.587	0.587	2,333	
	I-280 SB	Penn/25th on-ramp	Wkday Late	No												0.587	0.587	1,657	
	I-280 SB	Penn/25th on-ramp	Wkend	No												0.587	0.587	987	
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No												0.587	0.587	3,010	
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No												0.587	0.587	2,449	
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No												0.587	0.587	2,091	
	I-280 SB	Penn/25th on-ramp	Wkend w/	No												0.587	0.587	1,284	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,798	6,900	Yes	2,832	Yes	No	5,849	7,098	4,600	Yes	1,249	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	7,047	6,900	Yes	8,134	6,900	Yes	2,334	No	No	4,713	5,800	4,600	Yes	1,087	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	4,732	6,900	No	5,911	6,900	No	1,567	No	No	3,165	4,343	4,600	No	1,179	2,200	No	34.4	D
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,318	6,900	No	1,852	No	No	3,739	4,466	4,600	No	728	2,200	No	35.6	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	8,802	6,900	Yes	9,862	6,900	Yes	2,916	Yes	No	6,102	7,162	4,600	Yes	1,061	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	7,159	6,900	Yes	8,117	6,900	Yes	2,372	No	No	4,788	5,745	4,600	Yes	957	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	5,061	6,900	No	6,312	6,900	No	1,676	No	No	3,385	4,635	4,600	Yes	1,251	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	5,876	6,900	No	6,929	6,900	Yes	1,946	No	No	3,929	4,982	4,600	Yes	1,053	2,200	No	-	F
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,298	11,500	No	8,529	11,500	No	3,190	Yes	Yes	2,919	4,150	4,600	No	1,231	2,100	No	35.7
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	5,816	11,500	No	6,592	11,500	No	2,377	No	Yes	2,326	3,103	4,600	No	776	2,100	No	27.8	C
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	4,492	11,500	No	5,198	11,500	No	1,816	No	Yes	1,797	2,503	4,600	No	706	2,100	No	23.1	C
I-80 EB		Sterling/Bryant on-ramp	Wkend	4,802	11,500	No	5,202	11,500	No	1,849	No	Yes	1,921	2,321	4,600	No	401	2,100	No	21.8	C
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	7,362	11,500	No	8,540	11,500	No	3,193	Yes	Yes	2,945	4,122	4,600	No	1,177	2,100	No	35.5	E
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	5,803	11,500	No	6,597	11,500	No	2,378	No	Yes	2,321	3,115	4,600	No	794	2,100	No	27.8	C
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	4,797	11,500	No	5,876	11,500	No	2,051	No	Yes	1,919	2,998	4,600	No	1,079	2,100	No	26.8	C
I-80 EB		Sterling/Bryant on-ramp	Wkend w/	5,058	11,500	No	5,772	11,500	No	2,047	No	Yes	2,023	2,737	4,600	No	714	2,100	No	24.9	C
M3		I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,541	6,900	No	1,652	No	No	2,387	3,888	4,600	No	1,502	2,100	No	32.1
	I-280 SB	Mariposa on-ramp	Wkday Eve	3,368	6,900	No	4,361	6,900	No	1,378	No	No	1,990	2,983	4,600	No	993	2,100	No	25.3	C
	I-280 SB	Mariposa on-ramp	Wkday Late	1,844	6,900	No	3,021	6,900	No	754	No	No	1,090	2,266	4,600	No	1,177	2,100	No	19.6	B
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,932	6,900	No	624	No	No	902	1,308	4,600	No	406	2,100	No	12.5	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	4,017	6,900	No	5,564	6,900	No	1,643	No	No	2,374	3,921	4,600	No	1,548	2,100	No	32.3	D
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3,519	6,900	No	4,592	6,900	No	1,439	No	No	2,079	3,152	4,600	No	1,073	2,100	No	26.6	C
	I-280 SB	Mariposa on-ramp	Wkday Late w/	2,342	6,900	No	3,809	6,900	No	958	No	No	1,384	2,851	4,600	No	1,467	2,100	No	24.0	C
	I-280 SB	Mariposa on-ramp	Wkend w/	1,974	7,050	No	2,404	7,050	No	808	No	No	1,167	1,597	4,600	No	430	2,100	No	14.7	B
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,967	7,050	No	6,226	7,050	No	2,050	No	No	2,917	4,176	4,600	No	1,259	2,100	No	35.3
I-280 SB		Penn/25th on-ramp	Wkday Eve	3,973	7,050	No	4,814	7,050	No	1,640	No	No	2,333	3,174	4,600	No	841	2,100	No	27.7	C
I-280 SB		Penn/25th on-ramp	Wkday Late	2,821	7,050	No	3,507	7,050	No	1,164	No	No	1,657	2,342	4,600	No	685	2,100	No	21.2	C
I-280 SB		Penn/25th on-ramp	Wkend	1,681	7,050	No	1,948	7,050	No	694	No	No	987	1,254	4,600	No	266	2,100	No	12.9	B
I-280 SB		Penn/25th on-ramp	Wkday PM w/	5,125	7,050	No	6,394	7,050	No	2,115	No	No	3,010	4,279	4,600	No	1,269	2,100	No	36.1	E
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	4,170	7,050	No	5,001	7,050	No	1,721	No	No	2,449	3,280	4,600	No	831	2,100	No	28.5	D
I-280 SB		Penn/25th on-ramp	Wkday Late w/	3,560	7,050	No	4,571	7,050	No	1,469	No	No	2,091	3,102	4,600	No	1,011	2,100	No	27.0	C
I-280 SB		Penn/25th on-ramp	Wkend w/	2,187	7,050	No	2,725	7,050	No	903	No	No	1,284	1,822	4,600	No	538	2,100	No	17.2	B

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Plus Project With Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment										Effective		Off-Ramp Data							
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,452	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,188	7,188	Left	2	Yes	45.0	1,279	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	6,826	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,605	7,605	Left	2	Yes	45.0	1,802	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	6,157	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,859	6,859	Left	2	Yes	45.0	388	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	6,385	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,114	7,114	Left	2	Yes	45.0	1,646	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	6,544	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,291	7,291	Left	2	Yes	45.0	1,371	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	6,901	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,688	7,688	Left	2	Yes	45.0	1,877	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	6,217	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,926	6,926	Left	2	Yes	45.0	448	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	6,550	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,298	7,298	Left	2	Yes	45.0	1,811	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,594	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,118	5,118	Right	1	Yes	45.0	864	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	5,188	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,780	5,780	Right	1	Yes	45.0	1,588	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	1,917	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,136	2,136	Right	1	Yes	45.0	217	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	3,591	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,001	4,001	Right	1	Yes	45.0	1,223	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	4,666	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,198	5,198	Right	1	Yes	45.0	1,417	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	5,926	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,602	6,602	Right	1	Yes	45.0	1,907	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	1,925	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,145	2,145	Right	1	Yes	45.0	227	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	3,701	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,123	4,123	Right	1	Yes	45.0	1,314	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

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Analy:

General Information			Off-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,425	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,008	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	433	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,834	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,527	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,091	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	499	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,018	No												
D2	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	963	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,769	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	242	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,363	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,579	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,125	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	253	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,464	No												

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

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General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No															0.515	0.260	3,216
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No															0.478	0.260	3,809
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No															0.569	0.260	2,314
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No															0.498	0.260	3,527
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No															0.507	0.260	3,329
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No															0.472	0.260	3,901
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No															0.564	0.260	2,387
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No															0.485	0.260	3,730
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No															0.588	0.436	2,774
	I-280 NB	Mariposa off-ramp	Wkday Eve	No															0.534	0.436	3,518
	I-280 NB	Mariposa off-ramp	Wkday Late	No															0.695	0.436	1,068
	I-280 NB	Mariposa off-ramp	Wkend	No															0.597	0.436	2,513
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No															0.557	0.436	3,157
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No															0.497	0.436	4,077
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No															0.695	0.436	1,078
	I-280 NB	Mariposa off-ramp	Wkend w/	No															0.590	0.436	2,623

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,188	9,200	No	1,986	No	No	3,216	4,400	No	5,763	6,900	No	1,425	4,100	No	31.0	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	7,605	9,200	No	1,898	No	No	3,809	4,400	No	5,597	6,900	No	2,008	4,100	No	36.1	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	6,859	9,200	No	2,273	No	Yes	2,744	4,400	No	6,427	6,900	No	433	4,100	No	26.9	C
	I-80 WB	Fifth/Harrison off-ramp	Wkend	7,114	9,200	No	1,793	No	No	3,527	4,400	No	5,280	6,900	No	1,834	4,100	No	33.7	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	7,291	9,200	No	1,981	No	No	3,329	4,400	No	5,763	6,900	No	1,527	4,100	No	32.0	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	7,688	9,200	No	1,894	No	No	3,901	4,400	No	5,597	6,900	No	2,091	4,100	No	36.9	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	6,926	9,200	No	2,269	No	Yes	2,770	4,400	No	6,427	6,900	No	499	4,100	No	27.2	C
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	7,298	9,200	No	1,784	No	No	3,730	4,400	No	5,280	6,900	No	2,018	4,100	No	35.4	E
D2	I-280 NB	Mariposa off-ramp	Wkday PM	5,118	9,200	No	1,172	No	No	2,774	4,400	No	4,156	6,900	No	963	2,100	No	27.7	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	5,780	9,200	No	1,131	No	No	3,518	4,400	No	4,011	6,900	No	1,769	2,100	No	34.1	D
	I-280 NB	Mariposa off-ramp	Wkday Late	2,136	9,200	No	534	No	No	1,068	4,400	No	1,894	6,900	No	242	2,100	No	13.0	B
	I-280 NB	Mariposa off-ramp	Wkend	4,001	9,200	No	744	No	No	2,513	4,400	No	2,638	6,900	No	1,363	2,100	No	25.4	C
	I-280 NB	Mariposa off-ramp	Wkday PM w/	5,198	9,200	No	1,021	No	No	3,157	4,400	No	3,620	6,900	No	1,579	2,100	No	31.0	D
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	6,602	9,200	No	1,263	No	No	4,077	4,400	No	4,477	6,900	No	2,125	2,100	Yes	-	F
	I-280 NB	Mariposa off-ramp	Wkday Late w/	2,145	9,200	No	534	No	No	1,078	4,400	No	1,892	6,900	No	253	2,100	No	13.1	B
	I-280 NB	Mariposa off-ramp	Wkend w/	4,123	9,200	No	750	No	No	2,623	4,400	No	2,659	6,900	No	1,464	2,100	No	26.4	C

2040 CUMULATIVE WITH PROJECT – NO EVENT
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu No Event Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		On-Ramp Data								
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	3	60.0	7,758	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,643	8,643	Left	1	No	60.0	705	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend	3	60.0	5,425	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,044	6,044	Left	1	No	60.0	477	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	5	60.0	8,463	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,429	6,929	Right	1	No	45.0	1,757	250	0
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
I-80 EB		Sterling/Bryant on-ramp	Wkday Late	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
I-80 EB		Sterling/Bryant on-ramp	Wkend	5	60.0	5,902	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,575	4,800	Right	1	No	45.0	644	250	0	250
I-80 EB		Sterling/Bryant on-ramp	Wkday PM w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
I-80 EB		Sterling/Bryant on-ramp	Wkday Eve w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
I-80 EB		Sterling/Bryant on-ramp	Wkday Late w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
M3	I-280 SB	Mariposa on-ramp	Wkday PM	3	60.0	4,273	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,761	4,761	Right	1	No	45.0	1,846	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend	3	60.0	1,602	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,785	1,785	Right	1	No	45.0	515	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480
	M4	I-280 SB	Penn/25th on-ramp	Wkday PM	3	60.0	5,477	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	6,102	6,102	Right	1	No	45.0	1,517	350	0
I-280 SB		Penn/25th on-ramp	Wkday Eve	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
I-280 SB		Penn/25th on-ramp	Wkday Late	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
I-280 SB		Penn/25th on-ramp	Wkend	3	60.0	1,880	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,095	2,095	Right	1	No	45.0	323	350	0	350
I-280 SB		Penn/25th on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
I-280 SB		Penn/25th on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
I-280 SB		Penn/25th on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
I-280 SB		Penn/25th on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	785	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	531	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
M2	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,958	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	718	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
M3	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,057	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	574	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
M4	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,690	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	360	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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 Analyst

General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	Bus %	RV %	E _T	E _R		f _{HV}	f _P	25-2	25-3	1		2
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No												0.597	0.597	5,780	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No												0.597	0.597	4,042	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No												0.597	0.597	0	
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No												0.585	0.035	243	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No												0.585	0.190	912	
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No												0.585	0.280	0	
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No												0.591	0.591	2,813	
	I-280 SB	Mariposa on-ramp	Wkday Eve	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend	No												0.591	0.591	1,055	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend w/	No												0.591	0.591	0	
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No												0.587	0.587	3,584	
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend	No												0.587	0.587	1,230	
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend w/	No												0.587	0.587	0	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,643	6,900	Yes	9,429	6,900	Yes	2,863	Yes	No	5,943	6,729	4,600	Yes	785	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	6,044	6,900	No	6,575	6,900	No	2,002	No	No	4,042	4,573	4,600	No	531	2,200	No	36.5	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	6,929	11,500	No	8,886	11,500	No	3,343	Yes	Yes	2,772	4,729	4,600	Yes	1,958	2,100	No	-	F
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,800	11,500	No	5,517	11,500	No	1,944	No	Yes	1,920	2,637	4,600	No	718	2,100	No	24.1	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,761	6,900	No	6,817	6,900	No	1,947	No	No	2,813	4,870	4,600	Yes	2,057	2,100	No	-	F
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	1,785	6,900	No	2,359	6,900	No	730	No	No	1,055	1,629	4,600	No	574	2,100	No	14.9	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	6,102	7,050	No	7,792	7,050	Yes	2,518	No	No	3,584	5,274	4,600	Yes	1,690	2,100	No	-	F
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	2,095	7,050	No	2,455	7,050	No	864	No	No	1,230	1,590	4,600	No	360	2,100	No	15.5	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu No Event Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	7,340	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,178	8,178	Left	2	Yes	45.0	2,167	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	6,295	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,014	7,014	Left	2	Yes	45.0	1,556	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	5,468	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,092	6,092	Right	1	Yes	45.0	1,285	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	2,909	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,241	3,241	Right	1	Yes	45.0	541	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information			Off-Ramp Volume Adjustment									Adjacent Upstream Ramp Data											
Freeway/ Direction	Off-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)
Existing																							
D1	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,414	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,734	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
D2	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,432	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	603	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation								
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			P _{FD}	v ₁₂ (pcph)
																5	6	7				
Existing																						
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No															0.444		0.260	4,304
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No															0.760		0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No															0.760		0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No															0.505		0.260	3,417
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No															0.760		0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No															0.760		0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No															0.760		0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No															0.760		0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No															0.542		0.436	3,464
	I-280 NB	Mariposa off-ramp	Wkday Eve	No															0.760		0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No															0.760		0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No															0.651		0.436	1,753
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No															0.760		0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No															0.760		0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No															0.760		0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No															0.760		0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results						
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service
Existing																			
D1	I-80 WB	Fifth/Harrison off-ramp	8,178	9,200	No	1,937	No	No	4,304	4,400	No	5,763	6,900	No	2,414	4,100	No	40.4	E
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	7,014	9,200	No	1,798	No	No	3,417	4,400	No	5,280	6,900	No	1,734	4,100	No	32.7	D
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	6,092	9,200	No	1,314	No	No	3,464	4,400	No	4,660	6,900	No	1,432	2,100	No	33.6	D
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	3,241	9,200	No	744	No	No	1,753	4,400	No	2,638	6,900	No	603	2,100	No	18.9	B
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

2040 CUMULATIVE WITH PROJECT – CONVENTION EVENT
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu With Convention Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		On-Ramp Data							
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)		
Existing																							
M1	I-80 EB	Fifth/Bryant on-ramp	3	60.0	7,758	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,643	8,643	Left	1	No	60.0	721	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	5	60.0	8,479	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,447	6,947	Right	1	No	45.0	1,766	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
M3	I-280 SB	Mariposa on-ramp	3	60.0	4,273	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,761	4,761	Right	1	No	45.0	1,941	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480
M4	I-280 SB	Penn/25th on-ramp	3	60.0	5,572	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	6,208	6,208	Right	1	No	45.0	1,517	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	803	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,968	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,163	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,690	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
 Analyst:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation					
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %			Flow Rate		L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	RV %	E _T	E _R	f _{HV}	f _P	v _p (pcph)	25-2	25-3	1	2		3
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No													0.597	0.597	5,780
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No													0.597	0.597	0
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No													0.585	0.034	235
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No													0.585	0.280	0
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No													0.591	0.591	2,813
	I-280 SB	Mariposa on-ramp	Wkday Eve	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend w/	No													0.591	0.591	0
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No													0.587	0.587	3,646
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend w/	No													0.587	0.587	0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analys:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,643	6,900	Yes	9,447	6,900	Yes	2,863	Yes	No	5,943	6,747	4,600	Yes	803	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	6,947	11,500	No	8,914	11,500	No	3,356	Yes	Yes	2,779	4,746	4,600	Yes	1,968	2,100	No	-	F
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,761	6,900	No	6,923	6,900	Yes	1,947	No	No	2,813	4,976	4,600	Yes	2,163	2,100	Yes	-	F
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	6,208	7,050	No	7,898	7,050	Yes	2,562	No	No	3,646	5,336	4,600	Yes	1,690	2,100	No	-	F
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu With Convention Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment							Effective		Off-Ramp Data										
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	7,338	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,175	8,175	Left	2	Yes	45.0	2,165	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	5,472	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,097	6,097	Right	1	Yes	45.0	1,289	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Off-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,412	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
D2	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,436	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation								
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			P _{FD}	v ₁₂ (pcph)
																5	6	7				
Existing																						
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No													0.445				0.260	4,302
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No													0.760				0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No													0.760				0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No													0.542				0.436	3,468
	I-280 NB	Mariposa off-ramp	Wkday Eve	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No													0.760				0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No													0.760				0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	8,175	9,200	No	1,937	No	No	4,302	4,400	No	5,763	6,900	No	2,412	4,100	No	40.3	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	6,097	9,200	No	1,314	No	No	3,468	4,400	No	4,660	6,900	No	1,436	2,100	No	33.6	D
	I-280 NB	Mariposa off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

2040 CUMULATIVE WITH PROJECT – BASKETBALL GAME
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu With Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment							Effective		On-Ramp Data								
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)		
Existing																							
M1	I-80 EB	Fifth/Bryant on-ramp	3	60.0	7,758	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,643	8,643	Left	1	No	60.0	703	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	5,425	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,044	6,044	Left	1	No	60.0	466	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	5	60.0	8,461	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,427	6,927	Right	1	No	45.0	1,756	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	5,891	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,563	4,791	Right	1	No	45.0	638	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
M3	I-280 SB	Mariposa on-ramp	3	60.0	4,273	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,761	4,761	Right	1	No	45.0	1,834	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	1,602	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,785	1,785	Right	1	No	45.0	466	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480
M4	I-280 SB	Penn/25th on-ramp	3	60.0	5,465	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	6,089	6,089	Right	1	No	45.0	1,517	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	1,831	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,040	2,040	Right	1	No	45.0	323	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _P (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	783	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	519	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Fifth/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
M2	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,956	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	711	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 EB	Sterling/Bryant on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
M3	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,043	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	519	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 SB	Mariposa on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
M4	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,690	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	360	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												
	I-280 SB	Penn/25th on-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No												

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
 Analyst:

General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	Bus %	RV %	E _T	E _R		f _{HV}	f _P	25-2	25-3	1		2
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No												0.597	0.597	5,780	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No												0.597	0.597	4,042	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No												0.597	0.597	0	
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No												0.585	0.035	244	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No												0.585	0.191	915	
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No												0.585	0.280	0	
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No												0.591	0.591	2,813	
	I-280 SB	Mariposa on-ramp	Wkday Eve	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend	No												0.591	0.591	1,055	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend w/	No												0.591	0.591	0	
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No												0.587	0.587	3,576	
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend	No												0.587	0.587	1,198	
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend w/	No												0.587	0.587	0	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,643	6,900	Yes	9,427	6,900	Yes	2,863	Yes	No	5,943	6,727	4,600	Yes	783	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	6,044	6,900	No	6,563	6,900	No	2,002	No	No	4,042	4,561	4,600	No	519	2,200	No	36.4	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	6,927	11,500	No	8,883	11,500	No	3,341	Yes	Yes	2,771	4,727	4,600	Yes	1,956	2,100	No	-	F
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,791	11,500	No	5,502	11,500	No	1,938	No	Yes	1,916	2,627	4,600	No	711	2,100	No	24.1	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,761	6,900	No	6,804	6,900	No	1,947	No	No	2,813	4,857	4,600	Yes	2,043	2,100	No	-	F
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	1,785	6,900	No	2,304	6,900	No	730	No	No	1,055	1,574	4,600	No	519	2,100	No	14.5	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	6,089	7,050	No	7,779	7,050	Yes	2,513	No	No	3,576	5,266	4,600	Yes	1,690	2,100	No	-	F
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	2,040	7,050	No	2,400	7,050	No	842	No	No	1,198	1,558	4,600	No	360	2,100	No	15.3	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year 2040 Cumu With Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment							Effective		Off-Ramp Data										
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	7,419	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,266	8,266	Left	2	Yes	45.0	2,246	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	7,069	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,876	7,876	Left	2	Yes	45.0	2,330	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	5,599	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,238	6,238	Right	1	Yes	45.0	1,416	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	3,798	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,231	4,231	Right	1	Yes	45.0	1,430	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information			Off-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,502	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,596	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
D2	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,578	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,593	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No															0.438	0.260	4,401
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No															0.444	0.260	4,366
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No															0.760	0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No															0.531	0.436	3,610
	I-280 NB	Mariposa off-ramp	Wkday Eve	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No															0.581	0.436	2,743
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No															0.760	0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks									Results								
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	8,266	9,200	No	1,932	No	No	4,401	4,400	Yes	5,763	6,900	No	2,502	4,100	No	-	F
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend	7,876	9,200	No	1,755	No	No	4,366	4,400	No	5,280	6,900	No	2,596	4,100	No	40.9	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	6,238	9,200	No	1,314	No	No	3,610	4,400	No	4,660	6,900	No	1,578	2,100	No	34.8	D
	I-280 NB	Mariposa off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend	4,231	9,200	No	744	No	No	2,743	4,400	No	2,638	6,900	No	1,593	2,100	No	27.4	C
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

EXISTING PLUS PROJECT – BASKETBALL GAME – No TSP
MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year No TSP - PP with Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		On-Ramp Data								
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,123	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	3	60.0	6,325	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,047	7,047	Left	1	No	60.0	1,004	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	3	60.0	4,247	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,732	4,732	Left	1	No	60.0	1,226	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	678	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	5	60.0	8,796	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,800	7,300	Right	1	No	45.0	1,106	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5	60.0	7,329	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,166	5,838	Right	1	No	45.0	711	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	5	60.0	5,473	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,098	4,634	Right	1	No	45.0	717	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend	5	60.0	5,696	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,346	4,823	Right	1	No	45.0	373	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250
M3	I-280 SB	Mariposa on-ramp	Wkday PM	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,351	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve	3	60.0	3,023	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	3,368	3,368	Right	1	No	45.0	931	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late	3	60.0	1,655	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,844	1,844	Right	1	No	45.0	1,176	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	400	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480
	I-280 SB	Mariposa on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	3	60.0	4,461	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,970	4,970	Right	1	No	45.0	1,130	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve	3	60.0	3,606	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,018	4,018	Right	1	No	45.0	755	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late	3	60.0	2,652	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	2,955	2,955	Right	1	No	45.0	655	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend	3	60.0	1,545	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,721	1,721	Right	1	No	45.0	239	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350
	I-280 SB	Penn/25th on-ramp	Wkend w/	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,251	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,119	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,366	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	756	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,232	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	792	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	799	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	415	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,505	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,038	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,310	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	445	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	841	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	730	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analys:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation					
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %			Flow Rate		L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	RV %	E _T	E _R	f _{HV}	f _P	v _p (pcph)	25-2	25-3	1	2		3
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No													0.597	0.597	5,717
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No													0.597	0.597	4,713
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No													0.597	0.597	3,165
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No													0.597	0.597	3,739
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No													0.597	0.597	0
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No													0.585	0.126	918
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No													0.585	0.181	1,055
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No													0.585	0.180	833
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No													0.585	0.228	1,099
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No													0.585	0.280	0
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No													0.591	0.591	2,387
	I-280 SB	Mariposa on-ramp	Wkday Eve	No													0.591	0.591	1,990
	I-280 SB	Mariposa on-ramp	Wkday Late	No													0.591	0.591	1,090
	I-280 SB	Mariposa on-ramp	Wkend	No													0.591	0.591	902
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend w/	No													0.591	0.591	0
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No													0.587	0.587	2,919
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No													0.587	0.587	2,360
	I-280 SB	Penn/25th on-ramp	Wkday Late	No													0.587	0.587	1,735
	I-280 SB	Penn/25th on-ramp	Wkend	No													0.587	0.587	1,011
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend w/	No													0.587	0.587	0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,800	6,900	Yes	2,832	Yes	No	5,849	7,100	4,600	Yes	1,251	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	7,047	6,900	Yes	8,166	6,900	Yes	2,334	No	No	4,713	5,831	4,600	Yes	1,119	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	4,732	6,900	No	6,098	6,900	No	1,567	No	No	3,165	4,530	4,600	No	1,366	2,200	No	35.8	E
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,346	6,900	No	1,852	No	No	3,739	4,494	4,600	No	756	2,200	No	35.8	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,300	11,500	No	8,532	11,500	No	3,191	Yes	Yes	2,920	4,152	4,600	No	1,232	2,100	No	35.7	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	5,838	11,500	No	6,631	11,500	No	2,392	No	Yes	2,335	3,128	4,600	No	792	2,100	No	27.9	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	4,634	11,500	No	5,434	11,500	No	1,900	No	Yes	1,854	2,653	4,600	No	799	2,100	No	24.2	C
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,823	11,500	No	5,238	11,500	No	1,862	No	Yes	1,929	2,344	4,600	No	415	2,100	No	22.0	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,544	6,900	No	1,652	No	No	2,387	3,892	4,600	No	1,505	2,100	No	32.1	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	3,368	6,900	No	4,406	6,900	No	1,378	No	No	1,990	3,028	4,600	No	1,038	2,100	No	25.6	C
	I-280 SB	Mariposa on-ramp	Wkday Late	1,844	6,900	No	3,154	6,900	No	754	No	No	1,090	2,400	4,600	No	1,310	2,100	No	20.6	C
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,972	6,900	No	624	No	No	902	1,347	4,600	No	445	2,100	No	12.8	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,970	7,050	No	6,229	7,050	No	2,051	No	No	2,919	4,178	4,600	No	1,259	2,100	No	35.3	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	4,018	7,050	No	4,859	7,050	No	1,658	No	No	2,360	3,201	4,600	No	841	2,100	No	27.9	C
	I-280 SB	Penn/25th on-ramp	Wkday Late	2,955	7,050	No	3,685	7,050	No	1,220	No	No	1,735	2,465	4,600	No	730	2,100	No	22.2	C
	I-280 SB	Penn/25th on-ramp	Wkend	1,721	7,050	No	1,987	7,050	No	710	No	No	1,011	1,277	4,600	No	266	2,100	No	13.1	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year No TSP - PP with Basketball Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,468	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,207	7,207	Left	2	Yes	45.0	1,295	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	7,046	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,850	7,850	Left	2	Yes	45.0	2,022	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	6,205	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,914	6,914	Left	2	Yes	45.0	437	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	6,621	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,376	7,376	Left	2	Yes	45.0	1,881	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,605	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,130	5,130	Right	1	Yes	45.0	875	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	5,331	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,939	5,939	Right	1	Yes	45.0	1,731	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	1,961	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,184	2,184	Right	1	Yes	45.0	261	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend	4	60	3,736	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,162	4,162	Right	1	Yes	45.0	1,368	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Off-Ramp Volume Adjustment								Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period		PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,443	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,253	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	487	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	2,096	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
D2	I-280 NB	Mariposa off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	975	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,929	No											
	I-280 NB	Mariposa off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	291	No											
	I-280 NB	Mariposa off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,524	No											
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No															0.513	0.260	3,236
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No															0.460	0.260	4,079
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No															0.565	0.260	2,374
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No															0.479	0.260	3,816
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No															0.760	0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No															0.760	0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No															0.587	0.436	2,787
	I-280 NB	Mariposa off-ramp	Wkday Eve	No															0.523	0.436	3,677
	I-280 NB	Mariposa off-ramp	Wkday Late	No															0.692	0.436	1,116
	I-280 NB	Mariposa off-ramp	Wkend	No															0.586	0.436	2,675
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No															0.760	0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No															0.760	0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,207	9,200	No	1,985	No	No	3,236	4,400	No	5,763	6,900	No	1,443	4,100	No	31.2	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	7,850	9,200	No	1,885	No	No	4,079	4,400	No	5,597	6,900	No	2,253	4,100	No	38.4	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	6,914	9,200	No	2,270	No	Yes	2,765	4,400	No	6,427	6,900	No	487	4,100	No	27.1	C
	I-80 WB	Fifth/Harrison off-ramp	Wkend	7,376	9,200	No	1,780	No	No	3,816	4,400	No	5,280	6,900	No	2,096	4,100	No	36.2	E
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	5,130	9,200	No	1,172	No	No	2,787	4,400	No	4,156	6,900	No	975	2,100	No	27.8	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	5,939	9,200	No	1,131	No	No	3,677	4,400	No	4,011	6,900	No	1,929	2,100	No	35.4	E
	I-280 NB	Mariposa off-ramp	Wkday Late	2,184	9,200	No	534	No	No	1,116	4,400	No	1,894	6,900	No	291	2,100	No	13.4	B
	I-280 NB	Mariposa off-ramp	Wkend	4,162	9,200	No	744	No	No	2,675	4,400	No	2,638	6,900	No	1,524	2,100	No	26.8	C
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

APPENDIX TR-6
PROPOSED PROJECT TRAFFIC
CONTRIBUTIONS TO LOS E OR LOS F

INTERSECTION TRAFFIC VOLUMES
2015 PLUS PROJECT CONDITIONS

EXISTING PLUS PROJECT, NO EVENT

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, No Event, PM Peak Hour No Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1. King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project No Event, Saturday Evening, PM Peak Hour No Giants Game

No E → E or F→F intersections.

EXISTING PLUS PROJECT, CONVENTION

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Convention Event, PM Peak Hour No Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1. King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No

EXISTING PLUS PROJECT, WARRIORS GAME (NO GIANTS GAME)

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, PM Peak Hour, No Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1: King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Evening, No Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1: King / Third	EBL	0	808	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1581	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	561	0.0%	No
	SBL/L2	0	317	0.0%	No
	EBT/R	0	702	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Late Evening, No Giants Game

No E → E or F→F intersections.

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project Warriors Game, Saturday Evening, PM Peak Hour No Giants Game

No E → E or F→F intersections.

EXISTING PLUS PROJECT, WARRIORS GAME, WITH GIANTS GAME

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, PM Peak Hour with Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
2: King / Fourth	SBT	17	625	2.7%	No
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1494	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT/R	0	866	0.0%	No
	NWL/L2	99	1,110	8.9%	Yes
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	543	0.0%	No
	SBL/L2	0	356	0.0%	No
	EBT/R	0	746	0.0%	No
16: 7 th / Mississippi / 16 th	NBT	0	357	0.0%	No
	SBL	34	162	21.0%	Yes
	WBT	82	552	14.9%	Yes
	EBT/R	92	553	16.6%	Yes

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Evening with Giants Game

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	489	0.0%	No
	EBT/R	0	764	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Late Evening with Giants Game

No E → E or F→F intersections.

0% contribution at intersection 3; manually adjusted to F (from Synchro result of C) and so no critical movements operate at E or F.

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Saturday Evening with Giants Game

No E → E or F→F intersections.

EXISTING PLUS PROJECT, BASKETBALL GAME, NO TSP, NO GIANTS GAME

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, PM Peak Hour, No Giants Game, Without TSP

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1. King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
	NBL	0	86	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Evening, No Giants Game, Without TSP

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1. King / Third	EBL	0	808	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1581	0.0%	No
	NBL	0	74	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	561	0.0%	No
	SBL/L2	0	317	0.0%	No
	EBT/R	0	702	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project, Warriors Game, Weekday Late Evening, No Giants Game, Without TSP

No E → E or F→F intersections.

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2015 Plus Project Warriors Game, Saturday Evening, PM Peak Hour No Giants Game, Without TSP

No E → E or F→F intersections.

INTERSECTION TRAFFIC VOLUMES
2040 CUMULATIVE CONDITIONS

CUMULATIVE PLUS PROJECT

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2040 Plus Project, No Event, PM Peak Hour

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes	% Project Contribution	Impact ?
1: King / Third	NBR	21	481	4.4%	No
	EBL	0	924	0.0%	No
	WBT/R	0	984	0.0%	No
2: King / Fourth	SBT	17	625	2.7%	No
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT	0	810	0.0%	No
	SBR	0	340	0.0%	No
	NWL2 / L	19	1707	1.1%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT	0	565	0.0%	No
	NBR	0	140	0.0%	No
	SBT	6	956	0.6%	No
	EBT/R	0	1160	0.0%	No
6: Third / Channel	NBL	0	39	0.0%	No
	NBT/R	53	1563	3.4%	No
	SBL	0	58	0.0%	No
15: Owens / 16 th	NBL	0	138	0.0%	No
	EBL	0	137	0.0%	No
	WBT	164	831	19.7%	Yes
16: 7 th / Mississippi / 16 th	NBT	0	329	0.0%	No
	SBL	34	162	21.0%	Yes
	EBT/R	82	637	12.9%	Yes
18: Third / Mariposa	NBT/R	51	1257	4.1%	No
	EBL	0	205	0.0%	No
22: Third / Cesar Chavez	SBL	0	110	0.0%	No
	SBT/R	67	1200	5.6%	Yes
	EBL	10	227	4.4%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2040 Plus Project, Convention Event, PM Peak Hour

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes	% Project Contribution	Impact ?
1: King / Third	NBR	71	531	13.4%	Yes
	EBL	0	924	0.0%	No
	WBT/R	0	984	0.0%	No
2: King / Fourth	SBT	31	639	4.9%	No
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT	0	810	0.0%	No
	SBR	0	340	0.0%	No
	NWL2 / L	18	1705	1.1%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT	0	565	0.0%	No
	NBR	0	140	0.0%	No
	SBT	6	955	0.6%	No
	EBT/R	0	1160	0.0%	No
6: Third / Channel	NBL	0	39	0.0%	No
	NBT/R	146	1656	8.8%	Yes
	SBL	0	58	0.0%	No
13: Third / 16th	NBT/R	33	1130	2.9%	No
	SBT/R	0	1159	0.0%	No
	EBL	0	193	0.0%	No
15: Owens / 16th	NBL	0	138	0.0%	No
	EBL	0	137	0.0%	No
	WBT	193	860	22.4%	Yes
16: 7 th / Mississippi / 16th	NBT	0	329	0.0%	No
	SBL	45	173	26.0%	Yes
	EBT/R	58	613	9.5%	Yes
22: Third / Cesar Chavez	NBL	0	209	0.0%	No
	SBT/R	50	1182	4.2%	No
	EBL	7	224	3.1%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2040 Plus Project, Basketball Game, PM Peak Hour

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes	% Project Contribution	Impact ?
1: King / Third	NBR	18	477	3.8%	No
	EBL	0	924	0.0%	No
	WBT/R	0	984	0.0%	No
2: King / Fourth	SBT	50	657	7.6%	Yes
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT	0	810	0.0%	No
	SBR	0	340	0.0%	No
	NWL2 / L	99	1786	5.5%	Yes
5: Fifth / Bryant / I-80 EB on-ramp	NBT	0	565	0.0%	No
	NBR	0	140	0.0%	No
	SBT	33	982	3.4%	No
	EBT/R	0	1160	0.0%	No
6: Third / Channel	NBT/R	78	1588	4.9%	No
	SBL	12	70	17.1%	Yes
8: Seventh / Mission Bay Drive	NBT	39	984	4.0%	No
	SBL	109	420	26.0%	Yes
13: Third / 16 th	NBT/R	24	1121	2.1%	No
	SBT/R	1	1160	0.1%	No
	EBL	56	249	22.5%	Yes
15: Owens / 16 th	NBL	0	138	0.0%	No
	EBL	5	142	3.5%	No
	WBT	122	789	15.5%	Yes
16: 7 th / Mississippi / 16 th	NBT	0	329	0.0%	No
	SBL	14	142	9.9%	Yes
	EBT/R	92	647	14.2%	Yes
	WBT	82	581	14.1%	Yes
22: Third / Cesar Chavez	NBL	0	209	0.0%	No
	SBT/R	47	1179	4.0%	No
	EBL	10	227	4.4%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2040 Plus Project, No Event, Saturday Evening

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes	% Project Contribution	Impact ?
4: Fifth / Harrison / I-80 WB off-ramp	SBT/R	0	840	0.0%	No
	NWR	0	455	0.0%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: 2040 Plus Project, Basketball Game, Saturday Evening

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes	% Project Contribution	Impact ?
1: King / Third	WBL	289	651	44.4%	Yes
2: King / Fourth	EBL	0	348	0.0%	No
	EBT/R	0	1553	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT/R	0	840	0.0%	No
	NWL2 / L	807	1875	43.4%	Yes
5: Fifth / Bryant / I-80 EB on-ramp	SBT	269	985	27.3%	Yes
	EBL2 / L	16	524	3.1%	No
6: Third / Channel	NBT/R	94	608	15.5%	Yes
	SBL	130	164	79.3%	Yes
	EBL	0	50	0.0%	No
	EBT	980	993	98.7%	Yes
7: Fourth / Channel	SBL	238	400	59.5%	Yes
8: Seventh / Mission Bay Dr	SBL	795	966	82.3%	Yes
16: 7 th / Mississippi / 16th	NBT	0	120	0.0%	No
	SBL	77	111	69.4%	Yes
	EBT / R	160	430	37.2%	Yes

FREEWAY RAMP TRAFFIC VOLUMES

PERCENT CONTRIBUTIONS

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS – WITHOUT SF GIANTS GAME - WEEKDAY PM PEAK HOUR

#	Ramp Location	Existing plus Project		
		No Event	Convention Event	Basketball Game
1	I-80 EB On-ramp at Sterling	1.5%	2.2%	1.4%
2	I-80 EB On-ramp at Fifth/Bryant	3.0%	4.4%	2.9%
4	I-280 SB On-ramp at Pennsylvania	0.0%	0.0%	0.0%

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS – WITHOUT SF GIANTS GAME - WEEKDAY EVENING AND LATE EVENING PEAK HOURS

#	Ramp Location	Evening		Late Evening	
		Existing plus Project - Basketball Game		Existing plus Project - Basketball Game	
2	I-80 EB On-ramp at Fifth/Bryant	2.9%		-	
3	I-80 WB Off-ramp at Fifth/Harrison	41.4%		-	

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS – WITHOUT SF GIANTS GAME – SATURDAY EVENING PEAK HOUR

#	Ramp Location	Existing plus Project	
		No Event	Basketball Game
2	I-80 EB On-ramp at Fifth/Bryant	4.1%	2.5%

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS – WITH SF GIANTS GAME - WEEKDAY PM AND SATURDAY EVENING PEAK HOURS

#	Ramp Location	Weekday PM		Saturday Evening	
		Existing plus Project - Basketball Game		Existing plus Project - Basketball Game	
1	I-80 EB On-ramp at Sterling	2.4%			
2	I-80 EB On-ramp at Fifth/Bryant	3.4%		1.7%	
3	I-80 WB Off-ramp at Fifth/Harrison				44.6%
4	I-280 SB On-ramp at Pennsylvania	0.0%			

**FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS – WITH SF GIANTS GAME
- WEEKDAY EVENING AND LATE EVENING PEAK HOURS**

#	Ramp Location	Evening		Late Evening	
			Existing plus Project - Basketball Game		Existing plus Project - Basketball Game
2	I-80 EB On-ramp at Fifth/Bryant		3.3%		50.0%
3	I-80 WB Off-ramp at Fifth/Harrison		39.7%		
5	I-280 NB Off-ramp at Mariposa		47.7%		

FREEWAY RAMP LEVEL OF SERVICE – ALTERNATIVE NO PROJECT CONDITIONS – WITHOUT SF GIANTS GAME - WEEKDAY PM AND SATURDAY EVENING PEAK HOURS

#	Ramp Location	Weekday PM		Saturday Evening	
			Existing plus Project - Basketball Game		Existing plus Project - Basketball Game
1	I-80 EB On-ramp at Sterling		1.5%		
2	I-80 EB On-ramp at Fifth/Bryant		3.1%		0.3%
4	I-280 SB On-ramp at Pennsylvania		0.0%		

FREEWAY RAMP LEVEL OF SERVICE – ALTERNATIVE REDUCED-REDUCED PROJECT CONDITIONS – WITHOUT SF GIANTS GAME - WEEKDAY PM AND SATURDAY EVENING PEAK HOURS

#	Ramp Location	Weekday PM		Saturday Evening	
			Existing plus Project - Basketball Game		Existing plus Project - Basketball Game
1	I-80 EB On-ramp at Sterling		0.9%		
2	I-80 EB On-ramp at Fifth/Bryant		1.9%		2.5%
4	I-280 SB On-ramp at Pennsylvania		0.0%		

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS (NO TSP) – WITHOUT SF GIANTS GAME - WEEKDAY PM AND SATURDAY EVENING PEAK HOURS

#	Ramp Location	Weekday PM		Saturday Evening	
			Existing plus Project - Basketball Game		Existing plus Project - Basketball Game
1	I-80 EB On-ramp at Sterling		1.5%		
2	I-80 EB On-ramp at Fifth/Bryant		3.0%		6.1%
3	I-80 WB Off-ramp at Fifth/Harrison				55.4%
4	I-280 SB On-ramp at Pennsylvania		0.0%		

FREEWAY RAMP LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS (NO TSP) – WITHOUT SF GIANTS GAME - WEEKDAY EVENING AND LATE EVENING PEAK HOURS

#	Ramp Location	Evening		Late Evening	
			Existing plus Project - Basketball Game		Existing plus Project - Basketball Game
2	I-80 EB On-ramp at Fifth/Bryant		5.6%		60.4%
3	I-80 WB Off-ramp at Fifth/Harrison		47.8%		
5	I-280 NB Off-ramp at Mariposa		62.0%		

FREEWAY RAMP LEVEL OF SERVICE – 2040 CUMULATIVE CONDITIONS – WEEKDAY PM PEAK HOUR

#	Ramp Location	No Event	Convention Event	Basketball Game
1	I-80 EB On-ramp at Sterling	1.0%	1.4%	0.9%
2	I-80 EB On-ramp at Fifth/Bryant	4.8%	6.9%	4.6%
3	I-80 WB Off-ramp at Fifth/Harrison	0.9%	0.8%	4.4%
4	I-280 SB On-ramp at Pennsylvania	0.0%	0.0%	0.0%
6	I-280 SB On-ramp at Mariposa	7.0%	11.5%	6.4%

FREEWAY RAMP LEVEL OF SERVICE – 2040 CUMULATIVE CONDITIONS – SATURDAY EVENING PEAK HOUR

#	Ramp Location	No Event	Basketball Game
2	I-80 EB On-ramp at Fifth/Bryant	5.7%	3.4%
3	I-80 WB Off-ramp at Fifth/Harrison		34.6%

APPENDIX TR-7
PROPOSED PROJECT TRANSIT ANALYSES

TRANSIT DEMAND SUMMARY

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 PERSON TRANSIT TRIP SUMMARY - ALL LAND USES COMBINED

ORIGIN / DESTINATION SERVICE PROVIDER	WEEKDAY												SATURDAY								
	No Event PM Peak Hour (1 hr bet. 4 & 6 PM)			Basketball Game									Convention Event PM Peak Hour (1 hr bet. 4 & 6 PM)			No Event Evening Peak Hour (1 hr bet. 7 & 9 PM)			Basketball Game Evening Peak Hour (1 hr bet. 7 & 9 PM)		
				PM Peak Hour (1 hr bet. 4 & 6 PM)			Evening Peak Hour (1 hr bet. 6 & 8 PM)			Late PM Peak Hour (1 hr bet. 9 & 11 PM)											
In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Superdistrict 1	21	66	88	118	59	177	815	19	834	0	681	681	56	411	467	35	47	82	682	15	698
Superdistrict 2	17	76	93	78	71	149	160	24	184	0	157	157	17	82	99	28	44	72	133	18	151
Superdistrict 3	79	182	261	156	155	311	140	48	188	0	167	167	59	169	228	131	159	290	123	40	163
Superdistrict 4	9	52	61	54	50	104	107	17	125	0	107	107	11	70	81	16	27	43	81	13	94
East Bay	19	218	237	319	216	535	1,586	78	1,663	0	1,898	1,898	42	346	387	35	89	124	1,641	57	1,698
North Bay	1	17	18	38	17	55	289	6	295	0	460	460	2	18	19	0	5	5	395	4	399
South Bay	4	90	94	145	90	236	822	33	855	0	967	967	13	126	139	5	28	34	831	23	854
Out of Region	7	23	30	36	21	57	220	7	227	0	244	244	13	91	104	9	14	23	248	5	253
Total	157	724	881	944	681	1,625	4,138	232	4,371	0	4,680	4,680	212	1,312	1,524	261	413	673	4,134	176	4,310
SF Muni (incl. transfers)																					
San Francisco	126	376	503	405	336	741	1,222	109	1,330	0	1,111	1,111	143	732	874	210	277	487	1,019	86	1,105
East Bay	19	218	237	319	216	535	1,586	78	1,663	0	1,898	1,898	42	346	387	35	89	124	1,641	57	1,698
North Bay	1	17	18	38	17	55	289	6	295	0	460	460	2	18	19	0	5	5	395	4	399
South Bay (except Caltrain)	1	23	24	38	23	61	212	8	221	0	250	250	3	33	36	1	7	9	214	6	220
Out of Region	7	23	30	36	21	57	220	7	227	0	244	244	13	91	104	9	14	23	248	5	253
Subtotal	154	658	811	836	614	1,450	3,528	208	3,736	0	3,962	3,962	202	1,219	1,421	257	392	648	3,517	159	3,676

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Project

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32 (No TSP)
 PERSON TRANSIT TRIP SUMMARY - ALL LAND USES COMBINED

ORIGIN / DESTINATION SERVICE PROVIDER	WEEKDAY												SATURDAY								
	No Event PM Peak Hour (1 hr bet. 4 & 6 PM)			Basketball Game									Convention Event PM Peak Hour (1 hr bet. 4 & 6 PM)			No Event Evening Peak Hour (1 hr bet. 7 & 9 PM)			Basketball Game Evening Peak Hour (1 hr bet. 7 & 9 PM)		
				PM Peak Hour (1 hr bet. 4 & 6 PM)			Evening Peak Hour (1 hr bet. 6 & 8 PM)			Late PM Peak Hour (1 hr bet. 9 & 11 PM)											
In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Superdistrict 1	21	66	88	92	59	151	478	19	498	0	409	409	56	411	467	35	47	82	399	15	415
Superdistrict 2	17	76	93	72	71	143	86	24	110	0	97	97	17	82	99	28	44	72	70	18	89
Superdistrict 3	79	182	261	151	155	306	76	48	124	0	115	115	59	169	228	131	159	290	67	40	107
Superdistrict 4	9	52	61	50	50	100	55	17	73	0	65	65	11	70	81	16	27	43	42	13	55
East Bay	19	218	237	271	216	487	964	78	1,042	0	1,188	1,188	42	346	387	35	89	124	981	57	1,038
North Bay	1	17	18	28	17	46	163	6	170	0	263	263	2	18	19	0	5	5	218	4	223
South Bay	4	90	94	117	90	207	449	33	482	0	545	545	13	126	139	5	28	34	446	23	469
Out of Region	7	23	30	27	21	48	105	7	112	0	121	121	13	91	104	9	14	23	149	5	154
Total	157	724	881	808	681	1,489	2,377	232	2,609	0	2,802	2,802	212	1,312	1,524	261	413	673	2,372	176	2,548
SF Muni (incl. transfers)																					
San Francisco	126	376	503	365	336	701	696	109	804	0	685	685	143	732	874	210	277	487	578	86	665
East Bay	19	218	237	271	216	487	964	78	1,042	0	1,188	1,188	42	346	387	35	89	124	981	57	1,038
North Bay	1	17	18	28	17	46	163	6	170	0	263	263	2	18	19	0	5	5	218	4	223
South Bay (except Caltrain)	1	23	24	30	23	53	116	8	124	0	141	141	3	33	36	1	7	9	115	6	121
Out of Region	7	23	30	27	21	48	105	7	112	0	121	121	13	91	104	9	14	23	149	5	154
Subtotal	154	658	811	722	614	1,335	2,044	208	2,252	0	2,398	2,398	202	1,219	1,421	257	392	648	2,042	159	2,200

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No TSP

TRANSIT UTILIZATION ANALYSIS

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING CONDITIONS - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday PM			Weekday Evening			Weekday Late Evening			Saturday Evening		
	No Event (outbound from site)			Basketball Game (inbound to site)			Basketball Game (outbound from site)			No Event (inbound to site)		
	Existing Ridership	Project Capacity	Existing + Project Utilization	Existing Ridership	Project Capacity	Existing + Project Utilization	Existing Ridership	Project Capacity	Existing + Project Utilization	Existing Ridership	Project Capacity	Existing + Project Utilization
San Francisco												
T Third	1,945	3,808	51.1%	1,880	2,285	82.3%	415	1,714	24.2%	336	1,714	19.6%
22 Fillmore	545	942	57.9%	249	628	39.6%	181	252	71.7%	230	378	60.9%
	2,490	4,750	52.4%	2,128	2,913	73.1%	595	1,966	30.3%	566	2,092	27.1%
East Bay												
BART	19,972	21,220	94.1%	4,184	15,870	26.4%	4,035	6,095	66.2%	2,364	8,740	27.0%
AC Transit	2,275	3,926	57.9%	149	520	28.7%	104	200	52.2%	51	200	25.4%
Ferries	805	1,615	49.8%	45	576	7.8%	0	0	#DIV/0!	0	0	#DIV/0!
Subtotal	23,052	26,761	86.1%	4,378	16,966	25.8%	4,140	6,295	65.8%	2,415	8,940	27.0%
North Bay												
Buses	1,389	2,817	49.3%	81	120	67.2%	27	80	33.8%	80	137	58.4%
Ferries	968	1,959	49.4%	209	1,357	15.4%	483	637	75.8%	826	1,594	51.8%
Subtotal	2,357	4,776	49.4%	290	1,477	19.6%	510	717	71.1%	906	1,731	52.3%
South Bay												
BART	8,698	16,693	52.1%	3,776	18,400	20.5%	1,951	5,290	36.9%	2,134	10,925	19.5%
Caltrain	2,405	3,100	77.6%	2,031	2,600	78.1%	185	650	28.4%	690	1,300	53.1%
SamTrans	146	320	45.6%	35	160	21.8%	21	40	53.2%	20	80	25.3%
Ferries	0	0	0.0%	0	0	0.0%	0	0	0.0%	0	0	0.0%
Subtotal	11,249	20,113	55.9%	5,842	21,160	27.6%	2,157	5,980	36.1%	2,844	12,305	23.1%
Regional Total	36,658	51,650	71.0%	10,510	39,603	26.5%	6,807	12,992	52.4%	6,165	22,976	26.8%

Adavant Consulting/Fehr Peers/LCW Consulting

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING PLUS PROJECT - WITHOUT SF GIANTS GAME - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday PM														
	No Event (outbound from site)					Convention Event (outbound from site)					Basketball Game (outbound from site)				
	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization
San Francisco															
T Third	1,945	522	2,467	3,808	64.8%	1,945	1,092	3,037	3,808	79.7%	1,945	496	2,441	3,808	64.1%
22 Fillmore	545	169	714	942	75.8%	545	174	719	942	76.3%	545	151	696	942	73.9%
Special Event Shuttles															
Transbay/Ferry Bldg	0	0	0	0	--	0	0	0	0	--	0	0	0	0	--
Van Ness Ave	0	0	0	0	--	0	0	0	0	--	0	0	0	0	--
16th St BART	0	0	0	0	--	0	0	0	0	--	0	0	0	0	--
Total Shuttles	0	0	0	0	--	0	0	0	0	--	0	0	0	0	--
SF Total	2,490	691	3,181	4,750	67.0%	2,490	1,265	3,755	4,750	79.1%	2,490	647	3,137	4,750	66.0%
East Bay															
BART	19,972	188	20,160	21,220	95.0%	19,972	299	20,271	21,220	95.5%	19,972	187	20,159	21,220	95.0%
AC Transit	2,275	22	2,297	3,926	58.5%	2,275	34	2,309	3,926	58.8%	2,275	21	2,296	3,926	58.5%
Ferries	805	8	813	1,615	50.3%	805	12	817	1,615	50.6%	805	8	813	1,615	50.3%
Subtotal	23,052	218	23,270	26,761	87.0%	23,052	346	23,398	26,761	87.4%	23,052	216	23,268	26,761	86.9%
North Bay															
Buses	1,389	10	1,399	2,817	49.6%	1,389	10	1,399	2,817	49.7%	1,389	10	1,399	2,817	49.6%
Ferries	968	8	976	1,959	49.8%	968	8	976	1,959	49.8%	968	8	976	1,959	49.8%
Subtotal	2,357	17	2,374	4,776	49.7%	2,357	18	2,375	4,776	49.7%	2,357	17	2,374	4,776	49.7%
South Bay															
BART	8,698	22	8,720	16,963	51.4%	8,698	31	8,729	16,963	51.5%	8,698	22	8,720	16,963	51.4%
Caltrain	2,405	67	2,472	3,100	79.7%	2,405	93	2,498	3,100	80.6%	2,405	67	2,472	3,100	79.7%
SamTrans	146	1	147	320	45.9%	146	1	147	320	46.0%	146	1	147	320	45.9%
Ferries	0	0	0	0	0.0%	0	0	0	0	0.0%	0	0	0	0	0.0%
Subtotal	11,249	90	11,339	20,383	55.6%	11,249	126	11,375	20,383	55.8%	11,249	90	11,339	20,383	55.6%
Regional Total	36,658	325	36,983	51,920	71.2%	36,658	489	37,147	51,920	71.5%	36,658	324	36,982	50,697	72.9%

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING PLUS PROJECT - WITHOUT SF GIANTS GAME - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday Evening					Weekday Late Evening				
	Basketball Game (inbound to site)					Basketball Game (outbound from site)				
	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization
San Francisco										
T Third	1,880	2,663	4,542	4,886	93.0%	415	3,348	3,763	5,046	74.6%
22 Fillmore	249	32	281	628	44.7%	181	31	212	252	84.1%
Special Event Shuttles										
Transbay/Ferry Bldg	0	592	592	651	91.0%	0	372	372	372	100.0%
Van Ness Ave	0	259	259	283	91.4%	0	230	230	252	91.3%
16th St BART	0	288	288	284	101.2%	0	339	339	354	95.9%
Total Shuttles	0	1,139	1,139	1,218	93.5%	0	942	942	978	96.3%
SF Total	2,128	3,833	5,962	6,732	88.6%	595	4,321	4,916	6,276	78.3%
East Bay										
BART	4,184	1,373	5,557	15,870	35.0%	4,035	1,834	5,869	6,095	96.3%
AC Transit	149	157	306	520	58.9%	104	64	168	200	84.2%
Ferries	45	56	101	576	17.5%	0	0	0	0	0.0%
Subtotal	4,378	1,586	5,964	16,966	35.2%	4,140	1,898	6,038	6,295	95.9%
North Bay										
Buses	81	30	111	120	92.2%	27	24	51	80	63.8%
Ferries	209	259	468	1,357	34.5%	483	435	918	637	144.1%
Subtotal	290	289	579	1,477	39.2%	510	459	969	717	135.2%
South Bay										
BART	3,776	203	3,980	18,400	21.6%	1,951	239	2,190	5,290	41.4%
Caltrain	2,031	610	2,641	2,600	101.6%	185	718	902	650	138.8%
SamTrans	35	9	44	160	27.3%	21	10	32	40	79.0%
Ferries	0	0	0	0	0.0%	0	0	0	0	0.0%
Subtotal	5,842	822	6,664	21,160	31.5%	2,157	967	3,124	5,980	52.2%
Regional Total	10,510	2,697	13,207	39,603	33.3%	6,807	3,324	10,131	12,992	78.0%

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING PLUS PROJECT - WITHOUT SF GIANTS GAME - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Saturday Evening					Saturday Evening				
	No Event (inbound to site)					Basketball Game (inbound to site)				
	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization
San Francisco										
T Third	336	172	508	1,714	29.6%	336	2,795	3,130	4,332	72.3%
22 Fillmore	230	87	317	378	84.0%	230	27	257	378	67.9%
Special Event Shuttles										
Transbay/Ferry Bldg	0	0	0	0	--	0	509	509	742	68.6%
Van Ness Ave	0	0	0	0	--	0	216	216	252	85.7%
16th St BART	0	0	0	0	--	0	279	279	378	73.9%
Total Shuttles	0	0	0	0	--	0	1,004	1,004	1,372	73.2%
SF Total	566	259	825	2,092	39.4%	566	3,826	4,391	6,082	72.2%
East Bay										
BART	2,364	35	2,399	8,740	27.4%	2,364	1,604	3,968	8,740	45.4%
AC Transit	51	1	52	200	25.9%	51	37	88	200	43.9%
Ferries	0	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!
Subtotal	2,415	36	2,451	8,940	27.4%	2,415	1,641	4,056	8,940	45.4%
North Bay										
Buses	80	0	80	137	58.6%	80	35	115	137	84.0%
Ferries	826	0	826	1,594	51.8%	826	360	1,186	1,594	74.4%
Subtotal	906	0	906	1,731	52.4%	906	395	1,301	1,731	75.2%
South Bay										
BART	2,134	1	2,135	10,925	19.5%	2,134	205	2,339	10,925	21.4%
Caltrain	690	4	694	1,300	53.4%	690	616	1,307	1,300	100.5%
SamTrans	20	0	20	80	25.4%	20	9	29	80	36.4%
Ferries	0	0	0	0	0.0%	0	0	0	0	0.0%
Subtotal	2,844	5	2,850	12,305	23.2%	2,844	831	3,675	12,305	29.9%
Regional Total	6,165	42	6,207	22,976	27.0%	6,165	2,867	9,032	22,976	39.3%

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 TRANSIT CAPACITY UTILIZATION ANALYSIS - 2040 CUMULATIVE - WITHOUT SF GIANTS GAME - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday PM												Weekday Evening					Weekday Late Evening				
	No Event (outbound from site)				Convention Event (outbound from site)				Basketball Game (outbound from site)				Basketball Game (inbound to site)					Basketball Game (outbound from site)				
	2040 Ridership	Project Trips	2040 + Project	Percent Capacity Utilization	2040 Ridership	Project Trips	2040 + Project	Percent Capacity Utilization	2040 Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	2040 Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	2040 Ridership	Project Trips	Existing + Project	Percent Capacity Utilization		
San Francisco	2,496	522	3,018	57.1%	2,496	1,092	3,588	62.8%	2,496	496	2,992	52.4%	2,771	2,663	5,434	60.2%	181	31	212	25.2%		
T Third	2,496	522	3,018	57.1%	2,496	1,092	3,588	62.8%	2,496	496	2,992	52.4%	2,771	2,663	5,434	60.2%	181	31	212	25.2%		
22 Fillmore	545	169	714	75.8%	545	174	719	76.3%	545	151	696	73.9%	273	32	304	48.5%	181	31	212	25.2%		
Special Event Shuttles	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	592	592	651	91.0%	0	372	372	100.0%	
Transbay/Ferry Bldg	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	259	259	283	91.4%	0	230	230	100.0%	
Van Ness Ave	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	288	288	284	101.2%	0	339	339	100.0%	
16th St BART	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	1,139	1,139	1,218	93.5%	0	942	942	100.0%	
Ferries	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0	0	0	0	0	0%	
Subtotal	3,041	691	3,732	56.1%	3,041	1,265	4,306	64.7%	3,041	647	3,688	55.4%	3,043	3,833	6,877	78.7%	713	4,321	5,034	6,276	80.2%	
SF Total	3,041	691	3,732	56.1%	3,041	1,265	4,306	64.7%	3,041	647	3,688	55.4%	3,043	3,833	6,877	78.7%	713	4,321	5,034	6,276	80.2%	
East Bay	19,972	188	20,160	95.0%	19,972	299	20,271	95.5%	19,972	187	20,159	95.0%	4,184	1,373	5,557	35.0%	4,035	1,834	5,869	6,095	96.3%	
BART	19,972	188	20,160	95.0%	19,972	299	20,271	95.5%	19,972	187	20,159	95.0%	4,184	1,373	5,557	35.0%	4,035	1,834	5,869	6,095	96.3%	
AC Transit	2,275	22	2,297	58.5%	2,275	34	2,309	58.8%	2,275	21	2,296	58.5%	149	157	306	58.9%	104	64	168	200	84.2%	
Ferries	805	8	813	50.3%	805	12	817	50.6%	805	8	813	50.3%	45	56	101	17.5%	0	0	0	0	0%	
Subtotal	23,052	218	23,270	97.0%	23,052	346	23,398	97.4%	23,052	216	23,268	96.9%	4,378	1,596	5,964	35.2%	4,140	1,898	6,038	6,295	95.9%	
North Bay	1,389	10	1,399	49.6%	1,389	10	1,399	49.7%	1,389	10	1,399	49.6%	81	30	111	92.2%	27	24	51	80	63.8%	
Buses	1,389	10	1,399	49.6%	1,389	10	1,399	49.7%	1,389	10	1,399	49.6%	81	30	111	92.2%	27	24	51	80	63.8%	
Ferries	968	8	976	49.8%	968	8	976	49.8%	968	8	976	49.8%	209	259	468	34.5%	483	435	918	637	144.1%	
Subtotal	2,357	17	2,374	49.7%	2,357	18	2,375	49.7%	2,357	17	2,374	49.7%	290	289	579	39.2%	510	459	969	717	135.2%	
South Bay	8,698	22	8,720	51.4%	8,698	31	8,729	51.5%	8,698	22	8,720	51.4%	3,776	203	3,980	21.6%	1,951	239	2,190	5,290	41.4%	
BART	8,698	22	8,720	51.4%	8,698	31	8,729	51.5%	8,698	22	8,720	51.4%	3,776	203	3,980	21.6%	1,951	239	2,190	5,290	41.4%	
Caltrain	2,405	67	2,472	79.7%	2,405	93	2,498	80.6%	2,405	67	2,472	79.7%	2,031	610	2,641	101.8%	185	718	902	650	158.8%	
SamTrans	146	1	147	45.9%	146	1	147	46.0%	146	1	147	45.9%	35	9	44	160	27.3%	21	10	32	40	73.0%
Ferries	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0.0%	0	0	0	0	0%	
Subtotal	11,249	90	11,339	55.6%	11,249	126	11,375	55.8%	11,249	90	11,339	55.6%	5,842	822	6,664	31.5%	2,157	967	3,124	5,980	52.2%	
Regional Total	36,658	325	36,983	71.2%	36,658	489	37,147	71.5%	36,658	324	36,982	72.9%	10,510	2,697	13,207	33.3%	6,807	3,324	10,131	12,992	78.0%	

Adavant Consulting/Fehr Peers/LCW Consulting

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING PLUS PROJECT WITHOUT MUNI SPECIAL EVENT TRANSIT SERVICE PLAN - WITHOUT SF GIANTS GAME - PEAK DIRECTION

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday Evening					Weekday Late Evening					Saturday Evening					Saturday Evening									
	Basketball Game (inbound to site)					Basketball Game (outbound from site)					No Event (inbound to site)					Basketball Game (inbound to site)									
	Existing Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	Existing Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	Existing Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	Existing Ridership	Project Trips	Existing + Project	Percent Capacity Utilization	Existing Ridership	Project Trips	Existing + Project	Percent Capacity Utilization					
San Francisco	1,880	1,915	3,795	166.1%	415	2,268	2,682	171.4%	336	172	508	1,714	29.6%	336	1,943	2,278	1,714	132.9%	230	265	495	378	131.0%		
T Third	1,880	1,915	3,795	166.1%	415	2,268	2,682	171.4%	336	172	508	1,714	29.6%	336	1,943	2,278	1,714	132.9%	230	265	495	378	131.0%		
22 Fillmore	249	295	544	86.6%	181	334	515	252	204.4%	230	87	317	378	84.0%	230	265	495	378	131.0%	230	265	495	378	131.0%	
SF Total	2,128	2,211	4,339	149.0%	595	2,602	3,197	1,966	162.7%	566	259	825	2,092	39.4%	566	2,208	2,773	2,092	132.6%	460	530	990	756	132.6%	
East Bay	4,184	835	5,019	15,870	31.6%	4,035	1,149	5,184	6,095	85.1%	2,364	35	2,399	8,740	27.4%	2,364	959	3,323	8,740	38.0%	51	22	73	200	36.4%
BART	4,184	835	5,019	15,870	31.6%	4,035	1,149	5,184	6,095	85.1%	2,364	35	2,399	8,740	27.4%	2,364	959	3,323	8,740	38.0%	51	22	73	200	36.4%
AC Transit	149	96	245	520	47.1%	104	40	144	200	72.2%	51	1	52	200	25.9%	51	22	73	200	36.4%	0	0	0	0	0%
Ferries	45	34	79	576	13.7%	0	0	0	0	0.0%	0	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0	0	0	0%
Subtotal	4,378	965	5,343	16,966	31.5%	4,140	1,189	5,329	6,295	84.6%	2,415	36	2,451	8,940	27.4%	2,415	981	3,396	8,940	38.0%	51	22	73	200	36.4%
North Bay	81	25	106	120	88.0%	27	14	41	80	51.3%	80	0	80	137	58.6%	80	19	99	137	72.3%	209	138	347	1,357	25.6%
Buses	81	25	106	120	88.0%	27	14	41	80	51.3%	80	0	80	137	58.6%	80	19	99	137	72.3%	209	138	347	1,357	25.6%
Ferries	209	138	347	1,357	25.6%	483	249	732	637	114.9%	826	0	826	1,594	51.8%	826	200	1,026	1,594	64.4%	0	0	0	0	0%
Subtotal	290	163	453	1,477	30.6%	510	263	773	717	107.8%	906	0	906	1,731	52.4%	906	219	1,125	1,731	65.0%	0	0	0	0	0%
South Bay	3,776	111	3,887	18,400	21.1%	1,951	135	2,086	5,290	39.4%	2,134	1	2,135	10,925	19.5%	2,134	110	2,244	10,925	20.5%	690	331	1,021	1,300	78.6%
BART	3,776	111	3,887	18,400	21.1%	1,951	135	2,086	5,290	39.4%	2,134	1	2,135	10,925	19.5%	2,134	110	2,244	10,925	20.5%	690	331	1,021	1,300	78.6%
Caltrain	2,031	333	2,364	2,600	90.9%	185	404	589	650	90.5%	690	4	694	1,300	53.4%	690	331	1,021	1,300	78.6%	20	5	25	80	31.6%
SamTrans	35	5	40	160	24.9%	21	6	27	40	68.2%	20	0	20	80	25.4%	20	5	25	80	31.6%	0	0	0	0	0%
Ferries	0	0	0	0	0.0%	0	0	0	0	0.0%	0	0	0	0	0.0%	0	0	0	0	0%	0	0	0	0	0%
Subtotal	5,842	449	6,291	21,160	29.7%	2,157	545	2,702	5,980	45.2%	2,844	5	2,850	12,305	23.2%	2,844	446	3,290	12,305	26.7%	0	0	0	0	0%
Regional Total	10,510	1,577	12,087	39,603	30.5%	6,807	1,997	8,804	12,992	67.8%	6,165	42	6,207	22,976	27.0%	6,165	1,646	7,811	22,976	34.0%	0	0	0	0	0%

SF MUNI DOWNTOWN SCREENLINE ANALYSIS

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
Muni Downtown Screenlines - No Event
Weekday PM Peak Hour

Screenline/Sub-corridor	Existing			Project Ridership	Existing + Project		2040 Cumulative			Project Contributions to 2040
	Ridership	Capacity	Cap. Util.		Ridership	Cap. Util.	Ridership	Capacity	Cap. Util.	
Northeast										
Kearny/Stockton	2,172	3,291	66.0%	35	2,207	67.1%	6,295	8,329	75.6%	
Other	570	1,078	52.9%	9	579	53.7%	1,229	2,065	59.5%	
Subtotal	2,742	4,369	62.8%	45	2,787	63.8%	7,524	10,394	72.4%	
Northwest										
Geary	1,821	2,528	72.0%	26	1,848	73.1%	2,996	3,621	82.7%	
California	1,371	1,686	81.3%	20	1,391	82.5%	1,766	2,021	87.4%	1.12%
Sutter/Clement	472	630	74.9%	7	479	76.0%	749	756	99.1%	0.91%
Fulton/Hayes	969	1,176	82.4%	14	983	83.6%	1,762	1,878	93.8%	0.79%
Balboa	640	929	68.8%	9	649	69.8%	776	974	79.7%	
Subtotal	5,273	6,949	75.9%	76	5,349	77.0%	8,049	9,250	87.0%	0.94%
Southeast										
Third	553	714	77.5%	23	576	80.7%	2,300	5,712	40.3%	
Mission	1,539	2,789	55.2%	63	1,601	57.4%	2,673	3,008	88.9%	2.34%
San Bruno/Bayshore	1,328	2,134	62.2%	54	1,382	64.8%	1,817	2,134	85.1%	2.98%
Other	1,040	1,712	60.8%	42	1,083	63.2%	1,582	1,927	82.1%	
Subtotal	4,461	7,349	60.7%	182	4,642	63.2%	8,372	12,781	65.5%	2.17%
Southwest										
Subway	4,766	6,294	75.7%	41	4,807	76.4%	5,692	6,804	83.7%	
Haight/Noriega	1,109	1,651	67.2%	9	1,119	67.8%	1,265	1,596	79.3%	
Other	277	700	39.6%	2	279	39.9%	380	840	45.2%	
Subtotal	6,152	8,645	71.2%	52	6,205	71.8%	7,337	9,240	79.4%	
Total All Screenlines	18,628	27,312	68.2%	355	18,983	69.5%	31,282	41,665	75.1%	

Source: SF Planning Department December 2013, LCW Consulting 2014

GSW Transit Analysis 4-24-15 ver 1.xlsx

No Event - Muni

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
Muni Downtown Screenlines - Convention Event
Weekday PM Peak Hour

Screenline/Sub-corridor	Existing			Project Ridership	Existing + Project		2040 Cumulative			Project Contributions to 2040
	Ridership	Capacity	Cap. Util.		Ridership	Cap. Util.	Ridership	Capacity	Cap. Util.	
Northeast										
Kearny/Stockton	2,172	3,291	66.0%	199	2,371	72.0%	6,295	8,329	75.6%	
Other	570	1,078	52.9%	52	622	57.7%	1,229	2,065	59.5%	
Subtotal	2,742	4,369	62.8%	251	2,993	68.5%	7,524	10,394	72.4%	
Northwest										
Geary	1,821	2,528	72.0%	28	1,850	73.2%	2,996	3,621	82.7%	
California	1,371	1,686	81.3%	21	1,393	82.6%	1,766	2,021	87.4%	1.21%
Sutter/Clement	472	630	74.9%	7	479	76.1%	749	756	99.1%	0.98%
Fulton/Hayes	969	1,176	82.4%	15	984	83.7%	1,762	1,878	93.8%	0.86%
Balboa	640	929	68.8%	10	650	69.9%	776	974	79.7%	
Subtotal	5,273	6,949	75.9%	82	5,355	77.1%	8,049	9,250	87.0%	1.02%
Southeast										
Third	553	714	77.5%	21	574	80.5%	2,300	5,712	40.3%	
Mission	1,539	2,789	55.2%	58	1,597	57.3%	2,673	3,008	88.9%	2.18%
San Bruno/Bayshore	1,328	2,134	62.2%	50	1,379	64.6%	1,817	2,134	85.1%	2.77%
Other	1,040	1,712	60.8%	39	1,080	63.1%	1,582	1,927	82.1%	
Subtotal	4,461	7,349	60.7%	169	4,630	63.0%	8,372	12,781	65.5%	2.02%
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Subtotal	6,152	8,645	71.2%	70	6,222	72.0%	7,337	9,240	79.4%	
Total All Screenlines	18,628	27,312	68.2%	572	19,200	70.3%	31,282	41,665	75.1%	

Source: SF Planning Department December 2013, LCW Consulting 2014

GSW Transit Analysis 4-24-15 ver 1.xlsx

Convention - Muni

T-THIRD UCSF MISSION BAY PLATFORM ANALYSIS

TCRP REPORT 165

**Transit Capacity and
Quality of Service Manual**

Third Edition

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Reston, VA

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Washington, DC

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WASHINGTON, D.C.
2013
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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

TCRP REPORT 165

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The members of the technical panel selected to monitor this project and to review this report were chosen for their special competencies and with regard for appropriate balance. The report was reviewed by the technical panel and accepted for publication according to procedures established and overseen by the Transportation Research Board and approved by the Governing Board of the National Research Council.

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PLATFORMS AND WAITING AREAS

Levels of Service for Bus Stops and Station Platforms

Levels of service for passenger queuing and waiting areas, such as station platforms, are shown in Exhibit 10-32. The thresholds were developed based on average pedestrian space, personal comfort, and degrees of internal mobility. LOS is presented in terms of average area per person and average interpersonal space (distance between people).

The LOS required for waiting within a facility is a function of the amount of time spent waiting, the number of people waiting, the waiting pattern (in a queue versus looser standing), and a desired level of comfort. Typically, the longer the wait or the looser the waiting pattern, the greater the space per person required. A person's tolerance of a level of crowding will vary with time. People will accept being tightly packed on an elevator for one minute, but not in a waiting area for 15 minutes (17).

A person's acceptance of close interpersonal spacing will also depend on the characteristics of the population, the weather conditions, and the type of facility. For example, commuters may be willing to accept higher levels or longer periods of crowding than intercity and recreational travelers (17).

LOS	Average Pedestrian Area		Average Inter-Person Spacing	
	(ft ² /p)	(m ² /p)	(ft)	(m)
A	≥ 13	≥ 1.2	≥ 4.0	≥ 1.2
B	10-13	0.9-1.2	3.5-4.0	1.1-1.2
C	7-10	0.7-0.9	3.0-3.5	0.9-1.1
D	3-7	0.3-0.7	2.0-3.0	0.6-0.9
E	2-3	0.2-0.3	<2.0	<0.6
F	< 2	< 0.2	Variable	Variable

Source: Fruin (2).

The typical design LOS used for bus stops and station platforms is LOS C to D or better. Passenger congestion in the LOS E range is experienced only on the most crowded elevators or transit vehicles. LOS D represents crowding with some internal circulation possible; however, this LOS is not recommended for long-term waiting periods. The presence of passengers who use wheelchairs, strollers, or bicycles, or carry luggage or packages should be assessed and suitable provision made in station space.

Platform Usage

The shape and configuration of a station platform is dictated by many systemwide factors. Platform length is typically based on transit vehicle length and the number of transit vehicles using the platform at any one time. Platform width is dependent upon structural considerations, passenger queuing space, circulation requirements, and entry/exit locations.

Transit platforms can be divided into the following areas (20):

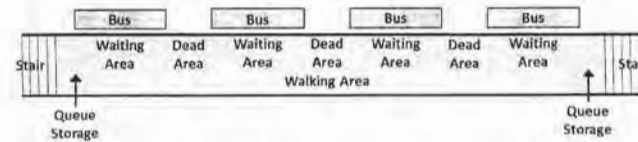
- Walking areas;
- Waiting areas;

Exhibit 10-32
Levels of Service for
Queuing Areas

2 OF 3

- Waiting area buffers (adjacent to the platform edge and to waiting areas), with the platform edge denoted by a 18-in. (0.5-m) detectable warning strip;
- Dead areas between bus loading areas or train doors;
- Space taken up by seats, pillars, and other obstructions; and
- Queue storage.

Exhibit 10-33 illustrates the use of these areas for a transit platform serving buses.



Source: Benz (20).

Walking and waiting do not occur evenly over the platform area. Some areas are used primarily for walking (e.g., near entry/exit locations and along the back edge of the platform) while other areas are used primarily for waiting (e.g., loading areas). Areas that are generally not used by passengers are termed *dead areas*. These areas are typically present between buses at a bus terminal or in front of or behind a train at a rail station. Dead areas should be taken into consideration when choosing the size and configuration of a platform. Where a platform serves multiple routes, special consideration should be made of passengers who will continue to wait on the platform until their train or bus arrives.

Platform Sizing

Evaluation Procedure

The procedures to determine the size of a transit platform are based on maintaining a desirable pedestrian LOS in the waiting and circulation areas, while providing needed buffer space and reserving space for physical objects, such as staircases or seating. The following is a list of steps recommended for determining the desired platform size:

1. Based on the desired LOS, choose the corresponding average pedestrian space from Exhibit 10-32; **LOS D = 3 sf/ped**
2. Adjust as appropriate for passenger characteristics (e.g., wheelchair usage, luggage, bicycles);
3. Estimate the maximum passenger demand for the platform at a given time;
4. Calculate the required waiting space by multiplying the average space per person by the maximum passenger demand;
5. Calculate the additional walkway width needed to serve arriving passengers by using the appropriate procedures for walkways described previously;
6. Calculate the queue storage space required for exit points (at stairs, escalators, and elevators) as described previously;

Exhibit 10-33
Transit Platform
Areas

There are several different platform components which impact capacity and size requirements.

240 from all exit
10 on platform
250 passengers
250 x 3 sf/ped =
750 sf

3 OF 3

PLATFORM
160 x 9 FEET =

160 x 5 FEET
EFFECTIVE = 800

RAMP
50 x 4 FEET =

50 x 3 FEET
EFFECTIVE = 150

950
st

7. Consider the additional platform space that will be unused, including dead areas and physical obstructions;
8. Add a buffer zone to the width of the platform (18 in., or 0.5 m, on each side having direct access to a roadway or trackway): **2 FEET ON EITHER**
9. Calculate the total platform area by summing the required waiting space, **EDGE** walkway width, queue storage at exit points, dead areas, and buffer zone width; and
10. Apply a safety or growth factor if appropriate.

The result of this calculation will be a minimum platform area required to meet demand. Actual platform area and dimensions may be determined by other factors, such as minimum clearances and architectural considerations, especially in low- to medium-volume stations. Calculation Example 3 later in this chapter demonstrates the application of this process.

Designing for Emergency Evacuation

NFPA 130 does not directly affect overall platform area unless obstacles, such as a stairway or open platform edge, require additional platform width to provide egress capacity past the obstacle (1). The standard specifies that egress routes must be at least 44 in. (1.12 m) wide. When such a route passes between an open platform edge, an additional 18 in. (450 mm) must be provided. When a route passes a sidewall or obstacle such as a stairway, an additional width of 12 in. (300 mm) must be provided. With both an open platform edge and a sidewall, a total width of 74 in. (1.87 m) would be required.

Shelters and Waiting Rooms

Level of Service

No specific LOS has been suggested for shelters, waiting rooms, or seating. The space provided within shelters or waiting rooms can be assessed using the LOS thresholds for queuing spaces, as presented in Exhibit 10-32. These thresholds are based on average pedestrian space, personal comfort, and degrees of mobility within the space. However, local circumstances must be taken into consideration when determining what the projected or desirable occupancy is, since such spaces are rarely used by all passengers and may only be used to the maximum extent on limited days of the year, depending on local climates. For example, shelters may be used on a daily basis for 6 months of the year in a colder northern climate but may be used only a few days a month in warmer, dryer climates. As a result, it may be more desirable to handle full stop or station loads in the more adverse climate, but provide more limited capacity relative to station passenger volumes where the shelter is used less often.

Evaluation Procedures

The LOS for persons standing in a shelter or waiting room may be assessed using the LOS criteria for queuing spaces, as presented in Exhibit 10-32. In larger waiting rooms where circulation is to be maintained or other activities such as ticket selling are occurring, the time-space analysis approach described in Equation 10-4 and Equation 10-5 can be applied or a pedestrian simulation software applied. A simpler analysis

SF PLANNING DEPT. TRANSIT ANALYSIS MEMORANDA



**SAN FRANCISCO
PLANNING DEPARTMENT**

MEMO

TO: Planning Department Transportation Consultant List
FROM: Planning Department Transportation Team
DATE: Updated – June 21, 2013
SUBJECT: Transit Data for Transportation Impact Studies

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Purpose

The purpose of this memorandum is to provide an update to the data used in transportation analyses for determining capacity utilization for the San Francisco Municipal Transportation Agency (SFMTA) individual lines and screenlines and regional transit screenlines.

Background

The SFMTA Board has adopted an “85 percent” capacity utilization standard for transit vehicle loads. In other words, transit lines should operate at or below 85 percent capacity utilization. The SFMTA Board has determined that this threshold more accurately reflects actual operations and the likelihood of “pass-ups” (i.e., vehicles not stopping to pick up more passengers). The Planning Department, in preparing and reviewing transportation impact studies, has similarly utilized the 85 percent capacity utilization as a threshold of significance for determining peak period transit demand impacts to the SFMTA lines. Previously, SFMTA Transit Effectiveness Project ridership data, collected in 2007 and 2008, has been utilized by the Planning Department to determine capacity utilization at the maximum load point (MLP) for bus and light rail lines. SFMTA has recently began to provide to the Planning Department updated ridership counts using automatic passenger count data for buses and updated manual counts for rail.¹ SFMTA intends to update this data annually, or as needed.

SFMTA and Regional Transit Screenline Analysis

Typically, transit impacts are analyzed through a screenline analysis. A screenline analysis assumes that there are identifiable corridors or directions of travel which are served by a grouping of transit lines. Therefore, an individual line would be combined with other transit lines in a corridor and corridors combined into a screenline in determining significance. However, on a case-by-case basis the Planning Department may request individual line capacity utilization analysis. In either case, the same methodology for impact determination would apply.

Four screenlines have been established in San Francisco to analyze potential impacts of projects on SFMTA service: the northeast screenline, the northwest screenline, the southeast screenline, and the southwest screenline, with sub-corridors within each screenline. The SFMTA routes by screenline and sub-corridors are shown in Attachment A, along with a schematic illustration of the screenlines and updated screenline data. As discussed above, the Planning Department uses 85 percent capacity utilization as the threshold of significance for identifying transit crowding impacts.

Four principal regional transit providers serve San Francisco: BART from the East Bay and Peninsula; SamTrans from the Peninsula; AC Transit from the East Bay, and Golden Gate Bridge, Highway and Transportation District (GGBHTD) from the North Bay. Two additional ferry providers exist besides GGBHTD: Alameda Harbor Bay Ferry from the East Bay and Blue & Gold Fleet from the North Bay and East Bay. For regional transit providers, the MLP is typically at the San Francisco City limit (i.e., the East Bay MLP would occur at the Transbay Tube and on the Bay Bridge; the North Bay MLP would occur at the Golden Gate Bridge; and the South Bay MLP would occur at the southern city border). The regional transit providers by screenline are shown in Attachment B, along with a schematic illustration of the screenlines and updated screenline data. The Planning Department uses 100 percent capacity utilization as the threshold of significance for identifying regional transit crowding impacts.

SFMTA Individual Line Analysis

Sometimes, transit impacts are analyzed on a corridor or line-by-line basis. The following table (see Attachment C for full data) provides an example of the data and capacity utilization calculation using updated SFMTA transit data for outbound (OB) and inbound (IB) 1 California and 10 Townsend during the PM peak hour. This is not meant to represent the format or content of the table that would be included in transportation impact studies, rather it is a sample of the full transit ridership and capacity data set.² Please refer to Attachment D for a Glossary of Terms.

**TABLE 1
EXAMPLE OF SFMTA FALL 2010/2011 CAPACITY UTILIZATION DATA (PM PEAK HOUR)**

SFMTA Line	(A) 100% Planning Capacity per Vehicle	(B) Headway (Mins)	(C) Average Max Load	(D) = (60/B * C) Peak Hour Load	MLP	(E) = (60/B * A) Peak Hour Capacity	(F) = (D/E) Peak Hour Capacity Utilization
1 (OB)	63	3.5	53	909	California/Presidio	1,080	84.2%
1 (IB)	63	3.5	35	600	California/Laurel	1,080	55.6%
10 (OB)	63	20.0	57	171	2 nd /Howard	189	90.5%
10 (IB)	63	20.0	62	186	Pacific/Powell St	189	98.4%

In the above example, OB 1 California is 0.8 percent below the 85 percent threshold of significance and IB 1 California is 29.4 percent below the threshold at the respective MLPs. Generally, if a proposed project would generate enough trips on a particular line (in the above example for the 1 California, nine trips (OB) and 318 trips (IB)) that it would cause the route to exceed the 85 percent capacity utilization, it would be considered to result in a significant transit impact.

¹ Tables included in Transportation Impact Studies should reference “SFMTA Transit Ridership Counts 2010/2011”. The manual rail counts were taken in the Fall of 2010 and the automatic passenger counts are from 2011.

² Note: The methodology and threshold of significance used for analyzing transit impacts are remaining the same; only the data used for that analysis is changing.

Attachment A – SFMTA Screenlines

Also in the above example, OB 10 Townsend is 5.5 percent above the 85 percent threshold of significance and IB 10 Townsend is 13.4 percent above the threshold of significance at the respective MLPs. In these situations, the analysis needs to calculate the percentage of trips that the proposed project contributes to the line. If the percent contribution to the total peak hour ridership at the MLP is five percent or greater, then the proposed project would contribute substantially to transit crowding and would result in a significant impact.

Example: The proposed project would contribute 20 transit trips to the IB 10 Townsend, therefore the peak hour load would be 206 (186 + 20). The 20 transit trips would constitute 9.7 percent ($20/206 = 9.71\%$) of the Existing plus Proposed Project peak hour load. This would be considered a significant impact. If on the other hand, the proposed project contributed nine transit trips to the IB 10 Townsend, the impact would be considered less than significant because proposed project transit trips would only account for 4.6 percent of the Existing plus Proposed Project peak hour load ($9/195 = 4.61\%$).³

Applicability

Generally, the updated SFMTA data should be used in any transportation impact study that has yet to reach the screencheck submittal phase and all future transportation impact study (!) cases. The transportation planner, in coordination with the environmental planner, will determine on a case-by-case basis whether a project is not subject to this general applicability requirement. Applicability questions should be directed to the ! case planner.

³ In the transportation impact study (TIS), numbers should be reported to the tenth of the percentage point, however, calculations should be done to the hundredth of the percentage point to determine significance. For example, if the calculation is 4.95 percent, the TIS should report 5.0 percent (significant impact). Conversely, if the calculation is 4.94 percent, the TIS should report 4.9 percent (less-than-significant impact).

FIGURE A-1
SFMTA SCREENLINES



TABLE A-1
EXISTING PEAK HOUR¹

Muni Screenline Sub-corridor	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Northeast						
Kearny/Stockton ²	2,532	3,366	75%	2,158	3,291	66%
Other Lines ³	439	1,005	44%	570	1,078	53%
Screenline Total	2,971	4,370	68%	2,727	4,369	62%
Northwest						
Geary ⁴	1,370	2,183	63%	1,814	2,528	72%
California ⁵	1,863	2,369	79%	1,366	1,686	81%
Sutter/Clement ⁶	485	630	77%	470	630	75%
Fulton/Hayes ⁷	1,193	1,470	81%	965	1,176	82%
Balboa ⁸	655	1,008	65%	637	929	69%
Screenline Total	5,566	7,660	73%	5,252	6,949	76%
Southeast						
Third Street ⁹	428	714	60%	550	714	77%
Mission ¹⁰	1,727	2,977	58%	1,529	2,789	55%
San Bruno/Bayshore ¹¹	1,561	2,087	75%	1,320	2,134	62%
Other Lines ¹²	1,115	1,536	70%	1,034	1,712	60%
Screenline Total	4,830	7,374	66%	4,433	7,349	60%
Southwest						
Subway lines ¹³	5,418	6,307	86%	4,747	6,294	75%
Haight/Noriega ¹⁴	1,157	1,706	68%	1,105	1,651	67%
Other lines ¹⁵	230	627	37%	276	700	39%
Screenline Total	6,805	8,640	79%	6,128	8,645	71%
Muni Screenlines Total	20,172	28,044	72%	18,540	27,312	68%

Screenlines and sub-corridors operating at capacity utilization of 85 percent or greater are highlighted in **bold**. Some of the individual lines within certain sub-corridors have been adjusted to be in the appropriate city "quadrant" per the screenline. Thus, for some sub-corridors (e.g., Kearny/Stockton AM Peak Hour), the total does not match the individual lines' maximum load point ridership and capacity shown in Appendix C.

- Muni bus data collected between August 2011 and October 2011 (except 1AX and 1BX which is January to March 2012). Muni rail data collected between September 2007 and February 2010.
- 8X Bayshore Express, 30 Stockton, 30X Marina Express, 41 Union, 45 Union-Stockton
- F Market & Wharves, 10 Townsend, 12 Folsom-Pacific
- 38 Geary, 38L Geary Limited, 38AX Geary 'A' Express, 38BX Geary 'B' Express
- 1 California, 1AX California 'A' Express, 1AX California 'B' Express
- 2 Clement, 3 Jackson
- 5 Fulton, 21 Hayes
- 31 Balboa, 31AX Balboa 'A' Express, 31BX Balboa 'B' Express
- T Third Street
- 14 Mission, 14L Mission Limited, 14X Mission Express, 49 Van Ness-Mission
- 8AX Bayshore 'A' Express, 8BX Bayshore 'B' Express, 8X Bayshore Express, 9 San Bruno, 9L San Bruno Limited
- J Church, 10 Townsend, 12 Folsom-Pacific, 19 Polk, 27 Bryant
- K Ingleside, L Taraval, M Ocean View, N Judah
- 6 Parnassus, 71/71L Haight-Noriega Limited, 16X Noriega Express, NX Judah Express
- F Market & Wharves

Source: SFMTA TEP Project, Case No. 2011.0558E, October 2012

Attachment B – Regional Transit Providers Screenlines

TABLE A-2
Cumulative (2035) PEAK HOUR

Muni Screenline Sub-corridor	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Northeast						
Kearny/Stockton ¹	2,505	3,347	75%	1,841	2,359	78%
Other Lines ²	452	903	50%	799	1,218	66%
<i>Screenline Total</i>	<i>2,957</i>	<i>4,250</i>	<i>70%</i>	<i>2,640</i>	<i>3,577</i>	<i>74%</i>
Northwest						
Geary ³	2,842	3,952	72%	3,267	3,826	85%
California ⁴	1,658	2,306	72%	1,178	1,841	64%
Sutter/Clement ⁵	271	630	43%	433	630	69%
Fulton/Hayes ⁶	1,129	1,470	77%	1,081	1,386	78%
Balboa ⁷	690	1,008	68%	730	929	79%
<i>Screenline Total</i>	<i>6,590</i>	<i>9,366</i>	<i>70%</i>	<i>6,689</i>	<i>8,611</i>	<i>78%</i>
Southeast						
Third Street ⁸	1,247	3,332	37%	1,974	2,856	69%
Mission ⁹	2,349	2,836	83%	2,104	2,836	74%
San Bruno/Bayshore ¹⁰	1,778	2,087	85%	1,739	2,134	82%
Other Lines ¹¹	1,387	1,801	77%	1,189	1,801	66%
<i>Screenline Total</i>	<i>6,761</i>	<i>10,056</i>	<i>67%</i>	<i>7,006</i>	<i>9,627</i>	<i>73%</i>
Southwest						
Subway lines ¹²	5,851	6,522	90%	5,157	6,624	78%
Haight/Noriega ¹³	1,241	1,554	80%	1,248	1,554	80%
Other lines ¹⁴	212	627	34%	318	840	38%
<i>Screenline Total</i>	<i>7,304</i>	<i>8,703</i>	<i>84%</i>	<i>6,723</i>	<i>9,018</i>	<i>75%</i>
Muni Screenlines Total	23,612	32,375	73%	23,058	30,833	75%

Screenlines and corridors operating at capacity utilization of 85 percent or greater are highlighted in **bold**.

1. 8X Bayshore Express, 30 Stockton, 30X Marina Express, 41 Union, 45 Union-Stockton
2. F Market & Wharves, 10 Townsend, 12 Folsom-Pacific
3. 38 Geary, 38L Geary Limited, 38AX Geary 'A' Express, 38BX Geary 'B' Express
4. 1 California, 1AX California 'A' Express, 1AX California 'B' Express
5. 2 Clement, 3 Jackson
6. 5 Fulton, 21 Hayes
7. 31 Balboa, 31AX Balboa 'A' Express, 31BX Balboa 'B' Express
8. T Third Street
9. 14 Mission, 14L Mission Limited, 14X Mission Express, 49 Van Ness-Mission
10. 8AX Bayshore 'A' Express, 8BX Bayshore 'B' Express, 8X Bayshore Express, 9 San Bruno, 9L San Bruno Limited
11. J Church, 10 Townsend, 12 Folsom-Pacific, 19 Polk, 27 Bryant
12. K Ingleside, L Taraval, M Ocean View, N Judah
13. 6 Parnassus, 71/71L Haight-Noriega Limited, 16X Noriega Express, NX Judah Express
14. F Market & Wharves

Source: SFMTA TEP Project, Case No. 2011.0558E, October 2012

**FIGURE B-1
REGIONAL SCREENLINES**



**TABLE B-1
EXISTING (2012) PEAK HOUR**

Regional Screenline Transit Provider/Service	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
East Bay						
BART	19,716	22,050	89%	19,716	22,050	89%
AC Transit	1,568	2,829	55%	2,256	3,926	57%
Ferries	810	1,170	69%	805	1,615	50%
Screenline Total	22,094	26,049	85%	22,777	27,591	83%
North Bay						
Golden Gate Transit Bus	1,330	2,543	52%	1,384	2,817	49%
Ferries	1,082	1,959	55%	968	1,959	49%
Screenline Total	2,412	4,502	54%	2,352	4,776	49%
South Bay						
BART	10,682	14,910	72%	10,682	14,910	72%
Caltrain	2,171	3,100	70%	2,377	3,100	77%
SamTrans	255	520	49%	141	320	44%
Ferries	--	--	--	--	--	--
Screenline Total	13,108	18,530	71%	13,200	18,330	72%
Regional Screenlines Total	37,615	49,081	77%	38,330	50,697	76%

Screenlines and transit providers/services operating at capacity utilization of 100 percent or greater are highlighted in **bold**.

Source: SFMTA TEP Project, Case No. 2011.0558E, October 2012

**TABLE B-2
CUMULATIVE (2035) PEAK HOUR**

Regional Screenline Transit Provider/Service	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
East Bay						
BART	28,780	33,170	87%	28,780	33,170	87%
AC Transit	7,000	12,000	58%	7,000	12,000	58%
Ferries	4,682	5,940	79%	5,319	5,940	90%
<i>Screenline Total</i>	<i>40,462</i>	<i>51,110</i>	<i>79%</i>	<i>41,099</i>	<i>51,110</i>	<i>80%</i>
North Bay						
Golden Gate Transit Bus	1,990	2,543	78%	2,070	2,817	73%
Ferries	1,619	1,959	83%	1,619	1,959	83%
<i>Screenline Total</i>	<i>3,609</i>	<i>4,502</i>	<i>80%</i>	<i>3,689</i>	<i>4,776</i>	<i>77%</i>
South Bay						
BART	13,847	24,182	57%	13,847	24,182	57%
Caltrain	2,310	3,600	64%	2,529	3,600	70%
SamTrans	271	520	52%	150	320	47%
Ferries	59	200	30%	59	200	30%
<i>Screenline Total</i>	<i>16,487</i>	<i>28,502</i>	<i>58%</i>	<i>16,585</i>	<i>28,302</i>	<i>59%</i>
Regional Screenlines Total	60,558	84,114	72%	61,373	84,188	73%

Screenlines and transit providers/services operating at capacity utilization of 100 percent or greater are highlighted in **bold**.

Source: SFMTA TEP Project, Case No. 2011.0558E, October 2012

Attachment C – Fall 2010/2011 SFMTA Line Load and Capacity by Time Period and Direction of Travel

FALL 2011 Route Load and Capacity by Time Period and Direction of Travel

Line	AM - Outbound							AM - Inbound							Route
	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	
1	63	3.5	34	583	Sacramento/Van Ness Ave	1,080	54%	63	3.5	50	857	Clay/Taylor	1,080	79%	1
1AX*								73	9.0	57	380	California St/8th Ave	487	78%	1AX*
1BX*								94	7.0	73	626	California St/Fillmore	806	78%	1BX*
2	63	12.0	24	120	Sutter/Leavenworth	315	38%	63	12.0	49	245	Post/Jones	315	78%	2
3	63	15.0	18	72	Sutter/Leavenworth	252	29%	63	12.0	48	240	Post/Jones	315	76%	3
5	63	4.2	24	340	McAllister/Gough	893	38%	63	3.6	50	833	McAllister/Laguna	1,050	79%	5
6	63	11.0	20	109	Haight/Divisadero	344	32%	63	10.0	45	270	Page/Octavia Blvd	378	71%	6
8X	94	7.5	63	504	Geneva Ave/Madrid St	752	67%	94	7.5	77	616	San Bruno Ave/Silver Ave	752	82%	8X
8AX								94	7.5	76	608	Bryant/6th St	752	81%	8AX
8BX								94	8.0	65	488	Bayshore Blvd/Blanken Ave	705	69%	8BX
9	63	12.0	35	175	Potrero Ave/20th St	315	56%	63	12.0	45	225	Bayshore Blvd/Cortland Ave	315	71%	9
9L	63	12.0	23	115	11th St/Market St	315	37%	63	12.0	48	240	Bayshore Blvd/Cortland Ave	315	76%	9L
10	63	20.0	55	165	Pacific Ave/Taylor St	189	87%	63	20.0	47	141	2nd St/Townsend St	189	75%	10
12	63	20.0	48	144	Pacific Ave/Mason St	189	76%	63	20.0	41	123	Folsom St/7th St	189	65%	12
14	94	6.0	22	220	Mission/20th St	940	23%	94	6.0	37	370	Mission/29th St	940	39%	14
14L	94	9.0	27	180	Mission/24th St	627	29%	94	9.0	73	487	Mission/30th St	627	78%	14L
14X								94	8.0	70	525	Trumbull St/Stoneybrook Ave	705	74%	14X
16X								86	9.0	51	340	Lincoln Way/11th Ave	572	59%	16X
17	63	30.0	6	12	West Portal Ave/14th Ave	126	10%	63	30.0	21	42	Crespi Dr/19th Ave	126	33%	17
18	63	20.0	33	99	Lake Merced/Lake Merced	189	52%	63	20.0	36	108	33rd Ave/Balboa St	189	57%	18
19	63	15.0	55	220	8th St/Mission St	252	87%	63	15.0	40	160	Larkin/O'Farrell	252	63%	19
21	63	9.0	20	133	Hayes/Franklin St	420	32%	63	9.0	54	360	Grove St/Gough St	420	86%	21
22	63	9.0	43	287	16th St/Mission St	420	68%	63	9.0	44	293	16th St/Guerrero St	420	70%	22
23	63	20.0	46	138	Crescent Ave/Leese St	189	73%	63	20.0	48	144	Monterey Blvd/Valdez Ave	189	76%	23
24	63	10.0	24	144	Castro St/DuBoce Ave	378	38%	63	10.0	45	270	Castro/19th St	378	71%	24
27	63	15.0	35	140	Mason St/O'Farrell St	252	56%	63	15.0	33	132	Bryant/18th St	252	52%	27
28	63	12.0	39	195	19th Ave/Illoa St	315	62%	63	10.0	46	276	19th Ave/Rivera St	378	73%	28
28L	63	12.0	34	170	19th Ave/Noriega St	315	54%	63	12.0	39	195	Daly City BART Station	315	62%	28L
29	63	10.0	49	294	Plymouth Ave/Ocean Ave	378	78%	63	10.0	50	300	Plymouth Ave/Ocean Ave	378	79%	29
30	69	7.0	51	437	Stockton St/Sutter St	591	74%	65	8.0	47	353	Stockton/Sacramento St	491	72%	30
30X								63	4.0	60	900	Chestnut St/Van Ness Ave	945	95%	30X
31	63	12.0	31	155	Eddy St/Larkin St	315	49%	63	12.0	46	230	Turk St/Arguello Blvd	315	73%	31
31AX								63	12.0	37	185	Balboa St/17th Ave	315	59%	31AX
31BX								63	10.0	40	240	Turk St/Stanyan St	378	63%	31BX
33	63	15.0	32	128	18th St/Sanchez St	252	51%	63	15.0	35	140	18th St/Guerrero St	252	56%	33

FALL 2011 Route Load and Capacity by Time Period and Direction of Travel

Line	AM - Outbound							AM - Inbound							Route
	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	
35	45	30.0	5	10	Castro St/18th St	90	11%	45	30.0	21	42	Eureka St/19th St	90	47%	35
36	45	30.0	25	50	Monterey Blvd/Baden St	90	56%	45	30.0	21	42	Monterey Blvd/Baden St	90	47%	36
37	45	15.0	12	48	14th St/Castro St	180	27%	45	15.0	29	116	Corbett Ave/Douglass St	180	64%	37
38	94	12.0	39	195	Geary Blvd/Van Ness Ave	470	41%	94	12.0	46	230	O'Farrell St/Taylor St	470	49%	38
38L	94	5.5	59	644	Geary Blvd/Fillmore St	1,025	63%	94	5.5	75	818	Geary Blvd/Laguna St	1,025	80%	38L
38AX								63	11.0	30	164	Geary Blvd/25th Ave	344	48%	38AX
38BX								63	11.0	29	158	Geary Blvd/Collins St	344	46%	38BX
39															39
41	94	12.0	14	70	Union St/Mason St	470	15%	94	8.0	59	443	Columbus Ave/Stockton St	705	63%	41
43	63	10.0	41	246	Laguna Honda Blvd/Clarendon	378	65%	63	10.0	58	348	Chestnut St/Fillmore St	378	92%	43
44	63	10.0	37	222	Laguna Honda Blvd/Noriega St	378	59%	63	8.0	53	398	Silver Ave/Congdon St	473	84%	44
45	63	7.0	49	420	Stockton St/Sutter St	540	78%	63	8.0	53	398	Stockton St/Washington St	473	84%	45
47	63	10.0	46	276	Van Ness Ave/Eddy St	378	73%	63	10.0	49	294	Van Ness Ave/O'Farrell St	378	78%	47
48	63	12.0	46	230	24th St/Valencia St	315	73%	63	10.0	46	276	24th St/Valencia St	378	73%	48
49	94	8.0	38	285	Van Ness Ave/Eddy St	705	40%	94	8.0	46	345	S. Van Ness Ave/Mission St	705	49%	49
52	63	20.0	26	78	Excelsior Ave/Mission St	189	41%	63	20.0	29	87	Rousseau St/Cayuga Ave	189	46%	52
54	63	20.0	39	117	Geneva Ave/Paris St	189	62%	63	20.0	35	105	Geneva Ave/Paris St	189	56%	54
56	45	30.0	6	12	Sunnydale Ave/Sawyer St	90	13%	45	30.0	12	24	Delta St/Toga Ave	90	27%	56
66	45	20.0	16	48	16th Ave/Moraga St	135	36%	45	20.0	15	45	Quintara St/26th Ave	135	33%	66
67	63	20.0	10	30	Folsom St/Bessie St	189	16%	63	20.0	31	93	Folsom St/25th St	189	49%	67
71/71L	63	11.0	24	131	Haight St/Fillmore St	344	38%	63	10.0	50	300	Page St/Octavia Blvd	378	79%	71/71L
80X								63	180.0	18	6	4th St/Townsend St	21	29%	80X
81X								69	20.0	48	144	4th St/Townsend St	208	69%	81X
82X								69	10.0	58	348	4th St/Townsend St	415	84%	82X
88								63	20.0	32	96	Geneva Ave/Cayuga Ave	189	51%	88
108	63	12.0	12	60	Beale/Howard St	315	19%	63	10.0	32	192	Treasure Island Main Gate	378	51%	108
NX								63	10.0	41	247	Judah St/19th Avenue	378	65%	NX

NOTE: RAIL DATA COLLECTED IN 2010

F	70	6.7	18	162	Market St/5th St	627	26%	70	6.0	29	289	Embarcadero/Washington	700	41%	F
J	119	8.6	22	156	Civic Center Station	830	19%	119	10.0	96	573	Van Ness Station	714	80%	J
K	119	10.0	55	330	Embarcadero	714	46%	119	8.6	105	735	Church Street Station	833	88%	K
L	238	8.6	46	321	Civic Center Station	1,660	19%	238	7.5	202	1,616	Church Street Station	1,904	85%	L
M	238	8.6	40	279	Forest Hill Station	1,660	17%	238	8.6	182	1,274	Church Street Station	1,666	76%	M
N	238	7.5	68	544	Sunset Tunnel E	1,904	29%	238	7.5	224	1,792	DuBoce/Church	1,904	94%	N
T	119	8.6	50	347	Embarcadero/Folsom	833	42%	119	10.0	71	428	Embarcadero/Brannan	714	60%	T

*Note: This seasonal automatic passenger count (APC) and load information may vary from the annualized transit ridership data provided to the Federal Transit Administration. This data is provided for planning purposes only.

*Spring 2012 ridership data was used due to errors in Fall 2011 ridership data.

Lines operating at capacity utilization of 85 percent or greater are highlighted in bold.

FALL 2011 Route Load and Capacity by Time Period and Direction of Travel

Line	PM - Outbound							PM - Inbound							Route
	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	
1	63	3.5	53	909	California/Presidio	1,080	84%	63	3.5	35	600	California/Laurel	1,080	56%	1
1AX*	63	13.0	45	208	Pine St/Montgomery St.	291	71%								1AX*
1BX*	63	12.0	50	250	Pine St/Montgomery St.	315	79%								1BX*
2	63	12.0	52	260	Sutter/Mason	315	83%	63	12.0	34	170	Post/Larkin	315	54%	2
3	63	12.0	42	210	Sutter/Taylor	315	67%	63	12.0	25	125	Post/Leavenworth	315	40%	3
5	63	4.7	52	659	McAllister/Van Ness	798	83%	63	4.5	45	600	McAllister/Laguna	840	71%	5
6	63	10.0	42	252	Haight/Gough	378	67%	63	10.0	26	156	Haight/Buchanan	378	41%	6
8X	94	7.5	52	416	Stockton/Sacramento	752	55%	94	7.5	51	408	Kearny/Bush	752	54%	8X
8AX	94	7.5	59	472	Harrison/6th St	752	63%								8AX
8BX	94	7.5	71	568	Stockton St/Sacramento St.	752	76%								8BX
9	63	12.0	43	215	Potrero/25th St	315	68%	63	12.0	36	180	Potrero/18th St	315	57%	9
9L	63	12.0	40	200	11th St/Market	315	63%	63	12.0	28	140	11th St/Harrison	315	44%	9L
10	63	20.0	57	171	2nd/Howard	189	90%	63	20.0	62	186	Pacific/Powell St	189	98%	10
12	63	20.0	42	126	Sansome/California	189	67%	63	20.0	45	135	Pacific/Powell St	189	71%	12
14	94	7.5	45	360	Otis/12th St	752	48%	94	7.5	29	232	Mission/20th St	752	31%	14
14L	94	9.0	64	427	Mission/24th St	627	68%	94	9.0	44	293	Mission/30th St	627	47%	14L
14X	94	8.0	49	368	6th St/Harrison St	705	52%								14X
16X	78	9.0	38	253	Lincoln Way/9th Ave	517	49%								16X
17	63	30.0	21	42	19th Ave/Holloway	126	33%	63	30.0	16	32	West Portal/Sloat	126	25%	17
18	63	20.0	31	93	33rd Ave/Balboa St	189	49%	63	20.0	28	84	Lake Merced/Brotherhood Wy	189	44%	18
19	63	15.0	31	124	Polk/Sutter St	252	49%	63	15.0	43	172	Larkin/McAllister	252	68%	19
21	63	10.0	51	306	Hayes/Van Ness	378	81%	63	10.0	26	156	Grove/Gough	378	41%	21
22	63	8.0	41	308	Fillmore/O'Farrell	473	65%	63	8.0	43	323	Fillmore/Hermann	473	68%	22
23	63	20.0	29	87	Diamond/Bosworth	189	46%	63	20.0	31	93	Monterey Blvd/Faxon St	189	49%	23
24	63	10.0	46	276	Divisadero/Haight	378	73%	63	10.0	29	174	Castro/17th St	378	46%	24
27	63	15.0	29	116	5th St/Mission	252	46%	63	15.0	40	160	Ellis/Mason St	252	63%	27
28	63	10.0	47	282	Park Presidio/Geary Blvd	378	75%	63	10.0	47	282	19th Ave/Quintara	378	75%	28
28L					19th Ave/Taraval										28L
29	63	10.0	49	294	19th Ave/Holloway	378	78%	63	10.0	44	264	19th Ave/Holloway	378	70%	29
30	83	4.0	44	660	Stockton/Sutter	1,248	53%	82	4.0	47	705	Chestnut/Octavia	1,224	58%	30
30X	63	7.5	54	432	Sansome/Washington St	504	86%								30X
31	63	14.0	52	223	Eddy St/Van Ness	270	83%	63	14.0	33	141	Eddy St/Larkin	270	52%	31
31AX	63	11.0	43	235	Pine St/Montgomery St.	344	68%								31AX
31BX	63	12.0	36	180	Pine St/Montgomery St.	315	57%								31BX
33	63	15.0	33	132	18th St/Church	252	52%	63	15.0	39	156	18th St/Church	252	62%	33

FALL 2011 Route Load and Capacity by Time Period and Direction of Travel

Line	PM - Outbound							PM - Inbound							Route
	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	100% capacity per vehicle	Headway (Mins)	Average Max Load	Peak Hour Load	MLP	Peak Hour Capacity	Peak Hour Capacity Utilization	
35	45	20.0	24	72	Castro/19th St	135	53%	45	20.0	5	15	Eureka/20th St	135	11%	35
36	45	30.0	15	30	Fowler Ave/Portola Dr	90	33%	45	30.0	31	62	Fowler Ave/Portola Dr	90	69%	36
37	45	20.0	37	111	17th St/Diamond St	135	82%	45	20.0	19	57	Corbett Ave/Douglass St	135	42%	37
38	94	8.0	60	450	Geary Blvd/Franklin St	705	64%	94	7.5	44	352	Geary Blvd/Laguna St	752	47%	38
38L	94	5.5	79	862	Geary Blvd/Van Ness Ave	1,025	84%	94	5.5	51	556	Geary Blvd/Divisadero	1,025	54%	38L
38AX	63	9.0	42	280	Pine St/Montgomery St.	420	67%								38AX
38BX	63	10.0	37	222	Pine St/Montgomery St.	378	59%								38BX
39	45	20.0	11	33	Powell/Filbert	135	24%	45	20.0	15	45	225 Telegraph Hill Blvd S.	135	33%	39
41	63	8.0	53	398	Union St/Columbus Ave	473	84%	63	8.0	18	135	Clay St/Montgomery St	473	29%	41
43	63	12.0	48	240	Masonic Ave/Golden Gave Ave	315	76%	63	12.0	32	160	7th Ave/Moraga St	315	51%	43
44	63	9.0	53	353	Silver Ave/Lisbon St	420	84%	63	9.0	27	180	Woodside Ave/Hernandez Ave	420	43%	44
45	63	12.0	52	260	Stockton/Sutter	315	83%	63	12.0	48	240	Stockton/Sacramento	315	76%	45
47	63	10.0	43	258	Van Ness/O'Farrell	378	68%	63	10.0	46	276	Van Ness/McAllister	378	73%	47
48	63	12.0	36	180	24th St/Folsom St	315	57%	63	12.0	35	175	24th St/Folsom St.	315	56%	48
49	94	8.0	50	375	Van Ness Ave/Eddy St	705	53%	94	8.0	47	353	Van Ness Ave/McAllister St	705	50%	49
52	63	20.0	27	81	Mission St/Silver Ave	189	43%	63	20.0	22	66	Woodside Ave/Hernandez Ave	189	35%	52
54	63	20.0	38	114	Balboa Park BART Station	189	60%	63	20.0	37	111	Balboa Park BART Station	189	59%	54
56	45	30.0	7	14	Blanken Ave/Peninsula Ave	90	16%	45	30.0	8	16	Wilde Ave/Girard St	90	18%	56
66	45	20.0	16	48	9th Ave/Lawton St	135	36%	45	20.0	6	18	Quintara St/17th Ave	135	13%	66
67	63	20.0	25	75	Folsom/Bessie St	189	40%	63	20.0	10	30	Folsom St/Cesar Chavez	189	16%	67
71/71L	63	10.0	54	324	Market St/Van Ness Ave	378	86%	63	10.0	43	258	Haight/Buena Vista	378	68%	71/71L
80X															80X
81X															81X
82X	63	12.0	29	145	Battery St/Jackson St	315	46%								82X
88	63	20.0	21	63	Geneva Ave/Cayuga Ave	189	33%								88
108	63	15.0	26	104	Treasure Island Rd/Macall	252	41%	63	15.0	28	112	Treasure Island Main Gate	252	44%	108
NX	63	10.0	46	275	Sutter St/Sansome St	378	73%								NX
NOTE: RAIL DATA COLLECTED IN 2010															
F	70	6.0	72	718	Embarcadero/Green	700	103%	70	6.0	25	249	Embarcadero/Broadway	700	36%	F
J	119	8.6	71	498	Van Ness Station	830	60%	119	7.5	24	189	Van Ness Station	952	20%	J
K	119	8.6	108	750	Van Ness Station	830	90%	119	10.0	85	508	Embarcadero	714	71%	K
L	238	7.5	170	1,360	Van Ness Station	1,904	71%	238	6.7	68	609	Van Ness Station	2,131	29%	L
M	238	10.0	144	864	Van Ness Station	1,428	61%	238	8.6	70	488	Castro Station	1,660	29%	M
N	238	6.7	198	1,773	Van Ness Station	2,131	83%	238	7.5	110	880	Carl/Cole	1,904	46%	N
T	119	10.0	92	550	Embarcadero/Folsom	714	77%	119	8.6	52	365	Embarcadero/Folsom	830	44%	T

*Note: This seasonal automatic passenger count (APC) and load information may vary from the annualized transit ridership data provided to the Federal Transit Administration. This data is provided for planning purposes only.
 *Spring 2012 ridership data was used due to errors in Fall 2011 ridership data.
 Lines operating at capacity utilization of 85 percent or greater are highlighted in bold.

Attachment D – Glossary of Terms

Average Max Load – The actual ridership (or load) number at the maximum load point for the worst half hour (doubled) during the peak period.

Headway – The scheduled peak period time between buses, streetcars, trains, or light rail vehicles on the same line.

Maximum Load Point – The transit stop on a given line with the estimated greatest demand.

Net Available Capacity – The estimated number of passengers that can be accommodated during the peak hour on a line without exceeding the line's capacity. Calculation is peak hour capacity multiplied by 85 percent minus the peak hour load.

Peak Hour – The one-hour during the peak period where ridership at a maximum load point is estimated to be at its highest.

Peak Hour Capacity – The estimated volume of ridership that can be accommodated per line during the peak hour. The calculation is equal to the peak hour (60 minutes) divided by the peak hour scheduled headway multiplied by the capacity of the line (provided by SFMTA).

Peak Hour Capacity Utilization – The estimated percent capacity of the line that is being used by riders during the peak hour. The calculation is equal to the peak hour load (ridership) divided by the peak hour capacity.

Peak Hour Load – The estimated ridership for a bus or rail route at the maximum load point during the peak hour. Calculation is sixty minutes divided by the headway multiplied by the average max load.

Peak Period – The time period during the day where crowding on the transit system is at its highest. During the AM, it is defined between 6 AM to 9 AM. During the PM, it is defined between 4 PM to 7 PM.

100 Percent Capacity per Vehicle – The capacity per SFMTA vehicle that includes both seated and standing capacity, where standing capacity, is somewhere between 30 to 80 percent seated capacity (depending upon the specific transit vehicle configuration). The capacity per regional transit vehicle is equal to the seated capacity. The following presents the 100 percent capacity of different SFMTA vehicles:¹

- historic streetcar – 70 passengers (F Market & Wharves);
- light rail vehicle – 119 passengers (J Church, KT Ingleside);
- modified light rail – 238 passengers (L Taraval, M Ocean View, and N Judah);

¹ Note that the different capacities for each line are provided by SFMTA and are subject to change.

- standard bus – 63 passengers (remaining lines not listed in modified bus); and
- modified bus:
 - 45 passengers (35 Eureka, 36 Teresita, 37 Corbett, 39 Coit, 56 Rutland, and 66 Quintara)
 - 69 passengers (81X Caltrain Express, 82X Levi Plaza Express²)
 - 73 passengers (1AX California 'A' Express)³
 - 94 passengers (1BX California 'B' Express,² 8X Bayshore Express, 8AX Bayshore 'A' Express, 8BX Bayshore 'B' Express, 14 Mission, 14L Mission Limited, 14X Mission Express, 38 Geary, 38L Geary Limited, 41 Union,³ 49 Van Ness-Mission)
 - Other (lines 16X Noriega Express and 30 Stockton)⁴

² Only during AM inbound peak period.

³ Only during AM peak period.

⁴ These two lines have other modified buses specific to these lines that differ throughout the day (see Attachment C).



SAN FRANCISCO PLANNING DEPARTMENT

MEMO

TO: Planning Department Transportation Consultant List
FROM: Planning Department Transportation Team
DATE: Updated – March 10, 2014
SUBJECT: Regional & Local 2040 Cumulative Transit Screenlines for Transportation Impact Studies

Purpose

The purpose of this memorandum is to provide an update to the Cumulative screenline transit data provided in the *Transit Data for Transportation Impact Studies* memorandum dated June 21, 2013 which provided direction for the transportation analyses of transit impacts for the San Francisco Municipal Transportation Agency (SFMTA), including the use of local and regional transit screenlines.

Background

Typically, transit impacts are analyzed through a screenline analysis. A screenline analysis assumes that there are identifiable corridors or directions of travel which are served by a grouping of transit lines. Therefore, an individual line would be combined with other transit lines in a corridor and corridors combined into a screenline in determining significance. Four screenlines have been established in San Francisco to analyze potential impacts of projects on SFMTA service: the northeast screenline, the northwest screenline, the southeast screenline, and the southwest screenline, with corridors within each screenline.

The SFMTA and SF Planning Department have recently updated both the regional and local transit screenlines to address the City’s current cumulative context horizon year, 2040. These updated screenlines are included in the updated and Table A-2 and Table B-2. For Muni, the Planning Department and SFMTA use 85 percent capacity utilization as the performance standard/threshold of significance for identifying transit crowding impacts. For regional providers, the Planning Department uses 100 percent capacity utilization as the threshold of significance for identifying regional transit crowding impacts.

Applicability

Generally, the updated SFMTA data should be used in any transportation impact study that has yet to reach the screencheck submittal phase and all future transportation impact study (!) cases. The transportation planner, in coordination with the environmental planner, will determine on a case-by-case basis whether a project is not subject to this general applicability requirement. Applicability questions should be directed to the ! case planner.

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**TABLE A-2
 CUMULATIVE (2040) PEAK HOUR**

Muni Screenline Sub-corridor	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
Northeast						
Kearny/Stockton ¹	7,394	9,473	78.1%	6,295	8,329	75.6%
Other Lines ²	758	1,785	42.5%	1,229	2,065	59.5%
<i>Screenline Total</i>	8,152	11,258	72.4%	7,524	10,394	72.4%
Northwest						
Geary ³	2,673	3,763	71.0%	2,996	3,621	82.7%
California ⁴	1,989	2,306	86.3%	1,766	2,021	87.4%
Sutter/Clement ⁵	581	756	76.9%	749	756	99.1%
Fulton/Hayes ⁶	1,962	1,977	99.2%	1,762	1,878	93.8%
Balboa ⁷	690	1,008	68.5%	776	974	79.7%
<i>Screenline Total</i>	7,895	9,810	80.5%	8,049	9,250	87.0%
Southeast						
Third Street ⁸	2,422	5,712	42.4%	2,300	5,712	40.3%
Mission ⁹	3,117	3,008	103.6%	2,673	3,008	88.9%
San Bruno/Bayshore ¹⁰	1,952	2,197	88.8%	1,817	2,134	85.1%
Other Lines ¹¹	1,795	2,027	88.6%	1,582	1,927	82.1%
<i>Screenline Total</i>	9,286	12,944	71.7%	8,372	12,781	65.5%
Southwest						
Subway lines ¹²	6,314	7,020	89.9%	5,692	6,804	83.7%
Haight/Noriega ¹³	1,415	1,596	88.7%	1,265	1,596	79.3%
Other lines ¹⁴	175	560	31.3%	380	840	45.2%
<i>Screenline Total</i>	7,904	9,176	86.1%	7,337	9,240	79.4%
Muni Screenlines Total	33,237	43,188	77.0%	31,282	41,665	75.1%

Screenlines and corridors operating at capacity utilization of 85 percent or greater are highlighted in bold. Some of the individual lines within certain corridors have been adjusted to be in the appropriate city “quadrant” per the screenline. Thus, for some sub-corridors (e.g., Kearny/Stockton AM Peak Hour), the total does not match the individual lines’ maximum load point ridership and capacity.

1. 8X Bayshore Express, 30 Stockton, 30X Marina Express, 41 Union, 45 Union-Stockton, T-Third
2. E Embarcadero, F Market & Wharves, 10 Townsend, 12 Folsom-Pacific
3. 38 Geary, 38L Geary Limited, 38X Geary Express
4. 1 California, 1 California Short, 1AX California ‘A’ Express, 1BX California ‘B’ Express
5. 2 Clement, 2 Clement Short
6. 5 Fulton, 5L Fulton Limited, 21 Hayes
7. 31 Balboa, 31AX Balboa ‘A’ Express, 31BX Balboa ‘B’ Express
8. T Third Street
9. 14 Mission, 14 Mission Short, 14L Mission Limited, 14X Mission Express, 49L Van Ness-Mission Limited
10. 8AX Bayshore Express, 8BX Bayshore Express, 9 San Bruno, 9L San Bruno Limited
11. J Church, 10 Townsend, 19 Polk, 27 Bryant
12. K Ingleside, L Taraval, M Ocean View, N Judah
13. 6 Parnassus, 71L Haight-Noriega Limited, 16X Noriega Express, NX Judah Express
14. F Market & Wharves

Source: SFMTA March 2014.

**TABLE B-2
CUMULATIVE (2040) PEAK HOUR**

Regional Screenline Transit Provider/Service	AM Peak Hour (Inbound)			PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization	Ridership	Capacity	Utilization
East Bay						
BART	32,608	33,170	98.3%	30,383	33,170	91.6%
AC Transit	7,000	12,000	58.3%	7,000	12,000	58.3%
Ferries	4,682	5,940	78.8%	5,319	5,940	89.5%
<i>Screenline Total</i>	<i>44,290</i>	<i>51,110</i>	<i>86.7%</i>	<i>42,702</i>	<i>51,110</i>	<i>83.5%</i>
North Bay						
Golden Gate Transit Bus	1,990	2,543	78.3%	2,070	2,817	73.5%
Ferries	1,619	1,959	82.6%	1,619	1,959	82.6%
<i>Screenline Total</i>	<i>3,609</i>	<i>4,502</i>	<i>80.2%</i>	<i>3,689</i>	<i>4,776</i>	<i>77.2%</i>
South Bay						
BART	13,942	24,182	57.7%	13,971	24,182	57.8%
Caltrain	2,310	3,600	64.2%	2,529	3,600	70.3%
SamTrans	271	520	52.1%	150	320	46.9%
Ferries	59	200	29.5%	59	200	29.5%
<i>Screenline Total</i>	<i>16,582</i>	<i>28,502</i>	<i>58.2%</i>	<i>16,709</i>	<i>28,302</i>	<i>59.0%</i>
Regional Screenlines Total	64,481	84,114	76.7%	63,100	84,188	75.0%

Screenlines and transit providers/services operating at capacity utilization of 100 percent or greater are highlighted in **bold**.

Source: SFMTA, March 2014

APPENDIX TR-8
PROPOSED PROJECT PEDESTRIAN CROSSWALK
AND SIDEWALK LEVEL OF SERVICE ANALYSIS

ANALYSIS ASSUMPTIONS

**Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
Person Trips**

Proposed Project	Auto Person Trips			Transit Trips			Walk/Other			Project Person Trips			Persons Assigned
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
No Event - Wkday PM	548	796	1,344	157	724	881	233	337	570	938	1,858	2,796	1,452
No Event - Sat. Evening	820	887	1,707	261	413	673	361	389	750	1,442	1,688	3,130	1,423
Convention - Wkday PM	415	1,133	1,547	212	1,312	1,524	322	1,777	2,098	948	4,221	5,169	4,396
Basketball - Wkday PM	1,054	590	1,645	944	681	1,625	339	251	590	2,337	1,522	3,859	3,530
Basketball - Wkday Evening	6,396	150	6,546	4,138	232	4,371	1,304	64	1,368	11,839	446	12,285	10,975
Basketball - Wkday Late Evening	0	7,280	7,280	0	4,680	4,680	0	1,258	1,258	0	13,218	13,218	11,762
Basketball - Sat. Evening	7,120	141	7,261	4,134	176	4,310	620	61	681	11,874	378	12,251	10,799

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
 Pedestrian Volumes at Crosswalks and Sidewalks - Without Giants Game at AT&T Park
 Revised April 2015

0.258

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
2015 Existing Conditions																					
1	Third St/South St	42	91	66	88	287	25	63	31	54	173	15	15	15	15	59	17	25	10	14	67
2	Third St/16th St	30	60	31	89	210	23	42	19	67	151	15	15	15	15	59	11	25	8	17	62
3	Terry A. Francois Blvd/South St	15	15	0	15	45	13	13	0	13	40	3	3	0	3	10	11	11	0	11	34
4	Third St between South St and 16th St				56	70				41	52				19	15			19	17	36
5	South St between Third and TFB 16th		30			30		23			23		15		15			15		15	15
6	St between Third and TFB	30				30	23				23	15			15		15				15

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
Existing plus Project - No Event																					
1	Third St/South St	99	408	696	174	1,376											92	334	582	127	1,134
2	Third St/16th St	304	120	181	149	755											240	115	209	107	670
3	Terry A. Francois Blvd/South St	26	21	0	26	74											26	19	0	26	71
4	Third St between South St and 16th St				279	116													261	68	329
5	South St between Third and TFB 16th		217			217												236			236
6	St between Third and TFB	217				217											236				236

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
Existing plus Project - Convention Event																					
1	Third St/South St	252	735	2,078	403	3,468															
2	Third St/16th St	683	207	566	236	1,693															
3	Terry A. Francois Blvd/South St	134	113	0	289	537															
4	Third St between South St and 16th St				722	205					928										
5	South St between Third and TFB 16th		631			631															
6	St between Third and TFB	707				707															

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
Existing plus Project - Basketball Game																					
1	Third St/South St	101	1,039	1,207	423	2,770	1,294	3,297	3,020	1,241	8,853	2,855	2,169	4,922	1,296	11,242	1,183	3,284	2,832	1,205	8,505
2	Third St/16th St	451	393	341	422	1,607	733	610	1,274	594	3,211	807	587	1,073	587	3,054	657	609	1,141	559	2,966
3	Terry A. Francois Blvd/South St	109	185	0	191	486	368	682	0	695	1,745	392	744	0	756	1,893	388	744	0	751	1,883
4	Third St between South St and 16th St				319	132				613	208				802	312			414	137	551
5	South St between Third and TFB 16th		259			259		584			584		797			797		401			401
6	St between Third and TFB	340				340	802				802	797			797		616				616

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
 Pedestrian Volumes at Crosswalks and Sidewalks - Without Giants Game at AT&T Park
 Revised April 2015

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
2040 Cumulative - No Event																					
1	Third St/South St	141	499	762	262	1,663											109	359	592	141	1,201
2	Third St/16th St	334	180	212	238	965											251	140	217	124	732
3	Terry A. Francois Blvd/South St	41	36	0	41	119											37	58	16	49	161
4	Third St between South St and 16th St			335	186	521													280	85	366
5	South St between Third and TFB 16th		247			247												251			251
6	St between Third and TFB	247				247											251				251

#	Intersection Name	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
2040 Cumulative - Convention Event																					
1	Third St/South St	294	826	2,144	491	3,755															0
2	Third St/16th St	713	267	597	325	1,903															0
3	Terry A. Francois Blvd/South St	149	128	0	304	582															0
4	Third St between South St and 16th St			778	275	1,054															0
5	South St between Third and TFB 16th		661			661															0
6	St between Third and TFB	737				737															0

2040 Cumulative - Basketball Game

#	Intersection Name	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
2040 Cumulative - Basketball Game																					
1	Third St/South St	143	1,130	1,273	423	2,969											1,200	3,310	2,843	1,220	8,572
2	Third St/16th St	481	453	372	511	1,817											668	634	1,150	577	3,028
3	Terry A. Francois Blvd/South St	124	200	0	206	531											399	755	0	762	1,917
4	Third St between South St and 16th St			375	202	577													433	155	588
5	South St between Third and TFB 16th		289			289												416			416
6	St between Third and TFB	370				370											632				632

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Pedestrian
 Volumes at Crosswalks and Sidewalks - With Giants Game at AT&T Park Revised
 April 2015

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
2015 Existing Conditions																					
1	Third St/South St	67	135	69	112	383	41	108	66	130	345	15	15	15	15	59	23	39	55	27	145
2	Third St/16th St	32	70	32	107	241	34	44	28	120	226	15	15	15	15	59	14	23	10	22	70
3	Terry A. Francois Blvd/South St	15	15	0	15	45	13	13	0	13	40	11	11	0	11	34	11	11	0	11	34
4	Third St between South St and 16th St			42	103	145			30	111	141			19	15	34			29	19	48
5	South St between Third and TFB 16th		30			30		23		23			15		15			15			15
6	St between Third and TFB	30				30	23			23		15			15		15				15

#	Analysis Location	Weekday PM					Weekday Evening					Weekday Late Evening					Saturday Evening				
		North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total	North	South	East	West	Total
Existing plus Project - Basketball Game - with Giants																					
1	Third St/South St	126	1,083	1,210	447	2,866	1,310	3,342	3,055	1,317	9,025	2,855	2,169	4,922	1,296	11,242	1,189	3,298	2,877	1,218	8,583
2	Third St/16th St	453	403	342	440	1,638	744	612	1,283	647	3,286	807	587	1,073	587	3,054	660	607	1,143	564	2,974
3	Terry A. Francois Blvd/South St	109	185	0	191	486	368	682	0	695	1,745	400	752	0	764	1,917	388	744	0	751	1,883
4	Third St between South St and 16th St			305	165	470			602	267	869			802	312	1,114			424	139	563
5	South St between Third and TFB 16th		259			259		584		584			797		797			401			401
6	St between Third and TFB	340				340	802			802		797			797		616				616

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
Pedestrian Crosswalk + Sidewalk Analysis - Dimensions
All scenarios and time periods

Location ID	Crosswalk Location	2015 Existing		Plus Project & 2040 Cumulative	
		Length L (feet)	Width W (feet)	Length L (feet)	Width W (feet)
1	Third/South				
	North	86	12	86	12
	South	86	12	86	12.5
	East	45	20	45	20
	West				
2	Third/16th				
	North	92	12	92	15
	South	92	12	92	12
	East	66	15	66	16
	West	70	15	70	15
3	Terry Francois/South				
	North	68	12	68	12.5
	South			68	12.5
	East				
	West	45	14	45	14

Location ID	Sidewalk Location	2015 Existing		Plus Project & 2040 Cumulative	
		Actual Width Wa (feet)	Effective Width We (feet)	Actual Width Wa (feet)	Effective Width We (feet)
4	Third Street - South to 16th - East	12	6	16	8
4	Third Street - South to 16th - West	12	6	16	8
5	South Street - Third to Terry Francois - South			12.5	6.25
6	16th Street - Third to Terry Francois - North			15	7.5

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk + Sidewalk Analysis - Signal Timing
 All scenarios and time periods

2015 EXISTING

Location ID	Crosswalk Location	Weekday PM (4-6) no Giants		Weekday Evening (6-8) no Giants		Weekday Late PM (9-11) no Giants		Saturday Evening (7-9) no Giants	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313		313		FREE		FREE	
	North	100	28.7	100	28.7	90.3	28.7	90.3	28.7
	South	100	28.7	100	28.7	90.3	28.7	90.3	28.7
	East	100	46.1	100	46.1	90.3	16	90.3	16
	West								
2	Third/16th	313		313		FREE		FREE	
	North	100	34.5	100	34.5	96.7	31	96.7	31
	South	100	34.5	100	34.5	96.7	31	96.7	31
	East	100	37.8	100	37.8	96.7	26	96.7	26
	West	100	35.8	100	35.8	96.7	26	96.7	26
3	Terry Francois/South	Side street stop controlled							
	North								
	South								
	East								
	West								
Location ID	Crosswalk Location	Weekday PM (4-6) with Giants		Weekday Evening (6-8) with Giants		Weekday Late PM (9-11) with Giants		Saturday Evening (7-9) with Giants	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313		411		811		411	
	North	100	28.7	120	28.7	120	28.7	120	28.7
	South	100	28.7	120	28.7	120	28.7	120	28.7
	East	100	46.1	120	61.1	120	66.1	120	61.1
	West								
2	Third/16th	313		313		811		FREE	
	North	100	34.5	100	34.5	120	34.5	96.7	31
	South	100	34.5	100	34.5	120	34.5	96.7	31
	East	100	37.8	100	37.8	120	57.8	96.7	26
	West	100	35.8	100	35.8	120	49.8	96.7	26
3	Terry Francois/South	Side street stop controlled							
	North								
	South								
	East								
	West								

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk + Sidewalk Analysis - Signal Timing
 All scenarios and time periods

PLUS PROJECT

Location ID	Crosswalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313						FREE	
	North	100	28.7					90.3	28.7
	South	100	28.7					90.3	28.7
	East	100	46.1					90.3	26
2	Third/16th	313						FREE	
	North	100	34.5					96.7	31
	South	100	34.5					96.7	31
	East	100	37.8					96.7	26
3	Terry Francois/South	new signal						new signal	
	North	90	20					90	20
	South	90	20					90	20
	East								
	West	90	20					90	20

Location ID	Crosswalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313							
	North	100	28.7						
	South	100	28.7						
	East	100	46.1						
2	Third/16th	313							
	North	100	34.5						
	South	100	34.5						
	East	100	37.8						
3	Terry Francois/South	new signal							
	North	90	20						
	South	90	20						
	East								
	West	90	20						

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk + Sidewalk Analysis - Signal Timing
 All scenarios and time periods

Location ID	Crosswalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313		411		811		411	
	North	100	28.7	120	28.7	120	28.7	120	28.7
	South	100	28.7	120	28.7	120	28.7	120	28.7
	East	100	46.1	120	61.1	120	66.1	120	61.1
	West								
2	Third/16th	313		313		811		FREE	
	North	100	34.5	100	34.5	120	34.5	96.7	31
	South	100	34.5	100	34.5	120	34.5	96.7	31
	East	100	37.8	100	37.8	120	57.8	96.7	26
	West	100	35.8	100	35.8	120	49.8	96.7	26
3	Terry Francois/South	new signal		new signal		new signal		new signal	
	North	90	20	90	20	90	20	90	20
	South	90	20	90	20	90	20	90	20
	East								
	West	90	20	90	20	90	20	90	20

Location ID	Crosswalk Location	Weekday PM (4-6) with Basketball + Giants		Weekday Evening (6-8) with Basketball + Giants		Weekday Late PM (9-11) with Basketball + Giants		Saturday Evening (7-9) with Basketball + Giants	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313		411		811		411	
	North	100	28.7	120	28.7	120	28.7	120	28.7
	South	100	28.7	120	28.7	120	28.7	120	28.7
	East	100	46.1	120	61.1	120	66.1	120	61.1
	West								
2	Third/16th	313		313		811		FREE	
	North	100	34.5	100	34.5	120	34.5	96.7	31
	South	100	34.5	100	34.5	120	34.5	96.7	31
	East	100	37.8	100	37.8	120	57.8	96.7	26
	West	100	35.8	100	35.8	120	49.8	96.7	26
3	Terry Francois/South	new signal		new signal		new signal		new signal	
	North	90	20	90	20	90	20	90	20
	South	90	20	90	20	90	20	90	20
	East								
	West	90	20	90	20	90	20	90	20

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk + Sidewalk Analysis - Signal Timing
 All scenarios and time periods

2040 CUMULATIVE

Location ID	Crosswalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313						FREE	
	North	100	28.7					90.3	28.7
	South	100	28.7					90.3	28.7
	East	100	46.1					90.3	26
2	Third/16th	313						FREE	
	North	100	34.5					96.7	31
	South	100	34.5					96.7	31
	East	100	37.8					96.7	26
3	Terry Francois/South	new signal						new signal	
	North	90	20					90	20
	South	90	20					90	20
	East								
	West	90	20					90	20

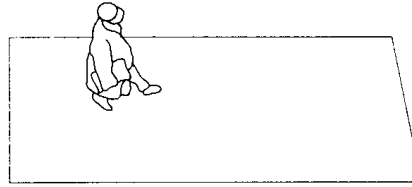
Location ID	Crosswalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313							
	North	100	28.7						
	South	100	28.7						
	East	100	46.1						
2	Third/16th	313							
	North	100	34.5						
	South	100	34.5						
	East	100	37.8						
3	Terry Francois/South	new signal							
	North	90	20						
	South	90	20						
	East								
	West	90	20						

Location ID	Crosswalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
		Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)
1	Third/South	313						411	
	North	100	28.7					120	28.7
	South	100	28.7					120	28.7
	East	100	46.1					120	61.1
2	Third/16th	313						FREE	
	North	100	34.5					96.7	31
	South	100	34.5					96.7	31
	East	100	37.8					96.7	26
3	Terry Francois/South	new signal						new signal	
	North	90	20					90	20
	South	90	20					90	20
	East								
	West	90	20					90	20

LOS A

Pedestrian Space > 60 ft²/p *Flow Rate* ≤ 5 p/min/ft

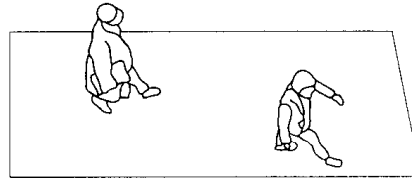
At a walkway LOS A, pedestrians move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.



LOS B

Pedestrian Space > 40–60 ft²/p *Flow Rate* > 5–7 p/min/ft

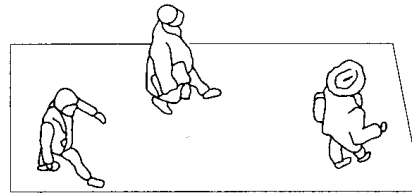
At LOS B, there is sufficient area for pedestrians to select walking speeds freely, to bypass other pedestrians, and to avoid crossing conflicts. At this level, pedestrians begin to be aware of other pedestrians, and to respond to their presence when selecting a walking path.



LOS C

Pedestrian Space > 24–40 ft²/p *Flow Rate* > 7–10 p/min/ft

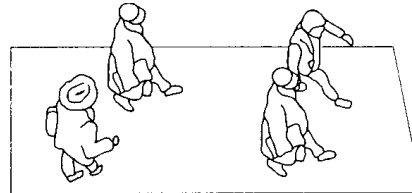
At LOS C, space is sufficient for normal walking speeds, and for bypassing other pedestrians in primarily unidirectional streams. Reverse-direction or crossing movements can cause minor conflicts, and speeds and flow rate are somewhat lower.



LOS D

Pedestrian Space > 15–24 ft²/p *Flow Rate* > 10–15 p/min/ft

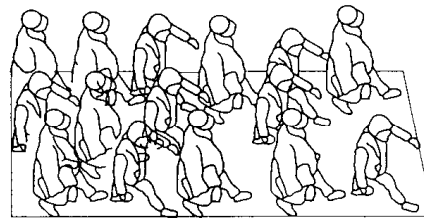
At LOS D, freedom to select individual walking speed and to bypass other pedestrians is restricted. Crossing or reverse-flow movements face a high probability of conflict, requiring frequent changes in speed and position. The LOS provides reasonably fluid flow, but friction and interaction between pedestrians is likely.



LOS E

Pedestrian Space > 8–15 ft²/p *Flow Rate* > 15–23 p/min/ft

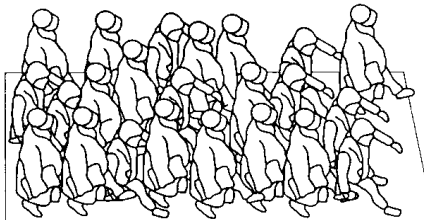
At LOS E, virtually all pedestrians restrict their normal walking speed, frequently adjusting their gait. At the lower range, forward movement is possible only by shuffling. Space is not sufficient for passing slower pedestrians. Cross- or reverse-flow movements are possible only with extreme difficulties. Design volumes approach the limit of walkway capacity, with stoppages and interruptions to flow.



LOS F

Pedestrian Space ≤ 8 ft²/p *Flow Rate* varies p/min/ft

At LOS F, all walking speeds are severely restricted, and forward progress is made only by shuffling. There is frequent, unavoidable contact with other pedestrians. Cross- and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrians than of moving pedestrian streams.



Pedestrian Walkway LOS

Source: Highway Capacity Manual (HCM 2000), Transportation Research Board, Washington DC, 2000

CROSSWALK ANALYSIS

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis
 All scenarios and time periods

2015 EXISTING

Crosswalk Location	Weekday PM (4-6) no Giants		Weekday Evening (6-8) no Giants		Weekday Late PM (9-11) no Giants		Saturday Evening (7-9) no Giants	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	472	A	793	A	1496	A	1285	A
South	216	A	313	A	1496	A	875	A
East	1093	A	2333	A	1315	A	1909	A
West	-	-	-	-	-	-	-	-
Third/16th								
North	868	A	1131	A	1531	A	2024	A
South	432	A	618	A	1531	A	896	A
East	1338	A	2180	A	1702	A	3079	A
West	424	A	564	A	1658	A	1424	A
Terry Francois/South								
North	-	-	-	-	-	-	-	-
South	-	-	-	-	-	-	-	-
East	-	-	-	-	-	-	-	-
West	-	-	-	-	-	-	-	-

Crosswalk Location	Weekday PM (4-6) with Giants		Weekday Evening (6-8) with Giants		Weekday late (9-11) with Giants		Weekend late (7-9) with Giants	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	294	A	401	A	1124	A	714	A
South	144	A	150	A	1124	A	421	A
East	1045	A	1253	A	6172	A	1502	A
West	-	-	-	-	-	-	-	-
Third/16th								
North	814	A	764	A	1474	A	1594	A
South	370	A	590	A	1474	A	973	A
East	1296	A	1479	A	4006	A	2472	A
West	351	A	313	A	3323	A	1102	A
Terry Francois/South								
North	-	-	-	-	-	-	-	-
South	-	-	-	-	-	-	-	-
East	-	-	-	-	-	-	-	-
West	-	-	-	-	-	-	-	-

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis
 All scenarios and time periods

PLUS PROJECT

Crosswalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	198	A	-	-	-	-	237	A
South	48	B	-	-	-	-	66	A
East	95	A	-	-	-	-	62	A
West	-	-	-	-	-	-	-	-
Third/16th								
North	104	A	-	-	-	-	115	A
South	214	A	-	-	-	-	194	A
East	239	A	-	-	-	-	124	A
West	251	A	-	-	-	-	225	A
Terry Francois/South								
North	529	A	-	-	-	-	532	A
South	676	A	-	-	-	-	745	A
East	-	-	-	-	-	-	-	-
West	728	A	-	-	-	-	732	A
Crosswalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	76	A	-	-	-	-	-	-
South	25	C	-	-	-	-	-	-
East	27	C	-	-	-	-	-	-
West	-	-	-	-	-	-	-	-
Third/16th								
North	44	B	-	-	-	-	-	-
South	122	A	-	-	-	-	-	-
East	73	A	-	-	-	-	-	-
West	156	A	-	-	-	-	-	-
Terry Francois/South								
North	102	A	-	-	-	-	-	-
South	121	A	-	-	-	-	-	-
East	-	-	-	-	-	-	-	-
West	62	A	-	-	-	-	-	-
Crosswalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	194	A	10	E	4	F	11	E
South	17	D	3	F	5	F	3	F
East	52	B	19	D	11	E	21	D
West	-	-	-	-	-	-	-	-
Third/16th								
North	69	A	41	B	30	C	40	C
South	63	A	39	C	33	C	34	C
East	124	A	29	C	51	B	20	D
West	85	A	59	B	76	A	40	B
Terry Francois/South								
North	126	A	36	C	33	C	34	C
South	73	A	18	D	16	D	16	D
East	-	-	-	-	-	-	-	-
West	96	A	24	D	21	D	22	D

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis
 All scenarios and time periods

Crosswalk Location	Weekday PM (4-6) with Basketball + Giants		Weekday Evening (6-8) with Basketball + Giants		Weekday Late PM (9-11) with Basketball + Giants		Saturday Evening (7-9) with Basketball + Giants	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	155	A	10	E	4	F	11	E
South	16	D	3	F	5	F	3	F
East	52	B	19	D	11	E	20	D
West	-	-	-	-	-	-	-	-
Third/16th								
North	68	A	40	B	30	C	40	C
South	61	A	39	C	33	C	34	C
East	124	A	29	C	51	B	20	D
West	81	A	54	B	76	A	40	C
Terry Francois/South								
North	126	A	36	C	32	C	34	C
South	73	A	18	D	16	D	16	D
East	-	-	-	-	-	-	-	-
West	96	A	24	D	21	D	22	D

2040 CUMULATIVE

Crosswalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	138	A	-	-	-	-	199	A
South	38	C	-	-	-	-	61	A
East	86	A	-	-	-	-	61	A
West	-	-	-	-	-	-	-	-
Third/16th								
North	94	A	-	-	-	-	109	A
South	142	A	-	-	-	-	158	A
East	203	A	-	-	-	-	120	A
West	155	A	-	-	-	-	194	A
Terry Francois/South								
North	336	A	-	-	-	-	374	A
South	391	A	-	-	-	-	240	A
East	-	-	-	-	-	-	-	-
West	463	A	-	-	-	-	388	A

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis

Pedestrian Crosswalk Analysis

All scenarios and time periods

Crosswalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	65	A	-	-	-	-	-	-
South	22	D	-	-	-	-	-	-
East	26	C	-	-	-	-	-	-
West	-	-	-	-	-	-	-	-
Third/16th								
North	42	B	-	-	-	-	-	-
South	94	A	-	-	-	-	-	-
East	68	A	-	-	-	-	-	-
West	112	A	-	-	-	-	-	-
Terry Francois/South								
North	91	A	-	-	-	-	-	-
South	107	A	-	-	-	-	-	-
East	-	-	-	-	-	-	-	-
West	59	B	-	-	-	-	-	-
Crosswalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS	(sq.ft./ped)	LOS
Third/South								
North	136	A	-	-	-	-	11	E
South	15	D	-	-	-	-	3	F
East	49	B	-	-	-	-	21	D
West	-	-	-	-	-	-	-	-
Third/16th								
North	64	A	-	-	-	-	39	C
South	54	B	-	-	-	-	33	C
East	113	A	-	-	-	-	20	D
West	69	A	-	-	-	-	39	C
Terry Francois/South								
North	110	A	-	-	-	-	33	C
South	67	A	-	-	-	-	16	D
East	-	-	-	-	-	-	-	-
West	89	A	-	-	-	-	21	D

LOS	Space per Ped Xing (sq.ft./ped)
A	> 60
B	> 40 - 60
C	> 24 - 40
D	> 15 - 24
E	> 8 - 15
F	≤ 8

Source: Highway Capacity Manual, 2000, Ch 18, p.12

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis - Level of Service Calculations
 All scenarios and time periods

Pedestrian walking speed, Sp:
 3.5 ft/sec

2015 EXISTING

		Weekday PM (4-6) no Giants															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South			313		199	55	27	27								
	1 North	86	12	100	28.7	5	42	12	6	6	16940	1	1	1	28	36	472 A
	1 South	86	12	100	28.7	6	91	25	13	13	16940	1	1	2	28	78	216 A
	1 East	45	20	100	46.1	7	66	18	9	9	35704	1	1	1	16	33	1093 A
	1 West																
2	Third/16th			313		210	58	29	29								
	2 North	92	12	100	34.5	5	30	8	4	4	23578	0	0	1	30	27	868 A
	2 South	92	12	100	34.5	6	60	17	8	8	23578	1	1	1	30	55	432 A
	2 East	66	15	100	37.8	7	31	9	4	4	28088	0	0	1	22	21	1338 A
	2 West	70	15	100	35.8	8	89	24	12	12	27090	1	1	2	24	64	424 A
3	Terry Francois/South																
	3 North																
	3 South																
	3 East																
	3 West																

		Weekday PM (4-6) with Giants															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South			313		271	75	37	37								
	1 North	86	12	100	28.7	5	67	18	9	9	16940	1	1	1	28	58	294 A
	1 South	86	12	100	28.7	6	135	37	19	19	16940	2	2	3	28	117	144 A
	1 East	45	20	100	46.1	7	69	19	9	9	35704	1	1	1	16	34	1045 A
	1 West																
2	Third/16th			313		241	66	33	33								
	2 North	92	12	100	34.5	5	32	9	4	4	23578	0	0	1	30	29	814 A
	2 South	92	12	100	34.5	6	70	19	10	10	23578	1	1	1	30	64	370 A
	2 East	66	15	100	37.8	7	32	9	4	4	28088	0	0	1	22	22	1296 A
	2 West	70	15	100	35.8	8	107	29	15	15	27090	2	2	2	24	77	351 A
3	Terry Francois/South																
	3 North																
	3 South																
	3 East																
	3 West																

PLUS PROJECT

		Weekday PM (4-6) no event															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South					1202	331	165	165								
	1 North	86	12	100	28.7	5	99	27	14	14	16940	2	2	2	28	85	198 A
	1 South	86	12.5	100	28.7	6	408	112	56	56	17645	6	6	9	30	370	48 B
	1 East	45	20	100	46.1	7	696	191	96	96	35704	11	11	11	18	374	95 A
	1 West																
2	Third/16th					755	208	104	104								
	2 North	92	15	100	34.5	5	304	84	42	42	29473	5	5	6	31	285	104 A
	2 South	92	12	100	34.5	6	120	33	16	16	23578	2	2	2	30	110	214 A
	2 East	66	16	100	37.8	7	181	50	25	25	29960	3	3	3	23	125	239 A
	2 West	70	15	100	35.8	8	149	41	20	20	27090	2	2	3	24	108	251 A
3	Terry Francois/South					74	20	10	10								
	3 North	68	12.5	90	20	5	26	7	4	4	8743	0	0	1	23	17	529 A
	3 South	68	12.5	90	20	6	21	6	3	3	8743	0	0	0	23	13	676 A
	3 East	0	0	0	0	7	0	0	0	0							
	3 West	45	14	90	20	8	26	7	4	4	8550	0	0	1	16	12	728 A

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis - Level of Service Calculations
 All scenarios and time periods

Pedestrian walking speed, Sp:
 3.5 ft/sec

		Weekday PM (4-6) with Convention															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		Vi (ped/cycle)	Vo (ped/cycle)					
1 Third/South																	
1 North		86	12	100	28.7	3065	843	421	421	16940	4	4	5	29	223	76	A
1 South		86	12.5	100	28.7	6	735	202	101	17645	11	11	16	31	701	25	C
1 East		45	20	100	46.1	7	2078	572	286	35704	32	32	34	21	1313	27	C
1 West																	
2 Third/16th																	
2 North		92	15	100	34.5	1693	466	233	233	29473	10	10	14	32	667	44	B
2 South		92	12	100	34.5	6	207	57	28	23578	3	3	4	30	193	122	A
2 East		66	16	100	37.8	7	566	156	78	29960	9	9	11	24	413	73	A
2 West		70	15	100	35.8	8	236	65	32	27090	4	4	5	24	173	156	A
3 Terry Francois/South																	
3 North		68	12.5	90	20	537	148	74	74	8743	2	2	3	23	86	102	A
3 South		68	12.5	90	20	6	113	31	16	8743	2	2	2	23	72	121	A
3 East																	
3 West		45	14	90	20	8	289	79	40	8550	4	4	6	17	137	62	A
		Weekday PM (4-6) with Basketball															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		Vi (ped/cycle)	Vo (ped/cycle)					
1 Third/South																	
1 North		86	12	100	28.7	2347	645	323	323	16940	2	2	2	28	87	194	A
1 South		86	12.5	100	28.7	5	1039	286	143	17645	16	16	23	33	1037	17	D
1 East		45	20	100	46.1	7	1207	332	166	35704	18	18	20	19	691	52	B
1 West																	
2 Third/16th																	
2 North		92	15	100	34.5	1607	442	221	221	29473	7	7	9	31	429	69	A
2 South		92	12	100	34.5	6	393	108	54	23578	6	6	8	31	376	63	A
2 East		66	16	100	37.8	7	341	94	47	29960	5	5	6	23	241	124	A
2 West		70	15	100	35.8	8	422	116	58	27090	6	6	8	25	319	85	A
3 Terry Francois/South																	
3 North		68	12.5	90	20	486	134	67	67	8743	1	1	2	23	69	126	A
3 South		68	12.5	90	20	5	109	30	15	8743	3	3	4	23	120	73	A
3 East																	
3 West		45	14	90	20	8	191	53	26	8550	3	3	4	17	89	96	A
		Weekday PM (4-6) with Basketball + Giants															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		Vi (ped/cycle)	Vo (ped/cycle)					
1 Third/South																	
1 North		86	12	100	28.7	2419	665	333	333	16940	2	2	3	28	109	155	A
1 South		86	12.5	100	28.7	6	1083	298	149	17645	17	17	24	33	1087	16	D
1 East		45	20	100	46.1	7	1210	333	166	35704	18	18	20	19	693	52	B
1 West																	
2 Third/16th																	
2 North		92	15	100	34.5	1638	451	225	225	29473	7	7	9	31	431	68	A
2 South		92	12	100	34.5	6	403	111	55	23578	6	6	8	31	386	61	A
2 East		66	16	100	37.8	7	342	94	47	29960	5	5	6	23	242	124	A
2 West		70	15	100	35.8	8	440	121	61	27090	7	7	9	25	333	81	A
3 Terry Francois/South																	
3 North		68	12.5	90	20	486	134	67	67	8743	1	1	2	23	69	126	A
3 South		68	12.5	90	20	6	185	51	25	8743	3	3	4	23	120	73	A
3 East																	
3 West		45	14	90	20	8	191	53	26	8550	3	3	4	17	89	96	A

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Crosswalk Analysis - Level of Service Calculations
 All scenarios and time periods

Pedestrian walking speed, Sp:
 3.5 ft/sec

2040 CUMULATIVE

		Weekday PM (4-6) no event															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South						1401	385	193	193								
	1 North	86	12	100	28.7	5	141	39	19	16940	2	2	3	28	123	138	A
	1 South	86	12.5	100	28.7	6	499	137	69	17645	8	8	11	30	459	38	C
	1 East	45	20	100	46.1	7	762	209	105	35704	12	12	13	18	413	86	A
1 West																	
2 Third/16th						965	265	133	133								
	2 North	92	15	100	34.5	5	334	92	46	29473	5	5	7	31	314	94	A
	2 South	92	12	100	34.5	6	180	49	25	23578	3	3	4	30	167	142	A
	2 East	66	16	100	37.8	7	212	58	29	29960	3	3	4	23	148	203	A
	2 West	70	15	100	35.8	8	238	65	33	27090	4	4	5	24	175	155	A
3 Terry Francois/South						119	33	16	16								
	3 North	68	12.5	90	20	5	41	11	6	8743	1	1	1	23	26	336	A
	3 South	68	12.5	90	20	6	36	10	5	8743	0	0	1	23	22	391	A
	3 East																
	3 West	45	14	90	20	8	41	11	6	8550	1	1	1	16	18	463	A
		Weekday PM (4-6) with Convention															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South						3264	898	449	449								
	1 North	86	12	100	28.7	5	294	81	40	16940	4	4	6	29	262	65	A
	1 South	86	12.5	100	28.7	6	826	227	114	17645	13	13	18	32	799	22	D
	1 East	45	20	100	46.1	7	2144	590	295	35704	33	33	35	21	1365	26	C
1 West																	
2 Third/16th						1903	523	262	262								
	2 North	92	15	100	34.5	5	713	196	98	29473	11	11	14	32	699	42	B
	2 South	92	12	100	34.5	6	267	73	37	23578	4	4	5	31	251	94	A
	2 East	66	16	100	37.8	7	597	164	82	29960	9	9	11	24	437	68	A
	2 West	70	15	100	35.8	8	325	89	45	27090	5	5	6	24	242	112	A
3 Terry Francois/South						582	160	80	80								
	3 North	68	12.5	90	20	5	149	41	21	8743	2	2	3	23	96	91	A
	3 South	68	12.5	90	20	6	128	35	18	8743	2	2	3	23	82	107	A
	3 East																
	3 West	45	14	90	20	8	304	84	42	8550	4	4	7	17	145	59	B
		Weekday PM (4-6) with Basketball															
Location ID	Crosswalk Location	Length L (feet)	Width W (feet)	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South						2546	700	350	350								
	1 North	86	12	100	28.7	5	143	39	20	16940	2	2	3	28	124	136	A
	1 South	86	12.5	100	28.7	6	1130	311	155	17645	17	17	25	33	1142	15	D
	1 East	45	20	100	46.1	7	1273	350	175	35704	19	19	21	19	735	49	B
1 West																	
2 Third/16th						1817	500	250	250								
	2 North	92	15	100	34.5	5	481	132	66	29473	7	7	10	31	459	64	A
	2 South	92	12	100	34.5	6	453	125	62	23578	7	7	9	32	437	54	B
	2 East	66	16	100	37.8	7	372	102	51	29960	6	6	7	23	264	113	A
	2 West	70	15	100	35.8	8	511	141	70	27090	8	8	10	25	391	69	A
3 Terry Francois/South						531	146	73	73								
	3 North	68	12.5	90	20	5	124	34	17	8743	2	2	3	23	79	110	A
	3 South	68	12.5	90	20	6	200	55	28	8743	3	3	4	24	130	67	A
	3 East																
	3 West	45	14	90	20	8	206	57	28	8550	3	3	4	17	96	89	A

Event Center and Mixed-Use Development
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2015 EXISTING

		Weekday Evening (6-8) no Giants													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi	SB or WB Vo					
1	Third/South	313		119	33	16	16	16940	0	0	1	28	21	793	A
	1 North	100	28.7	12	25	7	3	16940	0	0	1	28	21	793	A
	1 South	100	28.7	13	63	17	9	16940	1	1	1	28	54	313	A
	1 East	100	46.1	14	31	9	4	35704	0	0	1	16	15	2333	A
	1 West														
2	Third/16th	313		151	42	21	21								
	2 North	100	34.5	12	23	6	3	23578	0	0	0	30	21	1131	A
	2 South	100	34.5	13	42	12	6	23578	1	1	1	30	38	618	A
	2 East	100	37.8	14	19	5	3	28088	0	0	0	22	13	2180	A
	2 West	100	35.8	15	67	18	9	27090	1	1	1	23	48	564	A
3	Terry Francois/South														
	3 North														
	3 South														
	3 East														
	3 West														

		Weekday Evening (6-8) with Giants													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi	SB or WB Vo					
1	Third/South	411		215	59	30	30								
	1 North	120	28.7	12	41	11	6	16940	1	1	1	28	42	401	A
	1 South	120	28.7	13	108	30	15	16940	2	2	3	28	113	150	A
	1 East	120	61.1	14	66	18	9	49204	1	1	1	16	39	1253	A
	1 West														
2	Third/16th	313		226	62	31	31								
	2 North	100	34.5	12	34	9	5	23578	1	1	1	30	31	764	A
	2 South	100	34.5	13	44	12	6	23578	1	1	1	30	40	590	A
	2 East	100	37.8	14	28	8	4	28088	0	0	1	22	19	1479	A
	2 West	100	35.8	15	120	33	17	27090	2	2	2	24	87	313	A
3	Terry Francois/South														
	3 North														
	3 South														
	3 East														
	3 West														

PLUS PROJECT

		Weekday Evening (6-8) no event													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi	SB or WB Vo					
1	Third/South														
	1 North														
	1 South														
	1 East														
	1 West														
2	Third/16th														
	2 North														
	2 South														
	2 East														
	2 West														
3	Terry Francois/South														
	3 North														
	3 South														
	3 East														
	3 West														

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

		Weekday Evening (6-8) with Convention													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South														
	1 North														
	1 South														
	1 East														
	1 West														
2	Third/16th														
	2 North														
	2 South														
	2 East														
	2 West														
3	Terry Francois/South														
	3 North														
	3 South														
	3 East														
	3 West														

		Weekday Evening (6-8) with Basketball														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS	
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)						
1	Third/South			7612	2093	1047	1047									
	1 North	120	28.7	12	1294	356	178	178	16940	24	24	36	36	1704	10	E
	1 South	120	28.7	13	3297	907	453	453	17645	60	60	92	48	5760	3	F
	1 East	120	61.1	14	3020	830	415	415	49204	55	55	54	23	2590	19	D
	1 West															
2	Third/16th			3211	883	442	442									
	2 North	100	34.5	12	733	202	101	101	29473	11	11	15	32	719	41	B
	2 South	100	34.5	13	610	168	84	84	23578	9	9	12	32	601	39	C
	2 East	100	37.8	14	1274	350	175	175	29960	19	19	24	26	1018	29	C
	2 West	100	35.8	15	594	163	82	82	27090	9	9	12	25	459	59	B
3	Terry Francois/South			1745	480	240	240									
	3 North	90	20	12	368	101	51	51	8743	5	5	8	24	246	36	C
	3 South	90	20	13	682	187	94	94	8743	9	9	15	26	483	18	D
	3 East															
	3 West	90	20	15	695	191	96	96	8550	10	10	15	19	362	24	D

		Weekday Evening (6-8) with Basketball + Giants														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS	
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)						
1	Third/South			7708	2120	1060	1060									
	1 North	120	28.7	12	1310	360	180	180	16940	24	24	37	36	1730	10	E
	1 South	120	28.7	13	3342	919	460	460	17645	61	61	93	48	5872	3	F
	1 East	120	61.1	14	3055	840	420	420	49204	56	56	55	23	2630	19	D
	1 West															
2	Third/16th			3286	904	452	452									
	2 North	100	34.5	12	744	205	102	102	29473	11	11	15	32	731	40	B
	2 South	100	34.5	13	612	168	84	84	23578	9	9	12	32	603	39	C
	2 East	100	37.8	14	1283	353	176	176	29960	20	20	24	26	1026	29	C
	2 West	100	35.8	15	647	178	89	89	27090	10	10	13	25	504	54	B
3	Terry Francois/South			1745	480	240	240									
	3 North	90	20	12	368	101	51	51	8743	5	5	8	24	246	36	C
	3 South	90	20	13	682	187	94	94	8743	9	9	15	26	483	18	D
	3 East															
	3 West	90	20	15	695	191	96	96	8550	10	10	15	19	362	24	D

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2040 CUMULATIVE

		Weekday Evening (6-8) no event												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													
3	West													

		Weekday Evening (6-8) with Convention												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													
3	West													

		Weekday Evening (6-8) with Basketball												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													
3	West													

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2015 EXISTING

		Weekday PM Late (9-11) no Giants													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South	FREE		44	12	6	6								
1	North	90.3	28.7	18	15	4	2	2	16940	0	0	0	28	11	1496 A
1	South	90.3	28.7	19	15	4	2	2	16940	0	0	0	28	11	1496 A
1	East	90.3	16	20	15	4	2	2	8614	0	0	0	16	7	1315 A
1	West														
2	Third/16th	FREE		59	16	8	8								
2	North	96.7	31	18	15	4	2	2	19714	0	0	0	30	13	1531 A
2	South	96.7	31	19	15	4	2	2	19714	0	0	0	30	13	1531 A
2	East	96.7	26	20	15	4	2	2	16406	0	0	0	22	10	1702 A
2	West	96.7	26	21	15	4	2	2	16800	0	0	0	23	10	1658 A
3	Terry Francois/South														
3	North														
3	South														
3	East														
3	West														

		Weekday PM Late (9-11) with Giants													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South	811		44	12	6	6								
1	North	120	28.7	18	15	4	2	2	16940	0	0	0	28	15	1124 A
1	South	120	28.7	19	15	4	2	2	16940	0	0	0	28	15	1124 A
1	East	120	66.1	20	15	4	2	2	53704	0	0	0	16	9	6172 A
1	West														
2	Third/16th	811		59	16	8	8								
2	North	120	34.5	18	15	4	2	2	23578	0	0	0	30	16	1474 A
2	South	120	34.5	19	15	4	2	2	23578	0	0	0	30	16	1474 A
2	East	120	57.8	20	15	4	2	2	47888	0	0	0	22	12	4006 A
2	West	120	49.8	21	15	4	2	2	41790	0	0	0	23	13	3323 A
3	Terry Francois/South														
3	North														
3	South														
3	East														
3	West														

PLUS PROJECT

		Weekday PM Late (9-11) no event													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South														
1	North														
1	South														
1	East														
1	West														
2	Third/16th														
2	North														
2	South														
2	East														
2	West														
3	Terry Francois/South														
3	North														
3	South														
3	East														
3	West														

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

		Weekday PM Late (9-11) with Convention													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South														
1	North														
1	South														
1	East														
1	West														
2	Third/16th														
2	North														
2	South														
2	East														
2	West														
3	Terry Francois/South														
3	North														
3	South														
3	East														
3	West														

		Weekday PM Late (9-11) with Basketball													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South			9946	2735	1368	1368								
1	North	120	28.7	18	2855	785	393	16940	52	52	80	46	4783	4	F
1	South	120	28.7	19	2169	596	298	17645	40	40	60	41	3247	5	F
1	East	120	66.1	20	4922	1354	677	53704	90	90	81	27	4873	11	E
1	West														
2	Third/16th			3054	840	420	420								
2	North	120	34.5	18	807	222	111	29473	15	15	21	33	984	30	C
2	South	120	34.5	19	587	162	81	23578	11	11	15	33	709	33	C
2	East	120	57.8	20	1073	295	148	51080	20	20	20	25	1003	51	B
2	West	120	49.8	21	587	162	81	41790	11	11	13	25	548	76	A
3	Terry Francois/South			1893	520	260	260								
3	North	90	20	18	392	108	54	8743	5	5	8	24	264	33	C
3	South	90	20	19	744	205	102	8743	10	10	16	26	533	16	D
3	East														
3	West	90	20	21	756	208	104	8550	10	10	16	19	399	21	D

		Weekday PM Late (9-11) with Basketball + Giants													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1	Third/South			9946	2735	1368	1368								
1	North	120	28.7	18	2855	785	393	16940	52	52	80	46	4783	4	F
1	South	120	28.7	19	2169	596	298	17645	40	40	60	41	3247	5	F
1	East	120	66.1	20	4922	1354	677	53704	90	90	81	27	4873	11	E
1	West														
2	Third/16th			3054	840	420	420								
2	North	120	34.5	18	807	222	111	29473	15	15	21	33	984	30	C
2	South	120	34.5	19	587	162	81	23578	11	11	15	33	709	33	C
2	East	120	57.8	20	1073	295	148	51080	20	20	20	25	1003	51	B
2	West	120	49.8	21	587	162	81	41790	11	11	13	25	548	76	A
3	Terry Francois/South			1917	527	264	264								
3	North	90	20	18	400	110	55	8743	6	6	9	24	270	32	C
3	South	90	20	19	752	207	103	8743	10	10	16	26	540	16	D
3	East														
3	West	90	20	21	764	210	105	8550	11	11	16	19	404	21	D

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2040 CUMULATIVE

		Weekday PM Late (9-11) no event												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													

		Weekday PM Late (9-11) with Convention												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													

		Weekday PM Late (9-11) with Basketball												
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)					
1	Third/South													
	1 North													
	1 South													
	1 East													
2	Third/16th													
	2 North													
	2 South													
	2 East													
3	Terry Francois/South													
	3 North													
	3 South													
	3 East													

Event Center and Mixed-Use Development
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2015 EXISTING

		Saturday Evening (7-9) no Giants														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB	NB or EB					
1	Third/South	FREE		52	14	7	7									
1	North	90.3	28.7	25	17	5	2	2	16940	0	0	0	28	13	1285	A
1	South	90.3	28.7	26	25	7	3	3	16940	0	0	0	28	19	875	A
1	East	90.3	16	27	10	3	1	1	8614	0	0	0	16	5	1909	A
1	West															
2	Third/16th	FREE		62	17	8	8									
2	North	96.7	31	25	11	3	2	2	19714	0	0	0	30	10	2024	A
2	South	96.7	31	26	25	7	3	3	19714	0	0	1	30	22	896	A
2	East	96.7	26	27	8	2	1	1	16406	0	0	0	22	5	3079	A
2	West	96.7	26	28	17	5	2	2	16800	0	0	0	23	12	1424	A
3	Terry Francois/South															
3	North															
3	South															
3	East															
3	West															

		Saturday Evening (7-9) with Giants														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB	NB or EB					
1	Third/South	411		117	32	16	16									
1	North	120	28.7	25	23	6	3	3	16940	0	0	1	28	24	714	A
1	South	120	28.7	26	39	11	5	5	16940	1	1	1	28	40	421	A
1	East	120	61.1	27	55	15	8	8	49204	1	1	1	16	33	1502	A
1	West															
2	Third/16th	FREE		70	19	10	10									
2	North	96.7	31	25	14	4	2	2	19714	0	0	0	30	12	1594	A
2	South	96.7	31	26	23	6	3	3	19714	0	0	0	30	20	973	A
2	East	96.7	26	27	10	3	1	1	16406	0	0	0	22	7	2472	A
2	West	96.7	26	28	22	6	3	3	16800	0	0	0	23	15	1102	A
3	Terry Francois/South															
3	North															
3	South															
3	East															
3	West															

PLUS PROJECT

		Saturday Evening (7-9) no event														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB	NB or EB					
1	Third/South			1007	277	139	139									
1	North	90.3	28.7	25	92	25	13	13	16940	1	1	2	28	72	237	A
1	South	90.3	28.7	26	334	92	46	46	17645	5	5	6	29	268	66	A
1	East	90.3	26	27	582	160	80	80	17614	8	8	11	18	282	62	A
1	West															
2	Third/16th			670	184	92	92									
2	North	96.7	31	25	240	66	33	33	24643	4	4	5	30	215	115	A
2	South	96.7	31	26	115	32	16	16	19714	2	2	2	30	102	194	A
2	East	96.7	26	27	209	57	29	29	17499	3	3	5	23	141	124	A
2	West	96.7	26	28	107	29	15	15	16800	2	2	2	24	75	225	A
3	Terry Francois/South			71	20	10	10									
3	North	90	20	25	26	7	4	4	8743	0	0	1	23	16	532	A
3	South	90	20	26	19	5	3	3	8743	0	0	0	23	12	745	A
3	East															
3	West	90	20	28	26	7	4	4	8550	0	0	1	16	12	732	A

Event Center and Mixed-Use Development a
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

		Saturday Evening (7-9) with Convention													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)					
1 Third/South															
1 North															
1 South															
1 East															
1 West															
2 Third/16th															
2 North															
2 South															
2 East															
2 West															
3 Terry Francois/South															
3 North															
3 South															
3 East															
3 West															

		Saturday Evening (7-9) with Basketball														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS	
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)						
1 Third/South																
1 North		120	28.7	25	1183	2007	1004	1004	16940	22	22	33	35	1527	11	E
1 South		120	28.7	26	3284	903	452	452	17645	60	60	92	48	5728	3	F
1 East		120	61.1	27	2832	779	389	389	49204	52	52	51	23	2382	21	D
1 West																
2 Third/16th																
2 North		96.7	31	25	657	181	90	90	24643	10	10	13	32	618	40	C
2 South		96.7	31	26	609	167	84	84	19714	9	9	12	32	580	34	C
2 East		96.7	26	27	1141	314	157	157	17499	17	17	25	26	884	20	D
2 West		96.7	26	28	559	154	77	77	16800	8	8	12	25	419	40	B
3 Terry Francois/South																
3 North		90	20	25	1883	518	259	259	8743	5	5	8	24	261	34	C
3 South		90	20	26	744	205	102	102	8743	10	10	16	26	533	16	D
3 East																
3 West		90	20	28	751	207	103	103	8550	10	10	16	19	396	22	D

		Saturday Evening (7-9) with Basketball + Giants														
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min NB or EB SB or WB	Time-space TS (sq.ft.-sec)	Pedestrian Flow			Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS	
								NB or EB Vi (ped/cycle)	SB or WB Vo (ped/cycle)	SB or WB Vo (ped/cycle)						
1 Third/South																
1 North		120	28.7	25	1189	327	163	163	16940	22	22	33	35	1536	11	E
1 South		120	28.7	26	3298	907	454	454	17645	60	60	92	48	5762	3	F
1 East		120	61.1	27	2877	791	396	396	49204	53	53	52	23	2432	20	D
1 West																
2 Third/16th																
2 North		96.7	31	25	660	181	91	91	24643	10	10	13	32	621	40	C
2 South		96.7	31	26	607	167	83	83	19714	9	9	12	32	578	34	C
2 East		96.7	26	27	1143	314	157	157	17499	17	17	25	26	886	20	D
2 West		96.7	26	28	564	155	78	78	16800	8	8	12	25	424	40	C
3 Terry Francois/South																
3 North		90	20	25	1883	518	259	259	8743	5	5	8	24	261	34	C
3 South		90	20	26	744	205	102	102	8743	10	10	16	26	533	16	D
3 East																
3 West		90	20	28	751	207	103	103	8550	10	10	16	19	396	22	D

Event Center and Mixed-Use Development
 Pedestrian Crosswalk Analysis - Level of Service
 All scenarios and time periods

2040 CUMULATIVE

		Saturday Evening (7-9) no event													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South				1060	291	146	146								
1	North	90.3	28.7	25	109	30	15	16940	2	2	2	28	85	199	A
1	South	90.3	28.7	26	359	99	49	17645	5	5	7	29	289	61	A
1	East	90.3	26	27	592	163	81	17614	8	8	12	18	288	61	A
1	West														
2 Third/16th				732	201	101	101								
2	North	96.7	31	25	251	69	35	24643	4	4	5	30	225	109	A
2	South	96.7	31	26	140	38	19	19714	2	2	3	30	125	158	A
2	East	96.7	26	27	217	60	30	17499	3	3	5	23	146	120	A
2	West	96.7	26	28	124	34	17	16800	2	2	3	24	87	194	A
3 Terry Francois/South				161	44	22	22								
3	North	90	20	25	37	10	5	8743	1	1	1	23	23	374	A
3	South	90	20	26	58	16	8	8743	1	1	1	23	36	240	A
3	East														
3	West	90	20	28	49	14	7	8550	1	1	1	16	22	388	A

		Saturday Evening (7-9) with Convention													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South															
1	North														
1	South														
1	East														
1	West														
2 Third/16th															
2	North														
2	South														
2	East														
2	West														
3 Terry Francois/South															
3	North														
3	South														
3	East														
3	West														

		Saturday Evening (7-9) with Basketball													
Location ID	Crosswalk Location	Cycle Length C (sec)	Pedestrian Green Time WALK+FDW (sec)	Pedestrians Hourly	Max Ped per 15 min	Max Ped per 15 min		Time-space TS (sq.ft.-sec)	Pedestrian Flow		Max # ped accumulated N (ped/cycle)	Xing Time t (sec)	Occupancy Time T (ped-sec)	Space per Ped Xing M (sq.ft./ped)	LOS
						NB or EB	SB or WB		NB or EB	SB or WB					
1 Third/South				7352	2022	1011	1011								
1	North	120	28.7	25	1200	330	165	16940	22	22	33	35	1554	11	E
1	South	120	28.7	26	3310	910	455	17645	61	61	92	48	5790	3	F
1	East	120	61.1	27	2843	782	391	49204	52	52	51	23	2393	21	D
1	West														
2 Third/16th				3028	833	416	416								
2	North	96.7	31	25	668	184	92	24643	10	10	13	32	630	39	C
2	South	96.7	31	26	634	174	87	19714	9	9	13	32	606	33	C
2	East	96.7	26	27	1150	316	158	17499	17	17	25	26	891	20	D
2	West	96.7	26	28	577	159	79	16800	9	9	12	25	433	39	C
3 Terry Francois/South				1917	527	264	264								
3	North	90	20	25	399	110	55	8743	5	5	9	24	269	33	C
3	South	90	20	26	755	208	104	8743	10	10	16	26	543	16	D
3	East														
3	West	90	20	28	762	210	105	8550	10	10	16	19	403	21	D

SIDEWALK ANALYSIS

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Sidewalk Analysis
 All scenarios and time periods

2015 EXISTING

Sidewalk Location	Weekday PM (4-6) no Giants		Weekday Evening (6-8) no Giants		Weekday Late PM (9-11) no Giants		Saturday Evening (7-9) no Giants	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.2	A	0.1	A	0.1	A	0.1	A
Third Street - South to 16th - West	0.2	A	0.2	A	0.0	A	0.1	A
South Street - Third to Terry Francois - South								
16th Street - Third to Terry Francois - North								

Sidewalk Location	Weekday PM (4-6) with Giants		Weekday Evening (6-8) with Giants		Weekday Late PM (9-11) with Giants		Saturday Evening (7-9) with Giants	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.1	A	0.1	A	0.1	A	0.1	A
Third Street - South to 16th - West	0.3	A	0.3	A	0.0	A	0.1	A
South Street - Third to Terry Francois - South								
16th Street - Third to Terry Francois - North								

PLUS PROJECT

Sidewalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.6	B					0.6	B
Third Street - South to 16th - West	0.3	A					0.2	A
South Street - Third to Terry Francois - South	0.6	B					0.7	B
16th Street - Third to Terry Francois - North	0.5	B					0.6	B

Sidewalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	1.7	B						
Third Street - South to 16th - West	0.5	A						
South Street - Third to Terry Francois - South	1.9	B						
16th Street - Third to Terry Francois - North	1.7	B						

Sidewalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.7	B	1.4	B	1.8	B	0.9	B
Third Street - South to 16th - West	0.3	A	0.5	A	0.7	B	0.3	A
South Street - Third to Terry Francois - South	0.8	B	1.7	B	2.3	B	1.2	B
16th Street - Third to Terry Francois - North	0.8	B	2.0	B	1.9	B	1.5	B

Sidewalk Location	Weekday PM (4-6) with Basketball + Giants		Weekday Evening (6-8) with Basketball + Giants		Weekday Late PM (9-11) with Basketball + Giants		Saturday Evening (7-9) with Basketball + Giants	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.7	B	1.4	B	1.8	B	1.0	B
Third Street - South to 16th - West	0.4	A	0.6	B	0.7	B	0.3	A
South Street - Third to Terry Francois - South	0.8	B	1.7	B	2.3	B	1.2	B
16th Street - Third to Terry Francois - North	0.8	B	2.0	B	1.9	B	1.5	B

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Sidewalk Analysis
 All scenarios and time periods

2040 CUMULATIVE

Sidewalk Location	Weekday PM (4-6) no event		Weekday Evening (6-8) no event		Weekday Late PM (9-11) no event		Saturday Evening (7-9) no event	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.8	B					0.6	B
Third Street - South to 16th - West	0.4	A					0.2	A
South Street - Third to Terry Francois - South	0.7	B					0.7	B
16th Street - Third to Terry Francois - North	0.6	B					0.6	B

Sidewalk Location	Weekday PM (4-6) with Convention		Weekday Evening (6-8) with Convention		Weekday Late PM (9-11) with Convention		Saturday Evening (7-9) with Convention	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	1.8	B						
Third Street - South to 16th - West	0.6	B						
South Street - Third to Terry Francois - South	1.9	B						
16th Street - Third to Terry Francois - North	1.8	B						

Sidewalk Location	Weekday PM (4-6) with Basketball		Weekday Evening (6-8) with Basketball		Weekday Late PM (9-11) with Basketball		Saturday Evening (7-9) with Basketball	
	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS	(p/min/ft)	Platoon LOS
Third Street - South to 16th - East	0.9	B					1.0	B
Third Street - South to 16th - West	0.5	A					0.4	A
South Street - Third to Terry Francois - South	0.8	B					1.2	B
16th Street - Third to Terry Francois - North	0.9	B					1.5	B

LOS	flow rate (p/min/ft)	
	Average	Platoon
A	≤ 5	≤ 0.5
B	> 5 - 7	> 0.5 - 3
C	> 7 - 10	> 3 - 6
D	> 10 - 15	> 6 - 11
E	> 15 - 23	> 11 - 18
F	variable	> 18

Source: Highway Capacity Manual, 2000, Ch 18, p.3

Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 Transportation Analysis
 Pedestrian Sidewalk Analysis - Level of Service Calculations
 All scenarios and time periods

2015 EXISTING

Location ID	Sidewalk Location	Sidewalk Width		Weekday PM (4-6) no Giants						Weekday Evening (6-8) no Giants						Weekday Late PM (9-11) no Giants						Saturday Evening (7-9) no Giants						
		Actual Wa	Effective We	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS					
4	Third Street - South to 16th - East	12	6	7	56	15	0.2	A	A	14	41	11	0.1	A	A	20	19	5	0.1	A	A	27	19	5	0.1	A	A	
4	Third Street - South to 16th - West	12	6	8	70	19	0.2	A	A	15	52	14	0.2	A	A	21	15	4	0.0	A	A	28	17	5	0.1	A	A	
5	16th Street - Third to Terry Francois - North																											
6	South Street - Third to Terry Francois - South																											

PLUS PROJECT

Location ID	Sidewalk Location	Sidewalk Width		Weekday PM (4-6) no event						Weekday Evening (6-8) no event						Weekday Late PM (9-11) no event						Saturday Evening (7-9) no event							
		Actual Wa	Effective We	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS						
4	Third Street - South to 16th - East	16	8	7	279	77	0.6	A	B																				
4	Third Street - South to 16th - West	16	8	8	116	32	0.3	A	A																				
5	16th Street - Third to Terry Francois - North	12.5	6.25	6	217	60	0.6	A	B																				
6	South Street - Third to Terry Francois - South	15	7.5	5	217	60	0.5	A	B																				

2040 CUMULATIVE

Location ID	Sidewalk Location	Sidewalk Width		Weekday PM (4-6) no event						Weekday Evening (6-8) no event						Weekday Late PM (9-11) no event						Saturday Evening (7-9) no event							
		Actual Wa	Effective We	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS	Pedestrians Hourly	Max Ped per 15 Min V15	Flow Rate (p/min/ft) Vp	Avg LOS	Platoon LOS						
4	Third Street - South to 16th - East	16	8	7	335	92	0.8	A	B																				
4	Third Street - South to 16th - West	16	8	8	186	51	0.4	A	A																				
5	16th Street - Third to Terry Francois - North	12.5	6.25	6	247	68	0.7	A	B																				
6	South Street - Third to Terry Francois - South	15	7.5	5	247	68	0.6	A	B																				

APPENDIX TR-9
PROPOSED PROJECT PARKING DEMAND
AND SUPPLY INFORMATION

**TABLE A - PARKING SUPPLY BY SCENARIO
IN THE VICINITY OF BLOCKS 29-32**

Location	No Game at AT&T Park								With Game at AT&T Park							
	No Event and Convention Event				Basketball Game				No Event and Convention Event				Basketball Game			
	Weekday		Saturday		Weekday		Saturday		Weekday		Saturday		Weekday		Saturday	
	Midday	Evening	Midday	Evening	Midday	Evening	Midday	Evening	Midday	Evening	Midday	Evening	Midday	Evening	Midday	Evening
1 185 Berry Street	300	closed	closed	closed	300	closed	closed	closed	300	270	closed	closed	300	270	closed	<i>300</i>
2 Pier 48 Sheds A & B	closed	closed	closed	closed	closed	closed	closed	closed	closed	500	closed	500	closed	500	closed	500
3 West side of Terry François Blvd along Lot A	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
4 Mission Rock St - Lot A	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
5 Lot C (Blocks 3E & 4E)	closed	closed	closed	closed	closed	closed	closed	closed	closed	320	closed	320	closed	320	closed	320
6 601 Terry A François Blvd (Pier 52 Boat Launch)	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
7 East Side Terry A. François Blvd	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
8 450 South Street	1,400	closed	closed	closed	1,400	<i>1,400</i>	closed	<i>1,400</i>	1,400	closed	closed	closed	1,400	<i>1,400</i>	closed	<i>1,400</i>
9 1670 Owens Street	780	closed	closed	closed	780	closed	closed	closed	780	closed	closed	closed	780	<i>780</i>	closed	<i>780</i>
11 1650 Third Street	730	730	730	730	730	730	730	730	730	730	730	730	730	730	730	730
12 UCSF Block 23	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
13 1625 Owens Street (Rutter Community Center)	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590
14 UCSF Medical Center Garage and Lot - Phase 1	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
15 GSW Proposed Project Site (Blocks 29-32)	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
Total	8,685	6,205	6,205	6,205	8,685	7,605	6,205	7,605	8,685	7,295	6,205	7,025	8,685	9,475	6,205	9,505
GSW Proposed Project Site (Blocks 29-32)	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
SF Giants	2,530	2,530	2,530	2,530	2,530	2,530	2,530	2,530	2,530	3,350	2,530	3,350	2,530	3,350	2,530	3,350
UCSF	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590	2,590
Alexandria (includes 122 spaces allocated to GSW)	2,180	-	-	-	2,180	1,400	-	1,400	2,180	-	-	-	2,180	2,180	-	2,180
Other	435	135	135	135	435	135	135	135	435	405	135	135	435	405	135	435
Total	8,685	6,205	6,205	6,205	8,685	7,605	6,205	7,605	8,685	7,295	6,205	7,025	8,685	9,475	6,205	9,505

Facilities currently closed but assumed to be open for project event parking are shown in *bold italics*.

**TABLE 2 - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32**

Existing 2015

Location	NUMBER OF SPACES OCCUPIED																							
	Without Game at AT&T Park								With Game at AT&T Park															
	Weekday				Saturday				Weekday				Saturday											
	11:30 am - 3:30 pm			7 pm - 8:30 pm			11:30 am - 1:30 pm			7 pm - 8:30 pm			11:30 am - 1:30 pm			7 pm - 8:30 pm								
Supply	Demand	% Util.	Supply	Demand	% Util.	Supply	Demand	% Util.	Supply	Demand	% Util.	Supply	Demand	% Util.	Supply	Demand	% Util.							
1 185 Berry Street	300	300	100%	closed	N.A.	closed	N.A.	closed	N.A.	300	300	100%	270	240	89%	closed	40	closed	N.A.					
2 Pier 48 Sheds A & B	closed	N.A.		closed	N.A.	closed	N.A.	closed	N.A.	closed	N.A.		500	310	62%	closed	N.A.	500	490	98%				
3 West side of Terry François Blvd along Lot A	130	0	0%	130	10	8%	130	10	8%	130	20	15%	130	120	92%	130	10	8%	130	120	92%			
4 Mission Rock St - Lot A	2,400	980	41%	2,400	640	27%	2,400	120	5%	2,400	110	5%	2,400	670	28%	2,400	2,400	100%	2,400	120	5%	2,400	2,280	95%
X1 Lot D (Block 1) - Third St at Channel St																								
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.		closed	N.A.	closed	N.A.	closed	N.A.	closed	N.A.		320	314	98%	closed	0	320	304	95%				
X2 Lot C (Block 7) - China Basin to Mission Bay Blvd																								
6 601 Terry A Francois Blvd (Pier 52 Boat Launch) (Metered)	57	50	88%	57	50	88%	57	20	35%	57	10	18%	57	40	70%	57	10	18%	57	30	53%	57	20	35%
7 East Side Terry A. François Blvd (Metered)	78	30	38%	78	10	13%	78	0	0%	78	0	0%	78	20	26%	78	0	0%	78	10	13%	78	10	13%
8 450 South Street	1,400	1,080	77%	closed	90		closed	80		closed	40		1,400	998	71%	closed	260		closed	50		closed	40	
9 1670 Owens Street	780	320	41%	closed	40		closed	N.A.		closed	N.A.		780	340	44%	closed	50		closed	N.A.		closed	N.A.	
10 1650 Third Street	730	710	97%	730	350	48%	730	150	21%	730	140	19%	730	678	93%	730	580	79%	730	150	21%	730	480	66%
11 UCSF Block 23	220	210	95%	220	150	68%	220	210	95%	220	150	68%	220	210	95%	220	110	50%	220	200	91%	220	190	86%
12 1625 Owens Street (Rutter Community Center)	590	549	93%	590	180	30%	590	240	41%	590	80	14%	590	469	79%	590	170	29%	590	380	64%	590	120	20%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	90%	1,050	570	54%	1,050	320	30%	1,050	370	35%	1,050	940	90%	1,050	570	54%	1,050	320	30%	1,050	370	35%
14 455 South St Lot B & 1725 Third St Lot E - GSW Project Site	610	240	39%	610	20	3%	closed	10		closed	10		610	180	30%	610	210	34%	610	10	2%	610	580	95%
Total	8,345	5,409	65%	5,865	2,110	36%	5,255	1,160	22%	5,255	920	18%	8,345	4,865	58%	6,955	5,344	77%	5,865	1,320	23%	6,685	5,004	75%
SF Giants	3,140	1,220	39%	3,140	670	21%	2,530	140	6%	2,530	130	5%	3,140	870	28%	3,960	3,354	85%	3,140	140	4%	3,960	3,774	95%
UCSF	2,590	2,409	93%	2,590	1,250	48%	2,590	920	36%	2,590	740	29%	2,590	2,297	89%	2,590	1,430	55%	2,590	1,050	41%	2,590	1,160	45%
Alexandria	2,180	1,400	64%	0	130	0%	0	80	0%	0	40	0%	2,180	1,338	61%	0	310	0%	0	50	0%	0	40	0%
Other	435	380	87%	135	60	44%	135	20	15%	135	10	7%	435	360	83%	405	250	62%	135	80	59%	135	30	22%
Total	8,345	5,409	65%	5,865	2,110	36%	5,255	1,160	22%	5,255	920	18%	8,345	4,865	58%	6,955	5,344	77%	5,865	1,320	23%	6,685	5,004	75%

**TABLE 3a - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32
Existing 2015 plus Project - No Event**

Location	NUMBER OF SPACES OCCUPIED																			
	Without Game at AT&T Park																			
	Weekday										Saturday									
	11:30 am - 3:30 pm					7 pm - 8:30 pm					11:30 am - 1:30 pm					7 pm - 8:30 pm				
Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	
1 185 Berry Street	300	300	0	300	100%	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
2 Pier 48 Sheds A & B	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
3 West side of Terry François Blvd along Lot A	130	0	0	0	0%	130	10	0	10	8%	130	10	0	10	8%	130	10	0	10	8%
4 Mission Rock St - Lot A	2,400	980	52	1,032	43%	2,400	640	0	640	27%	2,400	120	0	120	5%	2,400	110	0	110	5%
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
6 601 Terry A Francois Blvd (Pier 52 Boat Launch) (Metered)	57	50	0	50	88%	57	50	0	50	88%	57	20	0	20	35%	57	10	0	10	18%
7 East Side Terry A. François Blvd (Metered)	78	30	0	30	38%	78	10	0	10	13%	78	0	0	0	0%	78	0	0	0	0%
8 450 South Street	1,400	1,320	63	1,383	99%	closed	90	49	139		closed	80	29	109		closed	40	23	63	
9 1670 Owens Street	780	320	0	320	41%	closed	40	0	40		closed	N.A.	0	0		closed	N.A.	0	0	
10 1650 Third Street	730	710	10	720	99%	730	357	0	357	49%	730	153	0	153	21%	730	143	0	143	20%
11 UCSF Block 23	220	210	0	210	95%	220	150	0	150	68%	220	210	0	210	95%	220	150	0	150	68%
12 1625 Owens Street (Rutter Community Center)	590	549	0	549	93%	590	187	0	187	32%	590	243	0	243	41%	590	83	0	83	14%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	1	941	90%	1,050	577	0	577	55%	1,050	323	0	323	31%	1,050	373	0	373	36%
15 GSW Proposed Project Site (Blocks 29-32)	950	0	923	923	97%	950	0	440	440	46%	950	0	560	560	59%	950	0	439	439	46%
Total	8,685	5,409	1,049	6,458	74%	6,205	2,111	489	2,600	42%	6,205	1,159	589	1,748	28%	6,205	919	462	1,381	22%
GSW Proposed Project Site (Blocks 29-32)	950	0	923	923	97%	950	0	440	440	46%	950	0	560	560	59%	950	0	439	439	46%
SF Giants	2,530	980	52	1,032	41%	2,530	650	0	650	26%	2,530	130	0	130	5%	2,530	120	0	120	5%
UCSF	2,590	2,409	11	2,420	93%	2,590	1,271	0	1,271	49%	2,590	929	0	929	36%	2,590	749	0	749	29%
Alexandria	2,180	1,640	63	1,703	78%	0	130	49	179	0%	0	80	29	109	0%	0	40	23	63	0%
Other	435	380	0	380	87%	135	60	0	60	44%	135	20	0	20	15%	135	10	0	10	7%
Total	8,685	5,409	1,049	6,458	74%	6,205	2,111	489	2,600	42%	6,205	1,159	589	1,748	28%	6,205	919	462	1,381	22%

**TABLE 3a - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32
Existing 2015 plus Project - No Event**

Location	NUMBER OF SPACES OCCUPIED																			
	With Game at AT&T Park																			
	Weekday									Saturday										
	11:30 am - 1:30 pm					7 pm - 8:30 pm				11:30 am - 1:30 pm					7 pm - 8:30 pm					
Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	
1 185 Berry Street	300	300	0	300	100%	270	240	0	240	89%	closed	40	0	40		closed	N.A.	0	0	
2 Pier 48 Sheds A & B	closed	N.A.	0	0		500	310	0	310	62%	closed	N.A.	0	0		500	490	0	490	98%
3 West side of Terry François Blvd along Lot A	130	20	0	20	15%	130	120	0	120	92%	130	10	0	10	8%	130	120	0	120	92%
4 Mission Rock St - Lot A	2,400	670	0	670	28%	2,400	2,400	0	2,400	100%	2,400	120	0	120	5%	2,400	2,280	0	2,280	95%
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.	0	0		320	314	0	314	98%	closed	0	0	0		320	304	0	304	95%
6 601 Terry A Francois Blvd (Pier 52 Boat Launch) (Metered)	57	40	0	40	70%	57	10	0	10	18%	57	30	0	30	53%	57	20	0	20	35%
7 East Side Terry A. François Blvd (Metered)	78	20	0	20	26%	78	0	0	0	0%	78	10	0	10	13%	78	10	0	10	13%
8 450 South Street	1,400	998	105	1,103	79%	closed	260	49	309		closed	50	29	79		closed	40	23	63	
9 1670 Owens Street	780	520	0	520	67%	closed	50	0	50		closed	N.A.	0	0		closed	N.A.	0	0	
10 1650 Third Street	730	678	0	678	93%	730	650	0	650	89%	730	153	0	153	21%	730	673	0	673	92%
11 UCSF Block 23	220	210	0	210	95%	220	110	0	110	50%	220	200	0	200	91%	220	190	0	190	86%
12 1625 Owens Street (Rutter Community Center)	590	469	0	469	79%	590	240	0	240	41%	590	383	0	383	65%	590	313	0	313	53%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	0	940	90%	1,050	640	0	640	61%	1,050	323	0	323	31%	1,050	563	0	563	54%
15 GSW Proposed Project Site (Blocks 29-32)	950	0	944	944	99%	950	0	440	440	46%	950	0	560	560	59%	950	0	439	439	46%
Total	8,685	4,865	1,049	5,914	68%	7,295	5,344	489	5,833	80%	6,205	1,319	589	1,908	31%	7,025	5,003	462	5,465	78%
GSW Proposed Project Site (Blocks 29-32)	950	0	944	944	99%	950	0	440	440	46%	950	0	560	560	59%	950	0	439	439	46%
SF Giants	2,530	690	0	690	27%	3,350	3,144	0	3,144	94%	2,530	130	0	130	5%	3,350	3,194	0	3,194	95%
UCSF	2,590	2,297	0	2,297	89%	2,590	1,640	0	1,640	63%	2,590	1,059	0	1,059	41%	2,590	1,739	0	1,739	67%
Alexandria	2,180	1,518	105	1,623	74%	0	310	49	359	0%	0	50	29	79	0%	0	40	23	63	0%
Other	435	360	0	360	83%	405	250	0	250	62%	135	80	0	80	59%	135	30	0	30	22%
Total	8,685	4,865	1,049	5,914	68%	7,295	5,344	489	5,833	80%	6,205	1,319	589	1,908	31%	7,025	5,003	462	5,465	78%

**TABLE 3b - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32
Existing 2015 plus Project - Convention Event**

Location	NUMBER OF SPACES OCCUPIED																			
	Without Game at AT&T Park										With Game at AT&T Park									
	Weekday										Weekday									
	11:30 am - 3:30 pm					7 pm - 8:30 pm					11:30 am - 1:30 pm				7 pm - 8:30 pm					
Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	
1 185 Berry Street	300	300	0	300	100%	closed	N.A.	0	0		300	300	0	300	100%	270	240	0	240	89%
2 Pier 48 Sheds A & B	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		500	310	0	310	62%
3 West side of Terry François Blvd along Lot A	130	0	0	0	0%	130	10	0	10	8%	130	20	0	20	15%	130	120	0	120	92%
4 Mission Rock St - Lot A	2,400	980	896	1,876	78%	2,400	640	0	640	27%	2,400	670	896	1,566	65%	2,400	2,400	0	2,400	100%
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		320	314	0	314	98%
6 601 Terry A François Blvd (Pier 52 Boat Launch) (Metered)	57	50	0	50	88%	57	50	0	50	88%	57	40	0	40	70%	57	10	0	10	18%
7 East Side Terry A. François Blvd (Metered)	78	30	0	30	38%	78	10	0	10	13%	78	20	0	20	26%	78	0	0	0	0%
8 450 South Street	1,400	1,320	67	1,387	99%	closed	90	67	157		1,400	998	67	1,065	76%	closed	260	67	327	
9 1670 Owens Street	780	320	0	320	41%	closed	40	0	40		780	520	0	520	67%	closed	50	0	50	
10 1650 Third Street	730	710	5	715	98%	730	357	0	357	49%	730	678	5	683	94%	730	650	0	650	89%
11 UCSF Block 23	220	210	0	210	95%	220	150	0	150	68%	220	210	0	210	95%	220	110	0	110	50%
12 1625 Owens Street (Rutter Community Center)	590	549	0	549	93%	590	187	0	187	32%	590	469	0	469	79%	590	240	0	240	41%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	4	944	90%	1,050	577	0	577	55%	1,050	940	4	944	90%	1,050	640	0	640	61%
15 GSW Proposed Project Site (Blocks 29-32)	950	0	934	934	98%	950	0	602	602	63%	950	0	934	934	98%	950	0	602	602	63%
Total	8,685	5,409	1,906	7,315	84%	6,205	2,111	669	2,780	45%	8,685	4,865	1,906	6,771	78%	7,295	5,344	669	6,013	82%
GSW Proposed Project Site (Blocks 29-32)	950	0	934	934	98%	950	0	602	602	63%	950	0	934	934	98%	950	0	602	602	63%
SF Giants	2,530	980	896	1,876	74%	2,530	650	0	650	26%	2,530	690	896	1,586	63%	3,350	3,144	0	3,144	94%
UCSF	2,590	2,409	9	2,418	93%	2,590	1,271	0	1,271	49%	2,590	2,297	9	2,306	89%	2,590	1,640	0	1,640	63%
Alexandria	2,180	1,640	67	1,707	78%	0	130	67	197	0%	2,180	1,518	67	1,585	73%	0	310	67	377	0%
Other	435	380	0	380	87%	135	60	0	60	44%	435	360	0	360	83%	405	250	0	250	62%
Total	8,685	5,409	1,906	7,315	84%	6,205	2,111	669	2,780	45%	8,685	4,865	1,906	6,771	78%	7,295	5,344	669	6,013	82%

**TABLE 3c - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32
Existing 2015 plus Project - Basketball Game**

Location	NUMBER OF SPACES OCCUPIED																			
	Without Game at AT&T Park																			
	Weekday										Saturday									
	11:30 am - 3:30 pm					7 pm - 8:30 pm					11:30 am - 1:30 pm				7 pm - 8:30 pm					
Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	
1 185 Berry Street	300	300	0	300	100%	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
2 Pier 48 Sheds A & B	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
3 West side of Terry François Blvd along Lot A	130	0	0	0	0%	130	10	0	10	8%	130	10	0	10	8%	130	10	0	10	8%
4 Mission Rock St - Lot A	2,400	980	54	1,034	43%	2,400	640	1,537	2,177	91%	2,400	120	0	120	5%	2,400	110	2,058	2,168	90%
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0		closed	N.A.	0	0	
6 601 Terry A Francois Blvd (Pier 52 Boat Launch) (Metered)	57	50	0	50	88%	57	50	0	50	88%	57	20	0	20	35%	57	10	0	10	18%
7 East Side Terry A. François Blvd (Metered)	78	30	0	30	38%	78	10	0	10	13%	78	0	0	0	0%	78	0	0	0	0%
8 450 South Street	1,400	1,320	64	1,384	99%	1,400	90	1,196	1,286	92%	closed	80	30	110		1,400	40	1,102	1,142	82%
9 1670 Owens Street	780	320	0	320	41%	closed	40	0	40		closed	N.A.	0	0		closed	N.A.	0	0	
10 1650 Third Street	730	710	11	721	99%	730	357	214	571	78%	730	153	0	153	21%	730	143	434	577	79%
11 UCSF Block 23	220	210	0	210	95%	220	150	0	150	68%	220	210	0	210	95%	220	150	0	150	68%
12 1625 Owens Street (Rutter Community Center)	590	549	0	549	93%	590	187	214	401	68%	590	243	0	243	41%	590	83	46	129	22%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	0	940	90%	1,050	577	170	747	71%	1,050	323	0	323	31%	1,050	373	0	373	36%
15 GSW Proposed Project Site (Blocks 29-32)	950	0	943	943	99%	950	0	939	939	99%	950	0	568	568	60%	950	0	933	933	98%
Total	8,685	5,409	1,072	6,481	75%	7,605	2,111	4,270	6,381	84%	6,205	1,159	598	1,757	28%	7,605	919	4,573	5,492	72%
GSW Proposed Project Site (Blocks 29-32)	950	0	943	943	99%	950	0	939	939	99%	950	0	568	568	60%	950	0	933	933	98%
SF Giants	2,530	980	54	1,034	41%	2,530	650	1,537	2,187	86%	2,530	130	0	130	5%	2,530	120	2,058	2,178	86%
UCSF	2,590	2,409	11	2,420	93%	2,590	1,271	598	1,869	72%	2,590	929	0	929	36%	2,590	749	480	1,229	47%
Alexandria	2,180	1,640	64	1,704	78%	1,400	130	1,196	1,326	95%	0	80	30	110	0%	1,400	40	1,102	1,142	82%
Other	435	380	0	380	87%	135	60	0	60	44%	135	20	0	20	15%	135	10	0	10	7%
Total	8,685	5,409	1,072	6,481	75%	7,605	2,111	4,270	6,381	84%	6,205	1,159	598	1,757	28%	7,605	919	4,573	5,492	72%

**TABLE 3c - PARKING SUPPLY AND DEMAND
IN THE VICINITY OF BLOCKS 29-32
Existing 2015 plus Project - Basketball Game**

Location	NUMBER OF SPACES OCCUPIED																			
	With Game at AT&T Park																			
	Weekday										Saturday									
	11:30 am - 1:30 pm					7 pm - 8:30 pm					11:30 am - 1:30 pm					7 pm - 8:30 pm				
Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	Supply	Existing	Project	Total	% Util.	
1 185 Berry Street	300	300	0	300	100%	270	240	53	293	109%	closed	40	0	40		300	N.A.	297	297	99%
2 Pier 48 Sheds A & B	closed	N.A.	0	0		500	310	0	310	62%	closed	N.A.	0	0		500	490	0	490	98%
3 West side of Terry François Blvd along Lot A	130	20	0	20	15%	130	120	0	120	92%	130	10	0	10	8%	130	120	0	120	92%
4 Mission Rock St - Lot A	2,400	670	0	670	28%	2,400	2,400	0	2,400	100%	2,400	120	0	120	5%	2,400	2,280	0	2,280	95%
5 Lot C (Blocks 3E & 4E) - Long Bridge to China Basin	closed	N.A.	0	0		320	314	0	314	98%	closed	0	0	0		320	304	0	304	95%
6 601 Terry A Francois Blvd (Pier 52 Boat Launch) (Metered)	57	40	0	40	70%	57	10	0	10	18%	57	30	0	30	53%	57	20	0	20	35%
7 East Side Terry A. François Blvd (Metered)	78	20	0	20	26%	78	0	64	64	82%	78	10	0	10	13%	78	10	64	74	95%
8 450 South Street	1,400	998	64	1,062	76%	1,400	260	1,131	1,391	99%	closed	50	30	80		1,400	40	1,347	1,387	99%
9 1670 Owens Street	780	520	0	520	67%	780	50	726	776	99%	closed	N.A.	0	0		780		773	773	99%
10 1650 Third Street	730	678	65	743	102%	730	650	75	725	99%	730	153	0	153	21%	730	673	59	732	100%
11 UCSF Block 23	220	210	0	210	95%	220	110	107	217	99%	220	200	0	200	91%	220	190	69	259	118%
12 1625 Owens Street (Rutter Community Center)	590	469	0	469	79%	590	240	342	582	99%	590	383	0	383	65%	590	313	293	606	103%
13 UCSF Medical Center Garage and Lot - Phase 1	1,050	940	0	940	90%	1,050	640	402	1042	99%	1,050	323	0	323	31%	1,050	563	477	1040	99%
15 GSW Proposed Project Site (Blocks 29-32)	950	0	943	943	99%	950	0	950	950	100%	950	0	568	568	60%	950	0	937	937	99%
Total	8,685	4,865	1,072	5,937	68%	9,475	5,344	3,850	9,194	97%	6,205	1,319	598	1,917	31%	9,505	5,003	4,316	9,319	98%
GSW Proposed Project Site (Blocks 29-32)	950	0	943	943	99%	950	0	950	950	100%	950	0	568	568	60%	950	0	937	937	99%
SF Giants	2,530	690	0	690	27%	3,350	3,144	0	3,144	94%	2,530	130	0	130	5%	3,350	3,194	0	3,194	95%
UCSF	2,590	2,297	65	2,362	91%	2,590	1,640	926	2,566	99%	2,590	1,059	0	1,059	41%	2,590	1,739	898	2,637	102%
Alexandria	2,180	1,518	64	1,582	73%	2,180	310	1,857	2,167	99%	0	50	30	80	0%	2,180	40	2,120	2,160	99%
Other	435	360	0	360	83%	405	250	117	367	91%	135	80	0	80	59%	435	30	361	391	90%
Total	8,685	4,865	1,072	5,937	68%	9,475	5,344	3,850	9,194	97%	6,205	1,319	598	1,917	31%	9,505	5,003	4,316	9,319	98%

	Additional Spaces			
	No Giants	w/ Giants		
Future Non-residential Parking Supply			Remaining Mission Bay Office/R&D	
1 Mission Rock St - Parcel D Garage	2,300	2,300	Block 26 - Parcel 1	200,000 gsf
2 Mission Rock St - Mission Rock Square Garage	700	700	Block 27 - Parcel 1	300,000 gsf
3 Lot A (eliminated)	-2,400	-2,400	Block 40	660,000 gsf
4 Pier 48 (eliminated)		-500	Blocks 41-43 Parcel 7	60,000 gsf
5 West side of TFB along Lot A (eliminated)		-130	Total	1,220,000 gsf
6 Lot C (eliminated)		-320		
7 Block 1 (hotel+retail only)	65	65		
8 Block 40	660	660		
9 East side of TFB lot (eliminated)	-78	-78		
10 1550 Owens Street - Parcel 6 Garage	320	320		
11 Parcel 6 Surface Lot (eliminated)	-92	-92		
12 UCSF Blocks 33 & 34	500	500		
13 UCSF Medical Center Garage - Phase 2	1,300	1,300		
14 Surface Spaces in North Campus (eliminate)	-160	-160		
15 UCSF Medical Center Lot - Phase 1 (eliminate)	-430	-430		
16 UCSF Block 18	1,540	1,540		
TOTAL	4,225	3,275		
	Additional Spaces			
	No Giants	w/ Giants		
Mission Rock	600	-350		
Missio Bay Plan	875	875		
UCSF	2,750	2,750		
TOTAL	4,225	3,275		
Supply available 24 hours (1 thru 7,9,13,14,15,16)	2,837	1,887		
Supply closed after 7 PM & Sat (8,10,11,12)	1,388	1,388		
TOTAL	4,225	3,275		

Future Non-residential Parking Demand	Weekday		Saturday	
	Midday	Evening	Midday	Evening
Mission Rock Project	2,600	2,350	1,560	1,500
Block 1 (hotel+retail only)	210	275	230	260
1600 Owens St - Kaiser MOB	360	90	140	20
Remaining Mission Bay Office/R&D (1.22 Mgsf)	1,240	110	170	10
UCSF LRDP to 2040	3,410	1,800	1,320	1,060

APPENDIX TR-10
PROPOSED PROJECT OFF-STREET SPACES
SUPPLY VERSUS MISSION BAY SOUTH
DESIGN FOR DEVELOPMENT REQUIREMENTS

Table T-2

**Summary of Proposed and D4D Required Transportation-related Facilities
Updated April 2015**

ITEM	Proposed by the Project	Mission Bay South D4D Requirement (3,4,5)
Vehicle Parking Spaces (On-site and 450 South Street)		
Event center (1)	415	563
Office	537	537
Retail/Restaurant	<u>130</u>	<u>172</u>
Total	1,082	1,272
ADA Parking Spaces (part of total above)	22	24
Class 1 Bicycle Parking Spaces		
Event center (2)	400	400
Office	104	104
Retail/restaurant	<u>7</u>	<u>7</u>
Total	511	511
Class 2 Bicycle Parking Spaces		
Event Center/Office/Retail/Restaurant	75	0
Loading Spaces (on-site)		
Event center	7	7
Office	3	3
Retail/Restaurant	<u>3</u>	<u>3</u>
Total	13	10

Notes:

1. 283 spaces within the project site + 132 spaces within 450 South Street.
2. Class 1 bicycle parking for event center would be provided via a permanent bicycle valet (during events) of 300 spaces, and 100 temporary staffed bicycle corrals.
3. The D4D does not contemplate an off-street parking standard for a multipurpose event center, therefore, the proposed changes to the D4D include a new parking standard for the event center that promotes sharing parking with the retail and office uses, as well as limits parking to promote the use of transit. Also, as part of the standard, allow off-site parking for the event center to be further than the 600 feet from the entrance of the event center. (Mission Bay Blocks 29-32 Major Phase Application, Appendix A)
4. The existing D4D does not contemplate a loading standard for a multi-purpose event center, therefore the proposed changes to the D4D include a standard for the event center loading area that reflects the increased intensity of demand from standard commercial buildings. (Mission Bay Blocks 29-32 Major Phase Application, Appendix A)
5. The existing D4D does not require provision of Class 2 bicycle parking spaces, car share spaces, or shower and locker facilities.

APPENDIX TR-11
MISSION BAY FSEIR MITIGATION MEASURES

Summary of Transportation Mitigation Measures in 1998 Mission Bay FSEIR				
#	Measure Name	Area Applicability	Status	GSW?
MEASURES INCLUDED AS PART OF PROJECT				
Intersections				
E.1	Third/King	Mission Bay North and South	completed	No
E.2	Third/Berry	Mission Bay North and South	completed	No
E.3	Third/Owens (Third/Channel)	Mission Bay South	completed	No
E.4	Third/The Commons (Third/Mission Bay Drive)	Mission Bay South	completed	No
E.5	Third/South	Mission Bay South	completed	No
E.6	Third/16th	Mission Bay South	completed	No
E.7	Third/Mariposa	Mission Bay South	completed	No
E.8	Fourth/King	Mission Bay North	completed	No
E.9	Fourth/Berry	Mission Bay North	completed	No
E.10	Fourth/Owens (Fourth/Channel)	Mission Bay South	completed	No
E.11	Fourth/UCSF (Fourth/Gene Friend Way)	Mission Bay South	completed	No
E.12	Fourth/16th	Mission Bay South	completed	No
E.13	Fourth/Mariposa	Mission Bay South	completed	No
E.14	Seventh/16th	Mission Bay South	completed	No
E.15	Owens/16th	Mission Bay South	completed	No
E.16	Owens/Mariposa/I-280	Mission Bay South	completed	No
E.17	I-280 On-ramp/Mariposa	Mission Bay South	completed	No
E.18	Seventh/The Commons (Seventh/Mission Bay Drive)	Mission Bay South	completed	No
E.19	Fifth/King	Mission Bay North	pending, in design, Caltrans approval required	Np
Street Segments				
E.21	Third Street	Mission Bay North and South	completed	No
E.22	Mariposa Street	Mission Bay South	completed	No
E.23	Fourth Street	Mission Bay North and South	completed	No
E.24	King Street	Mission Bay North	completed	No
E.25	Owens Street (Channel Street)	Mission Bay South	partial buildout, not adjacent to site	No
E.26	N. Commons/S. Commons/Seventh (N. & S. MB Blvd/MB Drive)	Mission Bay South	partial buildout, not adjacent to site	No
Transit				
E.27	22 Fillmore	Mission Bay South	SFMTA, completed 55 16th route, 22 Fillmore by 2018	No
E.28	30/45 Union-Stockton	Mission Bay South	revised to 10 Townsend in TEP	No
MEASURES IDENTIFIED IN THE FSEIR				
Intersections				
E.29	Seventh/Brannan	Mission Bay South	pending with UCSF	No
E.30	Seventh/Townsend	Mission Bay North	completed	No
E.31	Seventh/Berry	Mission Bay North	street network revised, no longer exists	NA
E.32	Seventh/N. Commons/S. Commons	Mission Bay South	completed	No
E.33	16th/Potrero	Mission Bay South	Superseded by TEP	No

E.34	16th/Vermont	Mission Bay South	completed	No
E.35	Eighth/Townsend	Mission Bay North	Modern Roundabout Instead of Signal	No
E.36	Third/Townsend	Mission Bay North	completed	No
E.38	Fourth/King	Mission Bay North	completed	No
<u>Street Segments</u>				
E.41	Fourth Street (for E.38)	Mission Bay North	completed	No
E.42	Seventh Street (for E.29 through 32)	Mission Bay North and South	may not be possible or required	No
<u>Regional</u>				
E.43	Increase Bay Bridge tolls for SOV trips during commute hours.	Mission Bay North and South	MTC/BATA implemented this	No
<u>Transit</u>				
E.44	Encourage AC Transit to expand service	Mission Bay North and South	No AC Transit shortfall	No
E.45	Extend & operate T Third to Mariposa St	Mission Bay North and South	to be implemented with Central Subway	No
<u>Transportation System Management</u>				
E.46	Transportation Management Org (46.a - 46.b)	Mission Bay North and South		
46.a	Transportation Management Association		completed, ongoing	No
46.b	Transportation Coordinating Committee		completed, ongoing	No
E.47	Transportation System Management Plan (47.a - 47.h)		completed, implemented by Mission Bay TMA	
47.a	Shuttle Bus	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.b	Transit Pass Sales	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.c	Employee transit subsidies	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.d	Ped signal at Owens St near ped bridge at Fifth Street	Mission Bay South	Not adjacent to project site	No
47.e	Secure bicycle parking	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.f	Appropriate street lighting	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.g	Transit and ped & bike route information	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.h	Parking management guidelines	Mission Bay North and South	completed, ongoing, part of OPA	OPA
47.i	Flexible Work Times/Telecommuting	Mission Bay South	completed, ongoing, part of OPA	OPA
E.49	Ferry Service	Mission Bay North and South	being implemented by WETA	No
E.20	Seventh/Berry	Mission Bay North	Rejected by SF BOS, Not part of 1998 MB MMRP	
E.37	Third/King	Mission Bay North	Rejected by SF BOS, Not part of 1998 MB MMRP	
E.39	King Street (for E.37)	Mission Bay North	Rejected by SF BOS, Not part of 1998 MB MMRP	
E.40	Third Street (for E.37)	Mission Bay North	Rejected by SF BOS, Not part of 1998 MB MMRP	
E.48	Constrain parking supply within UCSF	Mission Bay South	Rejected by SF BOS, Not part of 1998 MB MMRP	
OPA = Owners Participation Agreement. These measures assumed to be part of the proposed project.				
WETA = Water Emergency Transportation Authority. WETA is a regional public transit agency tasked with operating and expanding ferry service on the San Francisco Bay and with coordinating the water transit response to regional emergencies. Under the San Francisco Bay Ferry brand, WETA carries over 1.8 million passengers annually utilizing a fleet of 12 high speed passenger-only ferry vessels. San Francisco Bay Ferry currently serves the cities of Alameda, Oakland, San Francisco, South San Francisco and Vallejo.				

APPENDIX TR-12
PROJECT ALTERNATIVES INFORMATION

NO PROJECT ALTERNATIVE TRAVEL DEMAND ANALYSIS

No Project at Mission Bay Blocks 29-32 (1,056 ksf office + 31.7 kgsf retail)

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees 0 employees
Retail	31,700 gsf
Quick Service Rest.	0 gsf
Sit-down Restaurant	0 gsf
XXX	0 xxx
XXX	0 xxx
Office	1,056,000 gsf

Person-trips by Mode	Daily Trips									PM Peak Hour Trips								Percent of Daily during PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	0	2,011	0	0	0	0	8,723	10,734	48%	0	181	0	0	0	0	519	700	37%	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	6.0%	6.5%
Transit	0	475	0	0	0	0	6,542	7,016	31%	0	43	0	0	0	0	884	927	48%	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	13.5%	13.2%
Taxi/Coach (Event)								0	0%							0	0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%							0	0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	0	700	0	0	0	0	2,579	3,279	15%	0	63	0	0	0	0	152	215	11%	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	5.9%	6.6%
Other	0	63	0	0	0	0	1,271	1,334	6%	0	6	0	0	0	0	69	75	4%	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	5.5%	5.6%
Total	0	3,249	0	0	0	0	19,114	22,362	100%	0	292	0	0	0	0	1,625	1,917	100%	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	8.5%	8.6%
Vehicle Trips	0	1,073	0	0	0	0	4,436	5,510		0	97	0	0	0	0	349	445		0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	7.9%	8.1%
Avg. veh. occupancy	0.00	1.87	0.00	0.00	0.00	0.00	1.97	1.95		0.00	1.87	0.00	0.00	0.00	0.00	1.45	1.57									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips									PM Peak Hour Transit-Trips								PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total			
Superdistrict 1	2,321	0	18	0	0	0	0	140	158	0	6	0	0	0	0	73	78	0	4	0	0	0	0	0	16	21	5%	1.62
Superdistrict 2	2,687	0	26	0	0	0	0	172	198	0	5	0	0	0	0	92	97	0	10	0	0	0	0	0	36	47	11%	1.52
Superdistrict 3	8,825	0	172	0	0	0	0	422	594	0	18	0	0	0	0	177	195	0	50	0	0	0	0	0	70	120	27%	1.79
Superdistrict 4	1,530	0	15	0	0	0	0	119	134	0	2	0	0	0	0	67	69	0	7	0	0	0	0	0	26	33	7%	1.70
East Bay	3,153	0	13	0	0	0	0	399	412	0	5	0	0	0	0	299	304	0	4	0	0	0	0	0	53	57	13%	1.73
North Bay	433	0	6	0	0	0	0	50	56	0	1	0	0	0	0	24	25	0	4	0	0	0	0	0	15	19	4%	1.56
South Bay	2,716	0	28	0	0	0	0	280	308	0	4	0	0	0	0	127	130	0	12	0	0	0	0	0	123	136	30%	1.29
Out of Region	697	0	14	0	0	0	0	42	56	0	3	0	0	0	0	26	29	0	5	0	0	0	0	0	8	13	3%	1.64
Total	22,362	0	292	0	0	0	0	1,625	1,917	0	43	0	0	0	0	884	927	0	97	0	0	0	0	0	349	445	100%	1.57

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound									Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Total Person Trips	0	138	0	0	0	0	138	276		0	155	0	0	0	0	1,487	1,641	0	292	0	0	0	0	0	1,625	1,917
Transit Trips	0	16	0	0	0	0	26	42		0	27	0	0	0	0	858	885	0	43	0	0	0	0	0	884	927
Vehicle Trips	0	47	0	0	0	0	34	80		0	50	0	0	0	0	315	365	0	97	0	0	0	0	0	349	445
	0%	48%	0%	0%	0%	0%	10%	18%		0%	52%	0%	0%	0%	0%	90%	82%									

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound									Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	4	0	0	0	0	6	10		0	4	0	0	0	0	19	23	0	8	0	0	0	0	0	26	34
Superdistrict 2	0	8	0	0	0	0	13	21		0	8	0	0	0	0	42	50	0	16	0	0	0	0	0	56	71
Superdistrict 3	0	51	0	0	0	0	27	77		0	51	0	0	0	0	87	138	0	102	0	0	0	0	0	113	215
Superdistrict 4	0	6	0	0	0	0	7	12		0	6	0	0	0	0	37	44	0	12	0	0	0	0	0	44	56
East Bay	0	3	0	0	0	0	9	12		0	4	0	0	0	0	83	88	0	7	0	0	0	0	0	92	99
North Bay	0	2	0	0	0	0	1	4		0	3	0	0	0	0	23	25	0	5	0	0	0	0	0	24	29
South Bay	0	11	0	0	0	0	12	22		0	12	0	0	0	0	140	152	0	23	0	0	0	0	0	151	174
Out of Region	0	4	0	0	0	0	3	7		0	4	0	0	0	0	10	15	0	8	0	0	0	0	0	13	22
Total	0	88	0	0	0	0	77	166		0	93	0	0	0	0	442	535	0	181	0	0	0	0	0	519	700

No Project at Mission Bay Blocks 29-32 (1,056 ksf office + 31.7 kgsf retail)

PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM

SUMMARY OF TRIPS WITH NO EVENT

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	0	0	0	0	3	6	0	3	0	0	0	0	69	72	0	6	0	0	0	0	73	78
Superdistrict 2	0	2	0	0	0	0	3	5	0	3	0	0	0	0	89	92	0	5	0	0	0	0	92	97
Superdistrict 3	0	8	0	0	0	0	13	21	0	10	0	0	0	0	164	174	0	18	0	0	0	0	177	195
Superdistrict 4	0	1	0	0	0	0	2	2	0	1	0	0	0	0	65	67	0	2	0	0	0	0	67	69
East Bay	0	1	0	0	0	0	4	4	0	4	0	0	0	0	295	299	0	5	0	0	0	0	299	304
North Bay	0	0	0	0	0	0	0	0	0	1	0	0	0	0	24	25	0	1	0	0	0	0	24	25
South Bay	0	1	0	0	0	0	0	2	0	3	0	0	0	0	126	129	0	4	0	0	0	0	127	130
Out of Region	0	1	0	0	0	0	1	2	0	1	0	0	0	0	25	27	0	3	0	0	0	0	26	29
Total	0	16	0	0	0	0	26	42	0	27	0	0	0	0	858	885	0	43	0	0	0	0	884	927

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	0	0	0	0	8	10	0	2	0	0	0	0	34	36	0	5	0	0	0	0	42	46
Superdistrict 2	0	3	0	0	0	0	3	6	0	3	0	0	0	0	21	25	0	6	0	0	0	0	25	31
Superdistrict 3	0	25	0	0	0	0	21	46	0	26	0	0	0	0	111	137	0	52	0	0	0	0	132	184
Superdistrict 4	0	0	0	0	0	0	2	2	0	0	0	0	0	0	7	7	0	1	0	0	0	0	8	9
East Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	8	8	0	1	0	0	0	0	8	9
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
South Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2	3	0	1	0	0	0	0	3	4
Out of Region	0	2	0	0	0	0	0	2	0	2	0	0	0	0	2	4	0	3	0	0	0	0	3	6
Total	0	33	0	0	0	0	35	68	0	35	0	0	0	0	187	222	0	69	0	0	0	0	221	290

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	8	0	0	0	0	18	26	0	10	0	0	0	0	122	132	0	18	0	0	0	0	140	158
Superdistrict 2	0	12	0	0	0	0	19	32	0	14	0	0	0	0	153	167	0	26	0	0	0	0	172	198
Superdistrict 3	0	84	0	0	0	0	61	145	0	88	0	0	0	0	361	449	0	172	0	0	0	0	422	594
Superdistrict 4	0	7	0	0	0	0	10	17	0	8	0	0	0	0	109	117	0	15	0	0	0	0	119	134
East Bay	0	4	0	0	0	0	12	17	0	9	0	0	0	0	386	395	0	13	0	0	0	0	399	412
North Bay	0	3	0	0	0	0	1	4	0	3	0	0	0	0	49	52	0	6	0	0	0	0	50	56
South Bay	0	12	0	0	0	0	12	25	0	16	0	0	0	0	268	284	0	28	0	0	0	0	280	308
Out of Region	0	7	0	0	0	0	4	11	0	7	0	0	0	0	38	45	0	14	0	0	0	0	42	56
Total	0	138	0	0	0	0	138	276	0	155	0	0	0	0	1,487	1,641	0	292	0	0	0	0	1,625	1,917

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	0	0	0	0	3	5	0	2	0	0	0	0	13	15	0	4	0	0	0	0	16	21
Superdistrict 2	0	5	0	0	0	0	7	12	0	5	0	0	0	0	30	35	0	10	0	0	0	0	36	47
Superdistrict 3	0	25	0	0	0	0	11	36	0	25	0	0	0	0	59	85	0	50	0	0	0	0	70	120
Superdistrict 4	0	3	0	0	0	0	3	6	0	4	0	0	0	0	23	27	0	7	0	0	0	0	26	33
East Bay	0	2	0	0	0	0	3	5	0	2	0	0	0	0	50	52	0	4	0	0	0	0	53	57
North Bay	0	2	0	0	0	0	0	2	0	2	0	0	0	0	15	17	0	4	0	0	0	0	15	19
South Bay	0	5	0	0	0	0	5	11	0	7	0	0	0	0	118	125	0	12	0	0	0	0	123	136
Out of Region	0	2	0	0	0	0	2	4	0	2	0	0	0	0	7	9	0	5	0	0	0	0	8	13
Total	0	47	0	0	0	0	34	80	0	50	0	0	0	0	315	365	0	97	0	0	0	0	349	445

No Project at Mission Bay Blocks 29-32 (1,056 ksf office + 31.7 kgsf retail)

PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees 0 employees
Retail	31,700 gsf
Quick Service Rest.	0 gsf
Sit-down Restaurant	0 gsf
XXX	0 xxx
XXX	0 xxx
Office	1,056,000 gsf

Person-trips by Mode	Daily Trips									Evening Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	0	2,354	0	0	0	0	1,152	3,505	43%	0	94	0	0	0	0	13	107	54%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	3.0%
Transit	0	556	0	0	0	0	2,630	3,186	40%	0	22	0	0	0	0	29	51	26%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.6%
Taxi/Coach (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	0	819	0	0	0	0	335	1,154	14%	0	33	0	0	0	0	4	36	18%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	3.2%
Other	0	73	0	0	0	0	145	219	3%	0	3	0	0	0	0	2	5	2%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	2.1%
Total	0	3,802	0	0	0	0	4,263	8,065	100%	0	152	0	0	0	0	47	199	100%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	2.5%
0%	47%	0%	0%	0%	0%	0%	53%	100%		0%	76%	0%	0%	0%	0%	24%	100%									
Vehicle Trips	0	1,256	0	0	0	0	889	2,145		0	50	0	0	0	0	10	60		0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	1.1%	2.8%
	0%	59%	0%	0%	0%	0%	41%	100%		0%	84%	0%	0%	0%	0%	16%	100%									
Avg. veh. occupancy	0.00	1.87	0.00	0.00	0.00	0.00	1.30	1.63		0.00	1.87	0.00	0.00	0.00	0.00	1.30	1.78									

Saturday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips								Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	562	0	9	0	0	0	0	4	13	0	3	0	0	0	0	2	5	0	2	0	0	0	0	0	3	4%	1.69
Superdistrict 2	766	0	14	0	0	0	0	5	18	0	3	0	0	0	0	3	6	0	5	0	0	0	0	1	6	10%	1.48
Superdistrict 3	3,183	0	89	0	0	0	0	10	100	0	9	0	0	0	0	5	15	0	26	0	0	0	0	2	28	46%	1.98
Superdistrict 4	510	0	8	0	0	0	0	3	11	0	1	0	0	0	0	2	3	0	4	0	0	0	0	1	4	7%	1.72
East Bay	1,351	0	7	0	0	0	0	13	20	0	2	0	0	0	0	10	13	0	2	0	0	0	0	2	4	6%	1.69
North Bay	230	0	3	0	0	0	0	2	5	0	1	0	0	0	0	1	1	0	2	0	0	0	0	1	2	4%	1.44
South Bay	1,172	0	15	0	0	0	0	9	23	0	2	0	0	0	0	4	6	0	6	0	0	0	0	4	10	17%	1.59
Out of Region	291	0	7	0	0	0	0	1	9	0	1	0	0	0	0	1	2	0	3	0	0	0	0	0	3	5%	1.68
Total	8,065	0	152	0	0	0	0	47	199	0	22	0	0	0	0	29	51	0	50	0	0	0	0	10	60	100%	1.78

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Total Person Trips	0	72	0	0	0	0	0	72	0	80	0	0	0	0	47	127	0	152	0	0	0	0	0	47	199
	0%	47%	0%	0%	0%	0%	0%	36%	0%	53%	0%	0%	0%	0%	100%	64%									
Transit Trips	0	8	0	0	0	0	0	8	0	14	0	0	0	0	29	43	0	22	0	0	0	0	0	29	51
	0%	38%	0%	0%	0%	0%	0%	16%	0%	62%	0%	0%	0%	0%	100%	84%									
Vehicle Trips	0	24	0	0	0	0	0	24	0	26	0	0	0	0	10	36	0	50	0	0	0	0	0	10	60
	0%	48%	0%	0%	0%	0%	0%	40%	0%	52%	0%	0%	0%	0%	100%	60%									

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	4	0	0	0	0	0	0	4
Superdistrict 2	0	4	0	0	0	0	0	4	0	4	0	0	0	0	1	5	0	8	0	0	0	0	0	1	9
Superdistrict 3	0	26	0	0	0	0	0	26	0	27	0	0	0	0	2	29	0	53	0	0	0	0	0	2	55
Superdistrict 4	0	3	0	0	0	0	0	3	0	3	0	0	0	0	1	4	0	6	0	0	0	0	0	1	7
East Bay	0	2	0	0	0	0	0	2	0	2	0	0	0	0	3	5	0	4	0	0	0	0	0	3	6
North Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	3	0	0	0	0	0	1	3
South Bay	0	6	0	0	0	0	0	6	0	6	0	0	0	0	4	11	0	12	0	0	0	0	0	4	16
Out of Region	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	4	0	0	0	0	0	0	5
Total	0	46	0	0	0	0	0	46	0	48	0	0	0	0	13	61	0	94	0	0	0	0	0	13	107

No Project at Mission Bay Blocks 29-32 (1,056 ksf office + 31.7 kgsf retail)

PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
SUMMARY OF TRIPS WITH NO EVENT

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	1	0	0	0	0	0	1	0	2	0	0	0	0	2	4	0	3	0	0	0	0	0	2	5
Superdistrict 2	0	1	0	0	0	0	0	1	0	2	0	0	0	0	3	5	0	3	0	0	0	0	0	3	6
Superdistrict 3	0	4	0	0	0	0	0	4	0	5	0	0	0	0	5	10	0	9	0	0	0	0	0	5	15
Superdistrict 4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	0	1	0	0	0	0	0	2	3
East Bay	0	0	0	0	0	0	0	0	0	2	0	0	0	0	10	12	0	2	0	0	0	0	0	10	13
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1	1
South Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	4	6	0	2	0	0	0	0	0	4	6
Out of Region	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	1	0	0	0	0	0	1	2
Total	0	8	0	0	0	0	0	8	0	14	0	0	0	0	29	43	0	22	0	0	0	0	0	29	51

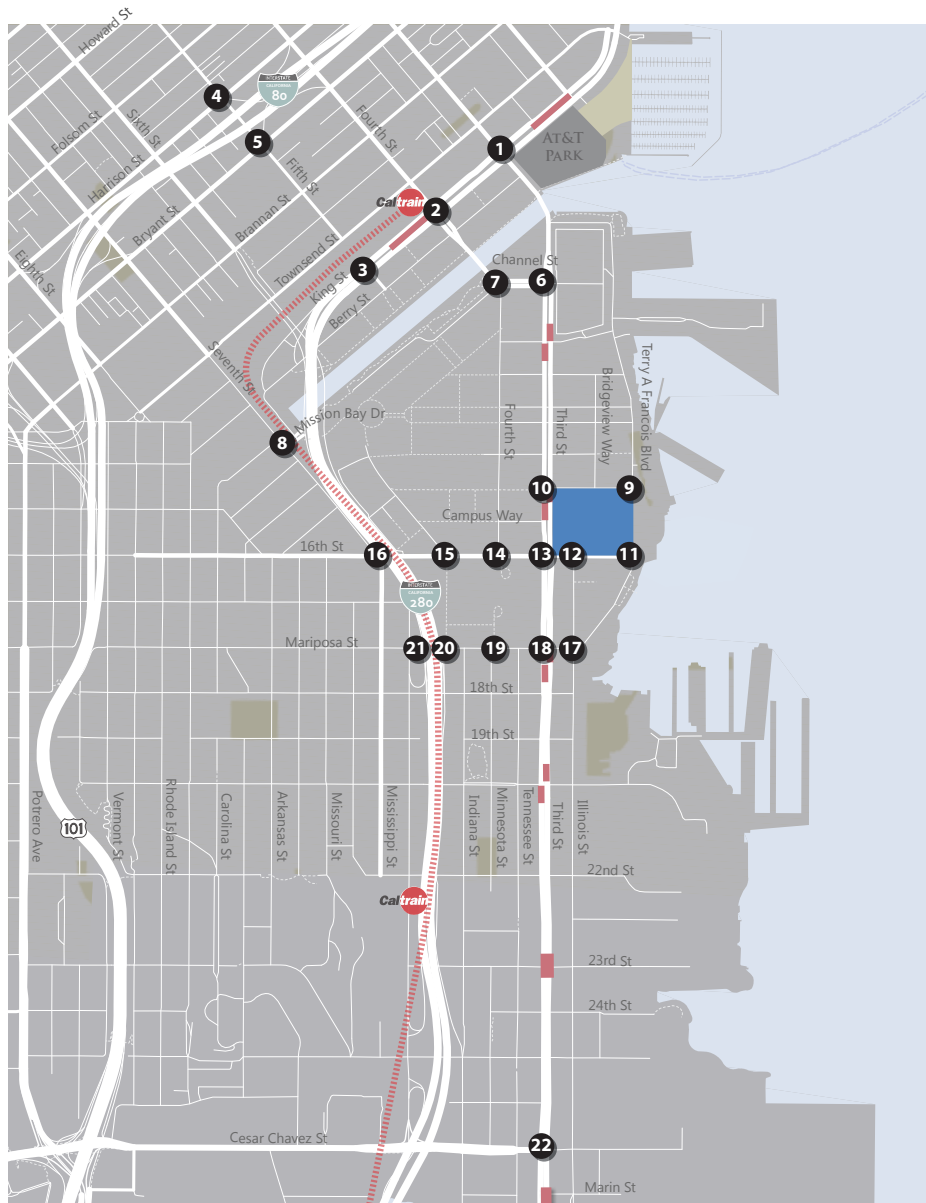
Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	2	0	0	0	0	0	1	3
Superdistrict 2	0	1	0	0	0	0	0	1	0	2	0	0	0	0	1	2	0	3	0	0	0	0	0	1	4
Superdistrict 3	0	13	0	0	0	0	0	13	0	14	0	0	0	0	3	17	0	27	0	0	0	0	0	3	30
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Out of Region	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	2	0	0	0	0	0	0	2
Total	0	17	0	0	0	0	0	17	0	18	0	0	0	0	5	24	0	36	0	0	0	0	0	5	41

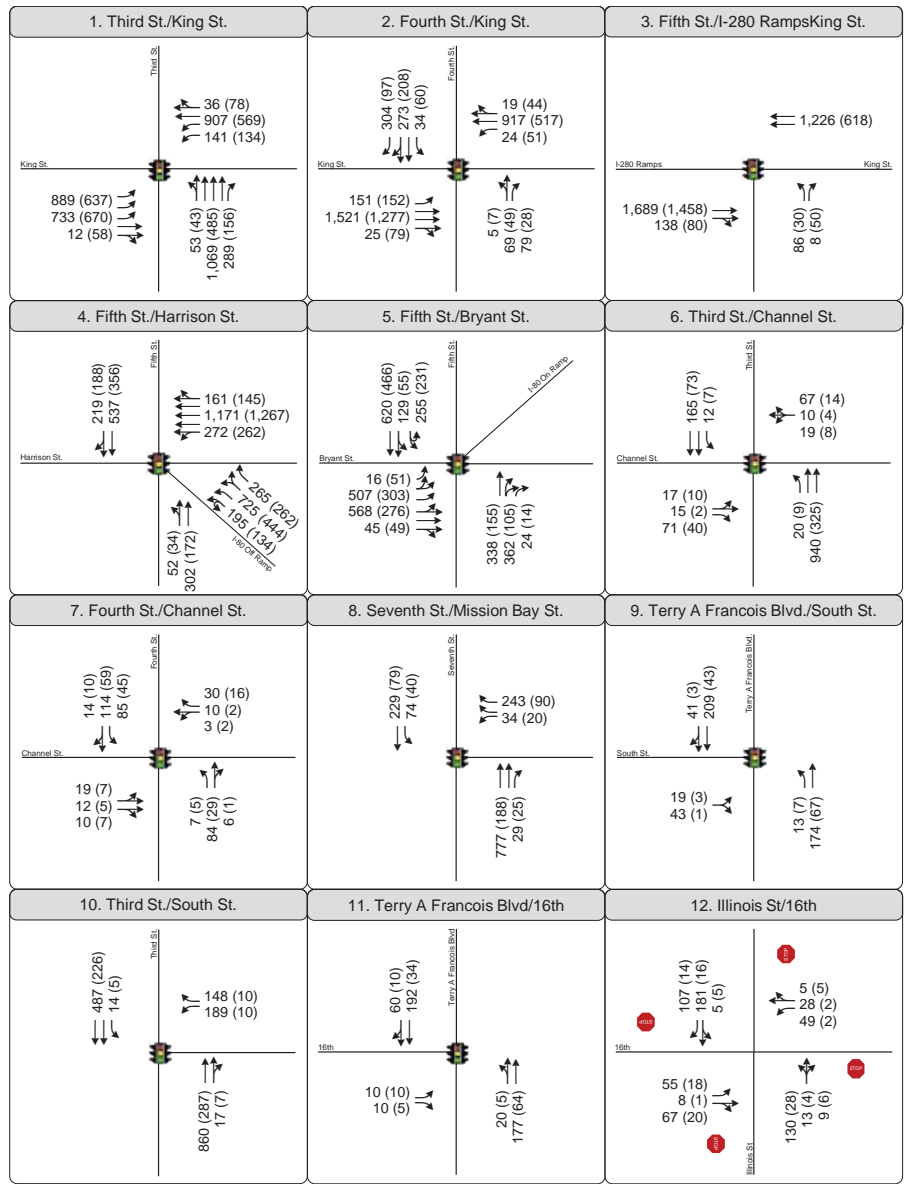
Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	4	0	0	0	0	0	4	0	5	0	0	0	0	4	9	0	9	0	0	0	0	0	4	13
Superdistrict 2	0	6	0	0	0	0	0	6	0	7	0	0	0	0	5	12	0	14	0	0	0	0	0	5	18
Superdistrict 3	0	44	0	0	0	0	0	44	0	46	0	0	0	0	10	56	0	89	0	0	0	0	0	10	100
Superdistrict 4	0	4	0	0	0	0	0	4	0	4	0	0	0	0	3	8	0	8	0	0	0	0	0	3	11
East Bay	0	2	0	0	0	0	0	2	0	5	0	0	0	0	13	18	0	7	0	0	0	0	0	13	20
North Bay	0	1	0	0	0	0	0	1	0	2	0	0	0	0	2	3	0	3	0	0	0	0	0	2	5
South Bay	0	6	0	0	0	0	0	6	0	8	0	0	0	0	9	17	0	15	0	0	0	0	0	9	23
Out of Region	0	4	0	0	0	0	0	4	0	4	0	0	0	0	1	5	0	7	0	0	0	0	0	1	9
Total	0	72	0	0	0	0	0	72	0	80	0	0	0	0	47	127	0	152	0	0	0	0	0	47	199

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Superdistrict 1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	0	3
Superdistrict 2	0	3	0	0	0	0	0	3	0	3	0	0	0	0	1	4	0	5	0	0	0	0	0	1	6
Superdistrict 3	0	13	0	0	0	0	0	13	0	13	0	0	0	0	2	15	0	26	0	0	0	0	0	2	28
Superdistrict 4	0	2	0	0	0	0	0	2	0	2	0	0	0	0	1	3	0	4	0	0	0	0	0	1	4
East Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2	3	0	2	0	0	0	0	0	2	4
North Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	2	0	0	0	0	0	1	2
South Bay	0	3	0	0	0	0	0	3	0	4	0	0	0	0	4	7	0	6	0	0	0	0	0	4	10
Out of Region	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	3	0	0	0	0	0	0	3
Total	0	24	0	0	0	0	0	24	0	26	0	0	0	0	10	36	0	50	0	0	0	0	0	10	60

EXISTING PLUS NO PROJECT ALTERNATIVE
TRAFFIC VOLUME FIGURES
WEEKDAY PM PEAK / SATURDAY EVENING



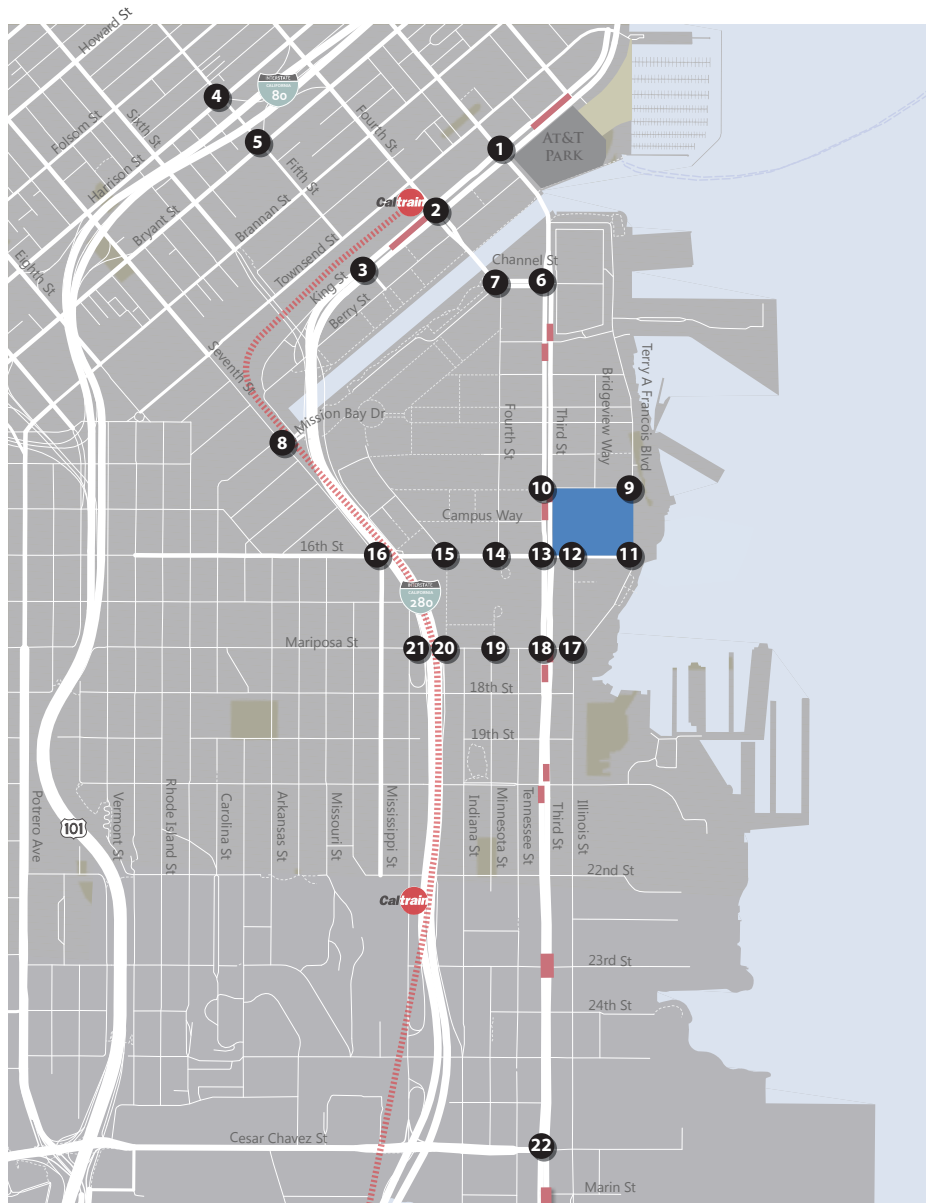
X Study Intersection
 Project Site
 Muni Stop
 Turn Lane



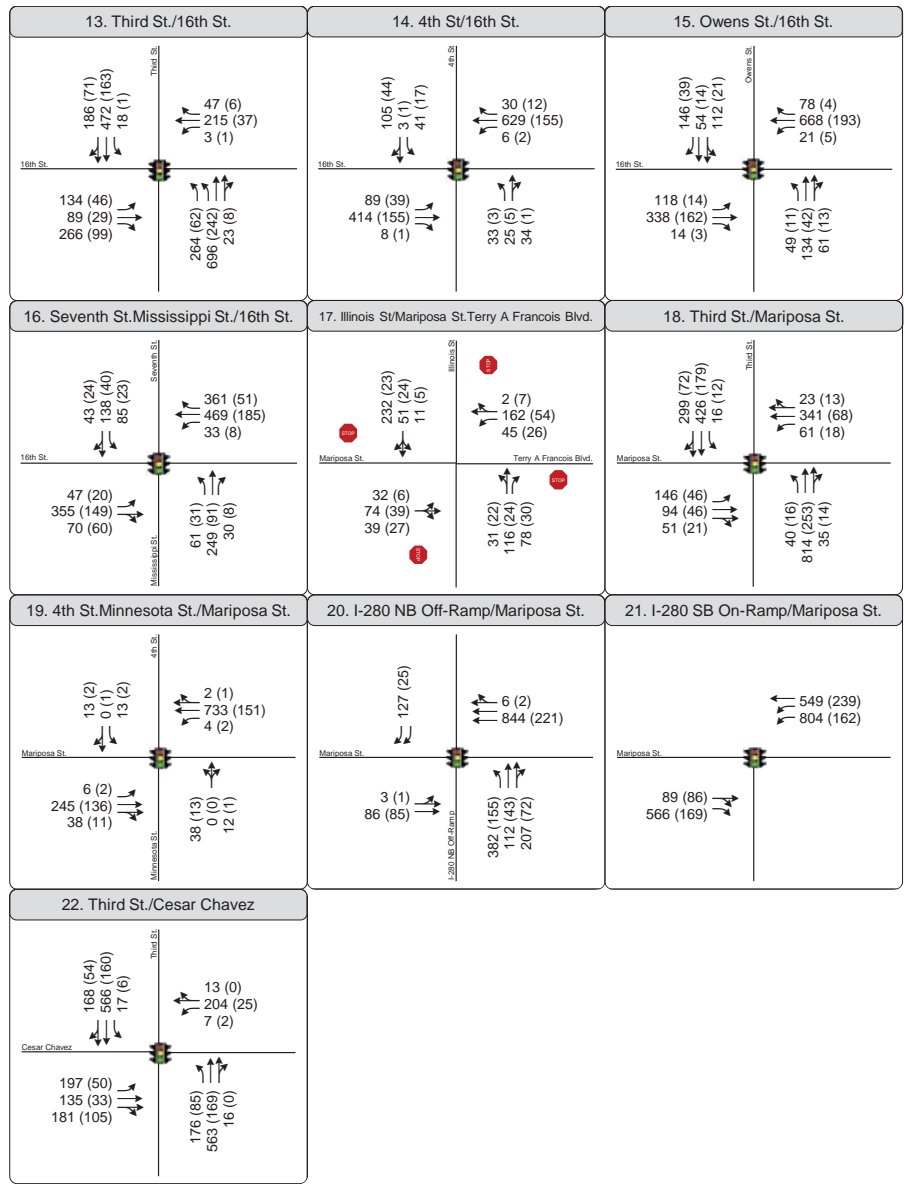
PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 16a
 Peak Hour Traffic Volumes and Lane Configurations Existing Plus No Project Alternative (2015) Conditions





X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 16b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus No Project Alternative (2015) Conditions



EXISTING PLUS NO PROJECT ALTERNATIVE
INTERSECTION LEVEL OF SERVICE - WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	889	733	12	141	907	36	53	1069	289	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5480	942			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5480	942			
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)	916	756	12	145	935	37	55	1102	298	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	200	0	0	0
Lane Group Flow (vph)	916	767	0	145	971	0	0	1157	98	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.3		13.2	36.8			36.1	36.1			
Effective Green, g (s)	18.2	40.3		13.2	36.8			36.1	36.1			
Actuated g/C Ratio	0.17	0.37		0.12	0.33			0.33	0.33			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1119		358	1011			1798	309			
v/s Ratio Prot	c0.20	0.25		0.05	c0.32							
v/s Ratio Perm								0.21	0.10			
v/c Ratio	1.24	0.69		0.41	0.96			0.64	0.32			
Uniform Delay, d1	45.9	29.5		44.8	35.9			31.5	27.7			
Progression Factor	1.38	1.60		1.54	1.02			0.90	2.83			
Incremental Delay, d2	113.5	2.1		0.2	8.4			0.7	0.6			
Delay (s)	176.8	49.3		69.0	44.9			29.1	78.8			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		118.7			48.1			39.3			0.0	
Approach LOS		F			D			D			A	

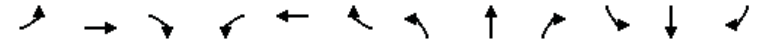
Intersection Summary

HCM 2000 Control Delay	73.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	273	304
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.84	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4155		1296	2553			1585	858	1044	2348	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1459	4155		1296	2553			1543	858	778	2348	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	279	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	43	118
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	363	65
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1733		70	833			535	297	277	836	207
v/s Ratio Prot	0.11	c0.38		0.02	c0.37						c0.15	
v/s Ratio Perm								0.05	0.03	0.04		0.11
v/c Ratio	0.81	0.91		0.34	1.14			0.14	0.09	0.13	0.43	0.32
Uniform Delay, d1	46.5	30.1		50.1	37.0			24.6	24.2	23.9	27.0	25.7
Progression Factor	0.58	1.19		0.88	0.90			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.9		1.0	70.6			0.1	0.1	0.2	0.4	0.9
Delay (s)	29.5	36.9		45.1	104.0			24.8	24.4	24.1	27.3	26.5
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		36.2			102.5			24.6			26.9	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

5/14/2015

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	69.5			1.0	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/14/2015

	↖	←	↗	↖	↑	↓	↙	↘	↖	↗
Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↖↑	↗↑			↖↖	↗↗
Volume (vph)	272	1171	161	52	302	537	219	195	725	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4086	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4086	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	212	780	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1021	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1225	293
v/s Ratio Prot						c0.33			0.25	
v/s Ratio Perm		0.30			0.20					c0.26
v/c Ratio		0.92			0.65	1.05			0.83	0.87
Uniform Delay, d1		29.4			26.7	31.0			29.4	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	47.9			6.7	28.4
Delay (s)		50.1			2.1	78.9			36.1	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	78.9			40.6	
Approach LOS		D			A	E			D	

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

5/14/2015

Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations										
Volume (vph)	16	507	568	45	338	362	24	255	129	620
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1912		2130		1163		1327	2541
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.63
Satd. Flow (perm)		1313	1912		2130		1163		207	1616
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	545	611	48	363	389	26	274	139	667
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	480	734	0	755	0	6	0	306	774
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0			23.0	42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5			23.0	43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27			0.26	0.48	0.48
Clearance Time (s)		4.5	4.5		4.0			4.0	4.0	4.0
Lane Grp Cap (vph)		328	531		579			297	305	950
v/s Ratio Prot		0.37	c0.38		c0.35				c0.18	0.15
v/s Ratio Perm							0.01		0.30	0.24
v/c Ratio		1.46	1.38		1.42dr		0.02		1.00	0.81
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	19.8
Progression Factor		1.00	1.00		1.00		1.00		1.10	1.15
Incremental Delay, d2		224.6	183.3		149.0		0.1		27.9	2.2
Delay (s)		258.4	215.8		181.8		25.2		62.2	25.1
Level of Service		F	F		F		C		E	C
Approach Delay (s)			232.6		177.1					35.6
Approach LOS			F		F					D
Intersection Summary										
HCM 2000 Control Delay			149.5							F
HCM 2000 Volume to Capacity ratio			1.08							
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				13.5	
Intersection Capacity Utilization			102.8%		ICU Level of Service				G	
Analysis Period (min)			15							
dr Defacto Right Lane. Recode with 1 though lane as a right lane.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

5/14/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Volume (vph)	17	15	71	19	10	67	20	940	18	12	165	13			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900			
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5				
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95				
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00				
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00				
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99				
Fit Protected		0.97	1.00		0.99		0.95	1.00		0.95	1.00				
Satd. Flow (prot)		1569	1353		1426		1272	2531		1540	3038				
Fit Permitted		0.87	1.00		0.95		0.95	1.00		0.95	1.00				
Satd. Flow (perm)		1405	1353		1373		1272	2531		1540	3038				
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)	18	16	75	20	11	71	21	989	19	13	174	14			
RTOR Reduction (vph)	0	0	51	0	48	0	0	1	0	0	6	0			
Lane Group Flow (vph)	0	34	24	0	54	0	21	1007	0	13	182	0			
Confl. Peds. (#/hr)	15		5	5		15			64			14			
Confl. Bikes (#/hr)			2			1			16			14			
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA				
Protected Phases		4			8		5	2		1	6				
Permitted Phases	4		4	8											
Actuated Green, G (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5				
Effective Green, g (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5				
Actuated g/C Ratio		0.32	0.32		0.32		0.14	0.38		0.14	0.38				
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5				
Lane Grp Cap (vph)		451	434		440		175	974		207	1169				
v/s Ratio Prot							0.02	c0.40		0.01	c0.06				
v/s Ratio Perm		0.02	0.02		c0.04										
v/c Ratio		0.08	0.06		0.12		0.12	1.03		0.06	0.16				
Uniform Delay, d1		23.6	23.5		24.0		37.8	30.8		37.7	20.1				
Progression Factor		1.00	1.00		1.00		1.22	0.22		1.00	1.00				
Incremental Delay, d2		31.1	30.2		30.6		1.0	33.7		0.6	0.3				
Delay (s)		23.9	23.7		24.6		47.0	40.4		38.3	20.4				
Level of Service		C	C		C		D	D		D	C				
Approach Delay (s)		23.8			24.6			40.5			21.6				
Approach LOS		C			C			D			C				
Intersection Summary															
HCM 2000 Control Delay			35.5				HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio			0.55												
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					15.9					
Intersection Capacity Utilization			97.5%		ICU Level of Service					F					
Analysis Period (min)			15												
c Critical Lane Group															

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

5/14/2015

	↖	→	↗	↙	←	↘	↖	↗	↙	↘	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	12	10	3	10	30	7	84	6	85	114	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2553			1434	1227	1154	1432		1377	1393	
Fit Permitted		0.95			1.00	1.00	0.80	1.00		0.95	1.00	
Satd. Flow (perm)		2493			1449	1227	972	1432		1377	1393	
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)	20	13	11	3	11	32	8	90	6	91	123	15
RTOR Reduction (vph)	0	10	0	0	0	17	0	4	0	0	5	0
Lane Group Flow (vph)	0	34	0	0	14	15	8	92	0	91	133	0
Confl. Peds. (#/hr)	28		3	3		28	213		19		213	
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.3			2.3	18.7	5.0	5.0		16.4	26.4	
Effective Green, g (s)		2.3			2.3	18.7	5.0	5.0		16.4	26.4	
Actuated g/C Ratio		0.06			0.06	0.48	0.13	0.13		0.42	0.68	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grip Cap (vph)		148			86	751	125	185		583	950	
v/s Ratio Prot						0.01		c0.06		0.07	c0.10	
v/s Ratio Perm		c0.01			0.01	0.00	0.01					
v/c Ratio		0.23			0.16	0.02	0.06	0.50		0.16	0.14	
Uniform Delay, d1		17.4			17.3	5.2	14.8	15.7		6.9	2.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.9	0.0	0.2	2.1		0.1	0.1	
Delay (s)		18.1			18.2	5.2	15.0	17.8		7.0	2.2	
Level of Service		B			B	A	B	B		A	A	
Approach Delay (s)		18.1			9.2			17.5			4.1	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

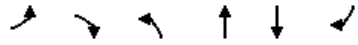
5/14/2015

	↖	↗	↑	↘	↙	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Volume (vph)	34	243	777	29	74	229
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	264	845	32	80	249
RTOR Reduction (vph)	0	236	0	5	0	0
Lane Group Flow (vph)	37	28	845	27	80	249
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.7	8.7	47.6	42.6	9.3	61.9
Effective Green, g (s)	8.7	8.7	47.6	42.6	9.3	61.9
Actuated g/C Ratio	0.11	0.11	0.59	0.53	0.12	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grip Cap (vph)	122	188	906	500	130	916
v/s Ratio Prot	c0.03		c0.55	0.01	c0.07	0.21
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.30	0.15	0.93	0.05	0.62	0.27
Uniform Delay, d1	33.2	32.6	15.0	9.2	33.9	2.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.4	16.0	0.0	8.4	0.2
Delay (s)	34.6	33.0	31.0	9.3	42.3	2.9
Level of Service	C	C	C	A	D	A
Approach Delay (s)	33.2		30.2			12.5
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

5/14/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔↔	
Volume (vph)	19	43	13	174	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	0.99		0.98	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1521		1680	1531	3062	
Fit Permitted	0.99		0.58	1.00	1.00	
Satd. Flow (perm)	1521		1027	1531	3062	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	14	193	232	46
RTOR Reduction (vph)	43	0	0	0	15	0
Lane Group Flow (vph)	26	0	14	193	263	0
Confl. Peds. (#/hr)	50	50				50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Actuated Green, G (s)	3.6		22.6	22.6	22.6	
Effective Green, g (s)	3.6		22.6	22.6	22.6	
Actuated g/C Ratio	0.10		0.64	0.64	0.64	
Clearance Time (s)	4.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	155		659	982	1965	
v/s Ratio Prot				c0.13	0.09	
v/s Ratio Perm	c0.02		0.01			
v/c Ratio	0.17		0.02	0.20	0.13	
Uniform Delay, d1	14.4		2.3	2.6	2.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.0	0.1	0.0	
Delay (s)	14.9		2.3	2.7	2.5	
Level of Service	B		A	A	A	
Approach Delay (s)	14.9			2.7	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

5/14/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔↔		↔	↔↔
Volume (vph)	189	148	860	17	14	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3406		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3406		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	164	956		19	541
RTOR Reduction (vph)	0	117	1	0	0	0
Lane Group Flow (vph)	210	47	974		16	541
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	52.0		4.0	61.1
Effective Green, g (s)	28.7	28.7	52.0		4.0	61.1
Actuated g/C Ratio	0.29	0.29	0.52		0.04	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1771		68	2090
v/s Ratio Prot			c0.29		0.01	c0.16
v/s Ratio Perm	c0.13	0.03				
v/c Ratio	0.46	0.11	0.55		0.24	0.26
Uniform Delay, d1	29.3	26.3	16.1		46.5	9.0
Progression Factor	1.00	1.00	2.06		1.08	1.36
Incremental Delay, d2	0.7	0.1	0.8		1.8	0.1
Delay (s)	30.1	26.4	34.0		51.9	12.3
Level of Service	C	C	C		D	B
Approach Delay (s)	28.4		34.0			13.4
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

5/14/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	20	177	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1520	1343		3060	2948	
Flt Permitted	0.95	1.00		0.89	1.00	
Satd. Flow (perm)	1520	1343		2733	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	12	24	208	226	71
RTOR Reduction (vph)	0	12	0	0	57	0
Lane Group Flow (vph)	12	0	0	232	240	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		9.1	9.1	
Effective Green, g (s)	0.6	0.6		9.1	9.1	
Actuated g/C Ratio	0.01	0.01		0.20	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	20	17		552	596	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.08		
v/c Ratio	0.60	0.01		0.42	0.40	
Uniform Delay, d1	22.1	21.9		15.7	15.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.2	0.2		0.5	0.4	
Delay (s)	62.3	22.1		16.2	16.0	
Level of Service	E	C		B	B	
Approach Delay (s)	42.2			16.2	16.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

5/14/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	55	8	67	49	28	5	130	13	9	5	181	107
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	60	9	77	56	32	5	149	14	10	5	197	116
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	60	86	56	38	174	202	116					
Volume Left (vph)	60	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	116					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.17	0.05	-0.67					
Departure Headway (s)	6.4	5.3	6.5	5.9	5.7	5.4	4.7					
Degree Utilization, x	0.11	0.13	0.10	0.06	0.28	0.31	0.15					
Capacity (veh/h)	518	624	510	560	603	634	726					
Control Delay (s)	9.0	7.9	9.0	8.1	10.9	9.6	7.4					
Approach Delay (s)	8.3		8.7		10.9	8.8						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	9.2		
Level of Service	A		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

5/14/2015

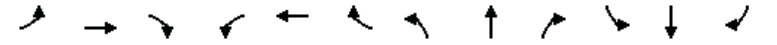


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	134	89	266	3	215	47	264	696	23	18	472	186
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1265	1365	1126	1283	1365	1099	2515	2577		1296	2464	
Fit Permitted	0.53	1.00	1.00	0.69	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	711	1365	1126	936	1365	1099	2515	2577		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	147	98	292	3	236	52	290	765	25	20	519	204
RTOR Reduction (vph)	0	0	191	0	0	34	0	2	0	0	42	0
Lane Group Flow (vph)	147	98	101	3	236	18	290	788	0	20	681	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	245	470	388	322	470	379	352	974		155	882	
v/s Ratio Prot		0.07			0.17		0.12	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.21		0.09	0.00		0.02						
v/c Ratio	0.60	0.21	0.26	0.01	0.50	0.05	0.82	0.81		0.13	0.77	
Uniform Delay, d1	27.1	23.1	23.6	21.5	25.9	21.8	41.8	27.9		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.76		1.15	1.19	
Incremental Delay, d2	10.4	1.0	1.6	0.1	3.8	0.2	8.6	3.0		1.7	6.3	
Delay (s)	37.5	24.1	25.2	21.6	29.7	22.0	35.5	24.3		47.0	40.3	
Level of Service	D	C	C	C	C	C	D	C		D	D	
Approach Delay (s)		28.4			28.3			27.3			40.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	89	414	8	6	629	30	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	450	9	7	684	33	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	18	0	28	0	0	85	0
Lane Group Flow (vph)	97	450	5	7	684	15	36	36	0	45	32	0
Confl. Peds. (#/hr)		50				50			10			50
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.06	c0.26		0.00	c0.40		0.01	0.03			0.02	
v/s Ratio Perm			0.00				0.01	0.03				
v/c Ratio	0.48	0.48	0.01	0.14	0.89	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.5	12.2	9.0	41.1	21.9	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.8	0.0	1.3	12.1	0.0	0.2	0.1		0.3	0.1	
Delay (s)	37.3	14.0	9.0	42.4	34.0	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	C	B	C	C		C	C	
Approach Delay (s)		18.0			33.1			25.3			25.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	118	338	14	21	668	78	49	134	61	112	54	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1048	1540	2934			2978	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.67	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1048	1041	2934			2060	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	123	352	15	22	696	81	51	140	64	117	56	152
RTOR Reduction (vph)	0	0	4	0	0	21	0	55	0	0	0	132
Lane Group Flow (vph)	123	352	11	22	696	60	51	149	0	0	173	20
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	10.0	71.2	71.2	2.3	62.5	62.5	14.6	14.6			13.6	13.6
Effective Green, g (s)	10.0	71.2	71.2	2.3	62.5	62.5	14.6	14.6			13.6	13.6
Actuated g/C Ratio	0.10	0.70	0.70	0.02	0.62	0.62	0.14	0.14			0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	120	855	970	35	751	647	150	423			277	144
v/s Ratio Prot	c0.10	0.29		0.01	c0.57			0.05				
v/s Ratio Perm			0.01			0.06	0.05				c0.08	0.02
v/c Ratio	1.02	0.41	0.01	0.63	0.93	0.09	0.34	0.35			0.94dl	0.14
Uniform Delay, d1	45.5	6.2	4.5	49.0	17.3	7.8	38.9	39.0			41.3	38.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	89.0	1.5	0.0	30.3	17.3	0.1	1.4	0.5			4.3	0.5
Delay (s)	134.5	7.7	4.5	79.3	34.6	7.9	40.3	39.5			45.7	39.1
Level of Service	F	A	A	E	C	A	D	D			D	D
Approach Delay (s)		39.4			33.1			39.7			42.6	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	101.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	47	355	70	33	469	361	61	249	30	85	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	927		1335	1126	859	1070	957	920	1070	1068	
Fit Permitted	0.15	1.00		0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	214	927		457	1126	859	1070	957	920	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	378	74	35	499	384	65	265	32	90	147	46
RTOR Reduction (vph)	0	6	0	0	0	139	0	0	24	0	11	0
Lane Group Flow (vph)	50	446	0	35	499	245	65	265	8	90	182	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	51.8	51.8		51.1	51.1	60.1	13.6	27.1	27.1	9.0	22.5	
Effective Green, g (s)	51.8	51.8		51.1	51.1	60.1	13.6	27.1	27.1	9.0	22.5	
Actuated g/C Ratio	0.47	0.47		0.46	0.46	0.54	0.12	0.25	0.25	0.08	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	132	435		230	521	506	131	235	226	87	217	
v/s Ratio Prot	0.01	c0.48		0.00	c0.44	0.04	0.06	c0.28		0.08	c0.17	
v/s Ratio Perm	0.17			0.07		0.25			0.01			
v/c Ratio	0.38	1.02		0.15	0.96	0.48	0.50	1.13	0.03	1.03	0.84	
Uniform Delay, d1	21.0	29.2		25.5	28.6	15.5	45.2	41.6	31.6	50.6	42.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	49.5		0.3	28.7	0.7	2.9	97.4	0.1	106.2	23.6	
Delay (s)	22.8	78.8		25.8	57.3	16.2	48.1	139.0	31.7	156.9	65.8	
Level of Service	C	E		C	E	B	D	F	C	F	E	
Approach Delay (s)		73.2			38.9			113.2			94.7	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	67.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

5/14/2015

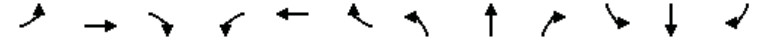


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	32	74	39	45	162	2	31	116	78	11	51	232
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	36	82	43	50	180	2	34	129	87	12	57	258
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	161	50	182	163	87	327						
Volume Left (vph)	36	50	0	34	0	12						
Volume Right (vph)	43	0	2	0	87	258						
Hadj (s)	-0.08	0.53	0.03	0.14	-0.67	-0.43						
Departure Headway (s)	6.5	7.0	6.5	6.4	5.6	5.7						
Degree Utilization, x	0.29	0.10	0.33	0.29	0.13	0.52						
Capacity (veh/h)	500	474	514	514	592	595						
Control Delay (s)	12.2	9.5	11.4	10.8	8.3	14.8						
Approach Delay (s)	12.2	11.0		10.0		14.8						
Approach LOS	B	B		A		B						

Intersection Summary						
Delay				12.2		
Level of Service				B		
Intersection Capacity Utilization		56.3%		ICU Level of Service		B
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	146	94	51	61	341	23	40	814	35	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3199		1677	3379		1260	2501		1260	2331	
Fit Permitted	0.48	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	843	3199		1155	3379		1260	2501		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	100	54	65	363	24	43	866	37	17	453	318
RTOR Reduction (vph)	0	35	0	0	5	0	0	3	0	0	127	0
Lane Group Flow (vph)	155	119	0	65	382	0	43	900	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	292	1110		400	1172		149	872		187	883	
v/s Ratio Prot		0.04			0.11		0.03	c0.36		0.01	c0.28	
v/s Ratio Perm	c0.18			0.06								
v/c Ratio	0.53	0.11		0.16	0.33		0.29	1.03		0.09	0.73	
Uniform Delay, d1	26.1	22.1		22.6	24.0		40.2	32.5		36.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.91	0.80		1.55	0.62	
Incremental Delay, d2	6.8	0.2		0.9	0.7		3.7	35.0		0.7	3.8	
Delay (s)	32.9	22.3		23.5	24.8		40.0	61.1		57.6	20.3	
Level of Service	C	C		C	C		D	E		E	C	
Approach Delay (s)		27.6			24.6			60.1			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	37.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

5/14/2015



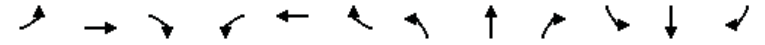
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Volume (vph)	6	245	38	4	733	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3353		1711	3420			1678		1711	1531	
Flt Permitted	0.26	1.00		0.56	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	473	3353		1017	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	266	41	4	797	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	20	0	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	287	0	4	799	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	189	1341		406	1368			635		563	663	
v/s Ratio Prot		0.09			c0.23						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.04	0.21		0.01	0.58			0.05		0.02	0.01	
Uniform Delay, d1	11.0	11.8		10.8	14.1			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		0.0	1.8			0.2		0.1	0.0	
Delay (s)	11.3	12.2		10.9	15.9			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.2			15.9			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

5/14/2015



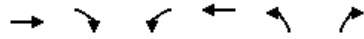
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	3	86	0	0	844	6	382	112	207	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			5.0	5.0			3.5
Lane Util. Factor		0.95			*0.95			1.00	0.95			0.88
Frt		1.00			1.00			1.00	1.00			1.00
Flt Protected		1.00			1.00			0.95	1.00			1.00
Satd. Flow (prot)		3416			5127			1711	3088			2694
Flt Permitted		0.95			1.00			0.95	1.00			1.00
Satd. Flow (perm)		3244			5127			1711	3088			2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	88	0	0	861	6	390	114	211	0	0	130
RTOR Reduction (vph)	0	0	0	0	1	0	0	109	0	0	0	121
Lane Group Flow (vph)	0	91	0	0	866	0	390	216	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1412			1701		824	1487				183
v/s Ratio Prot		c0.00			c0.17		c0.23	0.07				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.51		0.47	0.15				0.05
Uniform Delay, d1		18.3			29.5		19.1	15.9				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.1		1.9	0.2				0.5
Delay (s)		18.4			30.6		21.1	16.1				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.4			30.6			18.8				48.4
Approach LOS		B			C			B				D

Intersection Summary

HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

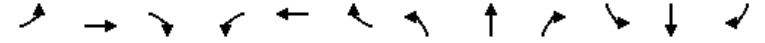
5/14/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	89	566	804	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1501	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1501	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	584	829	566	0	0
RTOR Reduction (vph)	29	29	0	0	0	0
Lane Group Flow (vph)	314	304	829	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	36.8	36.8	23.2	70.0		
Effective Green, g (s)	36.8	36.8	23.2	70.0		
Actuated g/C Ratio	0.53	0.53	0.33	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	789	749	1100	1801		
v/s Ratio Prot	0.21		c0.25	0.31		
v/s Ratio Perm		c0.21				
v/c Ratio	0.40	0.41	0.75	0.31		
Uniform Delay, d1	10.0	10.0	20.9	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.4	3.0	0.1		
Delay (s)	10.3	10.4	23.8	0.1		
Level of Service	B	B	C	A		
Approach Delay (s)	10.3			14.2	0.0	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			55.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

5/14/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	197	135	181	7	204	13	176	563	16	17	566	168
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2413		1215	2289	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2413		1215	2289	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	205	141	189	7	212	14	183	586	17	18	590	175
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	205	203	0	7	224	0	183	601	0	18	737	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		8	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.0	33.0		21.9	21.9		17.3	46.5		4.2	33.4	
Effective Green, g (s)	33.0	33.0		21.9	21.9		17.3	46.5		4.2	33.4	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.46		0.04	0.33	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	641		144	275		210	1122		51	764	
v/s Ratio Prot	c0.06	0.10			0.18		c0.15	0.25		0.01	c0.32	
v/s Ratio Perm	c0.29			0.01								
v/c Ratio	1.07	0.32		0.05	0.81		0.87	0.54		0.35	0.96	
Uniform Delay, d1	34.1	25.1		30.8	37.1		40.3	19.1		46.6	32.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.81	
Incremental Delay, d2	84.1	0.3		0.1	16.6		30.2	1.8		3.4	21.8	
Delay (s)	118.1	25.4		31.0	53.7		70.5	20.9		51.3	48.5	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		60.9			53.0			32.4			48.6	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			46.4									D
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			98.7%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING PLUS NO PROJECT ALTERNATIVE
INTERSECTION LEVEL OF SERVICE - SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

4/22/2015

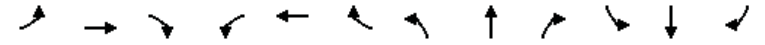


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	134	569	78	43	485	156	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.89			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3018		2987	2982			5514	1233			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3018		2987	2982			5514	1233			
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)	708	744	64	149	632	87	48	539	173	0	0	0
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	142	0	0	0
Lane Group Flow (vph)	708	804	0	149	711	0	0	587	31	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.6	60.4		10.8	45.6			19.9	19.9			
Effective Green, g (s)	25.6	60.4		10.8	45.6			19.9	19.9			
Actuated g/C Ratio	0.23	0.55		0.10	0.41			0.18	0.18			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1042	1657		293	1236			997	223			
v/s Ratio Prot	c0.16	0.27		0.05	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.68	0.49		0.51	0.58			0.59	0.14			
Uniform Delay, d1	38.5	15.2		47.1	24.8			41.3	37.9			
Progression Factor	0.58	0.25		1.35	0.25			1.12	3.29			
Incremental Delay, d2	1.6	0.9		0.4	0.2			0.8	0.3			
Delay (s)	23.7	4.7		64.2	6.3			47.2	125.0			
Level of Service	C	A		E	A			D	F			
Approach Delay (s)		13.6			16.3			64.9			0.0	
Approach LOS		B			B			E			A	
Intersection Summary												
HCM 2000 Control Delay		26.7										C
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			18.9				
Intersection Capacity Utilization		88.8%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

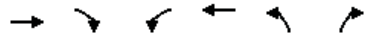
4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	208	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.96	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2437			1540	852	1033	2863	580
Fit Permitted	0.95	1.00		0.95	1.00			0.94	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2437			1452	852	781	2863	580
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	221	103
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	26	0	3	79
Lane Group Flow (vph)	162	1439	0	54	593	0	0	59	4	64	228	14
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	7
Permitted Phases						4			4	7		7
Actuated Green, G (s)	17.5	66.0		8.9	55.8			15.2	15.2	16.2	16.2	16.2
Effective Green, g (s)	17.5	66.0		8.9	55.8			15.2	15.2	16.2	16.2	16.2
Actuated g/C Ratio	0.16	0.60		0.08	0.51			0.14	0.14	0.15	0.15	0.15
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	245	2572		104	1236			200	117	115	421	85
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						0.08	
v/s Ratio Perm								0.04	0.00	c0.08		0.02
v/c Ratio	0.66	0.56		0.52	0.48			0.29	0.04	0.56	0.54	0.16
Uniform Delay, d1	43.5	13.2		48.5	17.6			42.6	41.1	43.6	43.5	41.0
Progression Factor	0.90	1.29		0.84	0.50			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.7		3.6	0.2			0.8	0.1	5.7	1.4	0.9
Delay (s)	44.4	17.8		44.2	9.2			43.4	41.2	49.3	44.9	41.9
Level of Service	D	B		D	A			D	D	D	D	D
Approach Delay (s)		20.5			12.1			42.7			44.9	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		22.7										C
HCM 2000 Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			21.5				
Intersection Capacity Utilization		110.0%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.55	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			1.2	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			1.2	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service A	
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			69.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

4/22/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↔	↑↑	↑↑		↔	↔
Volume (vph)	262	1267	145	34	172	356	188	134	444	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.97	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			0.98	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		5770			2846	2429			3976	1122
Fit Permitted		0.99			0.83	1.00			0.96	1.00
Satd. Flow (perm)		5770			2373	2429			3976	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	138	458	270
RTOR Reduction (vph)	0	22	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1703	0	0	212	555	0	0	666	200
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type		Perm	NA		Perm	NA	NA		Prot	Prot
Protected Phases		6			4	4			7	7
Permitted Phases		6			4					
Actuated Green, G (s)		22.4			20.4	20.4			14.7	14.7
Effective Green, g (s)		24.4			23.4	23.4			17.7	17.7
Actuated g/C Ratio		0.33			0.31	0.31			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1877			740	757			938	264
v/s Ratio Prot						c0.23			0.17	c0.18
v/s Ratio Perm		0.30			0.09					
v/c Ratio		0.91			0.29	0.73			0.71	0.76
Uniform Delay, d1		24.2			19.5	23.0			26.3	26.7
Progression Factor		1.00			0.71	1.00			1.00	1.00
Incremental Delay, d2		6.8			0.2	3.7			2.6	11.7
Delay (s)		31.0			14.0	26.7			28.8	38.4
Level of Service		C			B	C			C	D
Approach Delay (s)		31.0			14.0	26.7			31.1	
Approach LOS		C			B	C			C	
Intersection Summary										
HCM 2000 Control Delay					29.2				HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio					0.84					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					84.6%				ICU Level of Service	E
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

4/22/2015



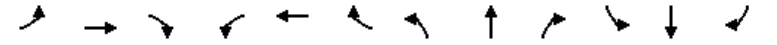
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↕↔
Volume (vph)	51	303	276	49	155	105	14	231	55	466
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2621		2297		1161		1327	2547
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.91
Satd. Flow (perm)		1700	2621		2297		1161		621	2321
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	374	341	60	191	130	17	285	68	575
RTOR Reduction (vph)	0	0	19	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	332	487	0	322	0	3	0	292	636
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA	NA	NA	Perm	pm+pt	pm+pt	NA	NA
Protected Phases	2	2	2		8		7	7	4	
Permitted Phases						8	4	4		
Actuated Green, G (s)		18.5	18.5		16.0		16.0	31.0	31.0	
Effective Green, g (s)		18.5	21.0		17.5		16.0	32.5	32.5	
Actuated g/C Ratio		0.25	0.28		0.23		0.21	0.43	0.43	
Clearance Time (s)		4.5	4.5		4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)		419	733		535		247	386	1043	
v/s Ratio Prot		c0.20	0.19		0.14			c0.13	0.10	
v/s Ratio Perm						0.00		c0.20	0.16	
v/c Ratio		0.79	0.66		0.60		0.01	0.76	0.61	
Uniform Delay, d1		26.5	23.9		25.6		23.3	20.1	16.4	
Progression Factor		1.00	1.00		1.00		1.00	0.88	0.89	
Incremental Delay, d2		14.2	4.7		5.0		0.1	10.1	2.0	
Delay (s)		40.7	28.6		30.6		23.4	27.9	16.7	
Level of Service		D	C		C		C	C	B	
Approach Delay (s)			33.4		30.3				20.2	
Approach LOS			C		C				C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔↔		↔↔	↕↔		↔	↕↔	↔
Volume (vph)	10	2	40	8	4	14	9	325	2	7	73	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1550	1350		1464		1272	2541		1540	3033	
Fit Permitted		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1614	1350		1486		1272	2541		1540	3033	
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)	10	2	41	8	4	14	9	335	2	7	75	7
RTOR Reduction (vph)	0	0	38	0	13	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	12	3	0	13	0	9	336	0	7	77	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Effective Green, g (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Actuated g/C Ratio		0.07	0.07		0.07		0.02	0.33		0.02	0.34	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		111	93		103		27	834		33	1029	
v/s Ratio Prot							0.01	c0.13		0.00	c0.03	
v/s Ratio Perm		0.01	0.00		c0.01							
v/c Ratio		0.11	0.03		0.13		0.33	0.40		0.21	0.08	
Uniform Delay, d1		12.0	11.9		12.0		13.2	7.1		13.2	6.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4	0.1		0.6		2.6	0.3		1.2	0.0	
Delay (s)		12.4	12.0		12.5		15.8	7.4		14.3	6.2	
Level of Service		B	B		B		B	A		B	A	
Approach Delay (s)		12.1			12.5			7.7			6.8	
Approach LOS		B			B		A				A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	27.4	Sum of lost time (s)	15.9
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	7	5	7	2	2	16	5	29	1	45	59	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2372			1413	1230	1148	1438		1377	1379	
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		2306			1448	1230	1208	1438		1377	1379	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	8	6	8	2	2	18	6	33	1	52	68	11
RTOR Reduction (vph)	0	8	0	0	0	8	0	1	0	0	3	0
Lane Group Flow (vph)	0	14	0	0	4	10	6	33	0	52	76	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		1.1			1.1	20.5	1.2	1.2		19.4	25.6	
Effective Green, g (s)		1.1			1.1	20.5	1.2	1.2		19.4	25.6	
Actuated g/C Ratio		0.03			0.03	0.56	0.03	0.03		0.53	0.70	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		69			43	854	39	47		727	961	
v/s Ratio Prot						0.01		c0.02		0.04	c0.05	
v/s Ratio Perm		c0.01			0.00	0.00	0.00					
v/c Ratio		0.21			0.09	0.01	0.15	0.70		0.07	0.08	
Uniform Delay, d1		17.4			17.3	3.6	17.3	17.6		4.2	1.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.9	0.0	1.8	38.1		0.0	0.0	
Delay (s)		18.9			18.3	3.6	19.1	55.6		4.3	1.8	
Level of Service		B			B	A	B	E		A	A	
Approach Delay (s)		18.9			6.3			50.2			2.8	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	20	90	188	25	40	79
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1744	1535	846	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1744	1535	846	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	103	216	29	46	91
RTOR Reduction (vph)	0	91	0	17	0	0
Lane Group Flow (vph)	23	12	216	12	46	91
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	5.8	5.8	25.8	20.8	4.7	35.5
Effective Green, g (s)	5.8	5.8	25.8	20.8	4.7	35.5
Actuated g/C Ratio	0.11	0.11	0.50	0.41	0.09	0.69
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	128	197	771	425	103	826
v/s Ratio Prot	c0.02		c0.14	0.01	c0.04	0.08
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.18	0.06	0.28	0.03	0.45	0.11
Uniform Delay, d1	20.6	20.3	7.4	9.2	22.1	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.2	0.0	3.1	0.1
Delay (s)	21.3	20.4	7.6	9.2	25.1	2.7
Level of Service	C	C	A	A	C	A
Approach Delay (s)	20.6		7.8			10.2
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y		Y	
Volume (vph)	3	1	7	67	43	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frpb, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	0.97		0.98	1.00	1.00	
Frt	0.97		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1598		1672	1531	3120	
Flt Permitted	0.96		0.72	1.00	1.00	
Satd. Flow (perm)	1598		1266	1531	3120	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	4	1	8	80	51	4
RTOR Reduction (vph)	1	0	0	0	1	0
Lane Group Flow (vph)	4	0	8	80	54	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	0.9		21.7	21.7	21.7	
Effective Green, g (s)	0.9		21.7	21.7	21.7	
Actuated g/C Ratio	0.03		0.67	0.67	0.67	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	44		842	1019	2076	
v/s Ratio Prot	c0.00			c0.05	0.02	
v/s Ratio Perm			0.01			
v/c Ratio	0.09		0.01	0.08	0.03	
Uniform Delay, d1	15.5		1.8	1.9	1.9	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.9		0.0	0.0	0.0	
Delay (s)	16.4		1.8	2.0	1.9	
Level of Service	B		A	A	A	
Approach Delay (s)	16.4			1.9	1.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	32.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

4/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	
Volume (vph)	10	10	287	7	5	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.87	1.00		1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1635	1326	3399		1711	3421
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1635	1326	3399		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	11	309	8	5	243
RTOR Reduction (vph)	0	11	1	0	0	0
Lane Group Flow (vph)	11	0	316	0	5	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	1.2	1.2	42.3		1.1	48.5
Effective Green, g (s)	1.2	1.2	42.3		1.1	48.5
Actuated g/C Ratio	0.02	0.02	0.71		0.02	0.81
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	32	26	2400		31	2769
v/s Ratio Prot			c0.09		0.00	c0.07
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.34	0.01	0.13		0.16	0.09
Uniform Delay, d1	29.0	28.8	2.9		28.9	1.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.1	0.1		2.4	0.1
Delay (s)	35.3	28.9	3.0		31.4	1.2
Level of Service	D	C	A		C	A
Approach Delay (s)	32.1		3.0			1.8
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	15.3
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

4/22/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↔↔	↔↔	
Volume (vph)	10	5	5	64	34	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1521	1344		2873	2769	
Flt Permitted	0.95	1.00		0.93	1.00	
Satd. Flow (perm)	1521	1344		2683	2769	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	6	6	75	40	12
RTOR Reduction (vph)	0	6	0	0	10	0
Lane Group Flow (vph)	12	0	0	81	42	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.7	0.7		6.6	6.6	
Effective Green, g (s)	0.7	0.7		6.6	6.6	
Actuated g/C Ratio	0.02	0.02		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	25	22		416	430	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.03		
v/c Ratio	0.48	0.00		0.19	0.10	
Uniform Delay, d1	20.7	20.6		15.6	15.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	0.1		0.2	0.1	
Delay (s)	34.5	20.6		15.9	15.5	
Level of Service	C	C		B	B	
Approach Delay (s)	29.9			15.9	15.5	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.06		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔			↔↔			↔↔	↔
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	18	1	20	2	2	5	28	4	6	5	16	14
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	20	1	25	3	3	5	35	4	8	5	17	15
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	20	27	3	8	47	23	15					
Volume Left (vph)	20	0	3	0	35	5	0					
Volume Right (vph)	0	25	0	5	8	0	15					
Hadj (s)	0.53	-0.63	0.53	-0.44	0.09	0.15	-0.67					
Departure Headway (s)	5.2	4.1	5.3	4.3	4.8	4.8	4.0					
Degree Utilization, x	0.03	0.03	0.00	0.01	0.06	0.03	0.02					
Capacity (veh/h)	672	854	659	810	739	735	875					
Control Delay (s)	7.2	6.0	7.1	6.1	8.1	6.8	5.9					
Approach Delay (s)	6.5		6.4		8.1	6.4						
Approach LOS	A		A		A	A						

Intersection Summary			
Delay	7.0		
Level of Service	A		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	46	29	99	1	37	6	62	242	8	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	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	1.00	0.85	1.00	1.00		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1280	1365	1128	1291	1365	1116	2515	2578		1296	2454	
Fit Permitted	0.73	1.00	1.00	0.74	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	983	1365	1128	1000	1365	1116	2515	2578		1296	2454	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	52	33	111	1	42	7	70	272	9	1	183	80
RTOR Reduction (vph)	0	0	92	0	0	6	0	3	0	0	59	0
Lane Group Flow (vph)	52	33	19	1	42	1	70	278	0	1	204	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	5.9	5.9	5.9	5.9	5.9	5.9	3.4	11.4		1.0	9.0	
Effective Green, g (s)	5.9	5.9	5.9	5.9	5.9	5.9	3.4	11.4		1.0	9.0	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.10	0.34		0.03	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	170	236	195	173	236	193	251	864		38	649	
v/s Ratio Prot		0.02			0.03		0.03	c0.11		0.00	c0.08	
v/s Ratio Perm	c0.05		0.02	0.00		0.00						
v/c Ratio	0.31	0.14	0.10	0.01	0.18	0.01	0.28	0.32		0.03	0.31	
Uniform Delay, d1	12.3	11.9	11.8	11.6	12.0	11.6	14.2	8.4		16.0	10.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.3	0.2	0.0	0.4	0.0	0.6	0.2		0.3	0.3	
Delay (s)	13.3	12.2	12.0	11.6	12.3	11.6	14.8	8.6		16.3	10.3	
Level of Service	B	B	B	B	B	B	B	A		B	B	
Approach Delay (s)		12.4			12.2			9.9			10.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	34.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	39	155	1	2	155	12	3	5		1	17	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1255	1621	1663		1493	1356	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1255	1239	1663		1185	1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	161	1	2	161	12	3	5		1	18	46
RTOR Reduction (vph)	0	0	0	0	0	6	0	1		0	0	37
Lane Group Flow (vph)	41	161	1	2	161	6	3	5		0	18	10
Confl. Peds. (#/hr)						50					50	
Confl. Bikes (#/hr)						10					10	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Effective Green, g (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1012	860	48	905	666	232	311		222	254	
v/s Ratio Prot	c0.03	c0.09		0.00	c0.09			0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					c0.02
v/c Ratio	0.27	0.16	0.00	0.04	0.18	0.01	0.01	0.02		0.08	0.04	
Uniform Delay, d1	33.5	7.2	6.6	37.4	9.7	8.8	26.3	26.3		26.7	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.3	0.0	0.4	0.1	0.0	0.0	0.0		0.2	0.1	
Delay (s)	34.5	7.6	6.6	37.8	9.8	8.8	26.3	26.4		26.8	26.5	
Level of Service	C	A	A	D	A	A	C	C		C	C	
Approach Delay (s)		13.0			10.0			26.3			26.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	14	162	3	5	193	4	11	42	13	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1500	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1045	1540	2967			2989	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1045	1543	2967			2941	1074
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	182	3	6	217	4	12	47	15	24	16	44
RTOR Reduction (vph)	0	0	2	0	0	3	0	13	0	0	0	39
Lane Group Flow (vph)	16	182	1	6	217	1	12	49	0	0	40	5
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.8	10.7	10.7	0.6	9.5	9.5	4.2	4.2			3.2	3.2
Effective Green, g (s)	0.8	10.7	10.7	0.6	9.5	9.5	4.2	4.2			3.2	3.2
Actuated g/C Ratio	0.03	0.38	0.38	0.02	0.33	0.33	0.15	0.15			0.11	0.11
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	34	456	517	32	405	348	227	437			330	120
v/s Ratio Prot	c0.01	0.15		0.00	c0.18			c0.02				
v/s Ratio Perm			0.00			0.00	0.01				0.01	0.00
v/c Ratio	0.47	0.40	0.00	0.19	0.54	0.00	0.05	0.11			0.12	0.04
Uniform Delay, d1	13.6	6.5	5.6	13.7	7.7	6.3	10.4	10.5			11.4	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	9.9	0.6	0.0	2.8	1.4	0.0	0.1	0.1			0.2	0.1
Delay (s)	23.6	7.1	5.6	16.5	9.1	6.3	10.5	10.6			11.6	11.4
Level of Service	C	A	A	B	A	A	B	B			B	B
Approach Delay (s)		8.4			9.2			10.6				11.5
Approach LOS		A			A			B				B

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	28.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	20	149	60	8	185	51	31	91	8	23	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.92	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1324	906		1333	1126	877	1070	957	916	1070	1039	
Fit Permitted	0.43	1.00		0.57	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	596	906		804	1126	877	1070	957	916	1070	1039	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	175	71	9	218	60	36	107	9	27	47	28
RTOR Reduction (vph)	0	14	0	0	0	33	0	0	7	0	21	0
Lane Group Flow (vph)	24	232	0	9	218	27	36	107	2	27	54	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8			7	4
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	24.8	24.8		24.1	24.1	27.9	3.9	11.9	11.9	3.8	11.8	
Effective Green, g (s)	24.8	24.8		24.1	24.1	27.9	3.9	11.9	11.9	3.8	11.8	
Actuated g/C Ratio	0.41	0.41		0.40	0.40	0.46	0.06	0.20	0.20	0.06	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	255	368		321	445	473	68	187	178	66	201	
v/s Ratio Prot	0.00	c0.26		0.00	c0.19	0.00	0.03	c0.11		0.03	c0.05	
v/s Ratio Perm	0.04			0.01		0.03			0.00			
v/c Ratio	0.09	0.63		0.03	0.49	0.06	0.53	0.57	0.01	0.41	0.27	
Uniform Delay, d1	11.3	14.4		11.2	13.8	9.2	27.6	22.2	19.8	27.5	20.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	3.4		0.0	0.9	0.1	7.3	4.2	0.0	4.1	0.7	
Delay (s)	11.4	17.8		11.3	14.6	9.2	34.9	26.4	19.8	31.6	21.6	
Level of Service	B	B		B	B	A	C	C	B	C	C	
Approach Delay (s)		17.2			13.4		28.0				24.2	
Approach LOS		B			B		C				C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Sign Control		Stop		Stop	Stop		Stop	Stop		Stop	Stop	
Volume (vph)	6	39	27	26	54	7	22	24	30	5	24	23
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	8	49	34	32	68	9	28	30	38	6	30	29
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1						
Volume Total (vph)	90	33	76	58	38	65						
Volume Left (vph)	8	33	0	28	0	6						
Volume Right (vph)	34	0	9	0	38	29						
Hadj (s)	-0.17	0.53	-0.05	0.27	-0.67	-0.21						
Departure Headway (s)	4.9	5.5	4.9	5.3	4.4	4.9						
Degree Utilization, x	0.12	0.05	0.10	0.09	0.05	0.09						
Capacity (veh/h)	714	624	699	645	776	694						
Control Delay (s)	8.5	7.6	7.3	7.6	6.4	8.4						
Approach Delay (s)	8.5	7.4		7.2		8.4						
Approach LOS	A	A		A		A						

Intersection Summary						
Delay				7.8		
Level of Service				A		
Intersection Capacity Utilization		34.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	46	46	21	18	68	13	16	253	14	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1664	3226		1677	3313		1260	2496		1260	2391	
Flt Permitted	0.69	1.00		0.70	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1215	3226		1244	3313		1260	2496		1260	2391	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	53	24	21	78	15	18	291	16	14	206	83
RTOR Reduction (vph)	0	18	0	0	11	0	0	3	0	0	35	0
Lane Group Flow (vph)	53	59	0	21	82	0	18	304	0	14	254	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	22.5	22.5		22.5	22.5		6.5	48.9		2.5	44.9	
Effective Green, g (s)	22.5	22.5		22.5	22.5		6.5	48.9		2.5	44.9	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.07	0.55		0.03	0.50	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	811		313	833		91	1365		35	1200	
v/s Ratio Prot		0.02			0.02		0.01	0.12		0.01	0.11	
v/s Ratio Perm	0.04			0.02								
v/c Ratio	0.17	0.07		0.07	0.10		0.20	0.22		0.40	0.21	
Uniform Delay, d1	26.2	25.5		25.5	25.7		39.0	10.4		42.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.1	0.1		1.1	0.4		7.3	0.1	
Delay (s)	26.4	25.5		25.6	25.7		40.1	10.8		50.1	12.5	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		25.9			25.7			12.4			14.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	15.5
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	2	136	11	2	151	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3383		1711	3418			1705		1711	1621	
Flt Permitted	0.75	1.00		0.75	1.00			0.85		0.75	1.00	
Satd. Flow (perm)	1359	3383		1359	3418			1512		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	148	12	2	164	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	10	0	0	1	0	0	8	0	0	1	0
Lane Group Flow (vph)	2	150	0	2	164	0	0	7	0	2	2	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	5.3	5.3		5.3	5.3			12.8		12.8	12.8	
Effective Green, g (s)	5.3	5.3		5.3	5.3			12.8		12.8	12.8	
Actuated g/C Ratio	0.19	0.19		0.19	0.19			0.46		0.46	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	256	638		256	644			688		613	738	
v/s Ratio Prot		0.04			c0.05						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.01	0.24		0.01	0.25			0.01		0.00	0.00	
Uniform Delay, d1	9.3	9.7		9.3	9.7			4.2		4.2	4.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.2			0.0		0.0	0.0	
Delay (s)	9.3	9.9		9.3	9.9			4.2		4.2	4.2	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		9.9			9.9			4.2			4.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	28.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

4/22/2015



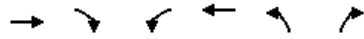
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Volume (vph)	1	85	0	0	221	2	155	43	72	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.91				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3420			5126		1711	3101				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3265			5126		1711	3101				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	1	106	0	0	276	2	194	54	90	0	0	31
RTOR Reduction (vph)	0	0	0	0	1	0	0	53	0	0	0	29
Lane Group Flow (vph)	0	107	0	0	277	0	194	91	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1533			1787		697	1264				141
v/s Ratio Prot		c0.00			c0.05		c0.11	0.03				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.15		0.28	0.07				0.01
Uniform Delay, d1		11.2			17.0		15.0	13.7				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.0	0.1				0.1
Delay (s)		11.2			17.2		16.0	13.8				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.2			17.2		15.1					34.3
Approach LOS		B			B		B					C

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

4/22/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	86	169	162	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1609	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1609	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	105	206	198	291	0	0
RTOR Reduction (vph)	18	47	0	0	0	0
Lane Group Flow (vph)	145	101	198	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	41.1	41.1	8.9	60.0		
Effective Green, g (s)	41.1	41.1	8.9	60.0		
Actuated g/C Ratio	0.69	0.69	0.15	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1102	978	492	1801		
v/s Ratio Prot	0.09		c0.06	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.13	0.10	0.40	0.16		
Uniform Delay, d1	3.3	3.2	23.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	0.5	0.0		
Delay (s)	3.3	3.3	23.7	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.3			9.6	0.0	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay			7.2		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.22			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			22.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

4/22/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔	↔	↔	↔	↔
Volume (vph)	50	33	105	2	25	0	85	169	0	6	160	54
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1189	1903		1160	1279		1215	2431		1215	2297	
Fit Permitted	0.40	1.00		0.83	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	496	1903		1017	1279		1215	2431		1215	2297	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	37	118	2	28	0	96	190	0	7	180	61
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	56	68	0	2	28	0	96	190	0	7	216	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10				10		10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	15.0	15.0		4.8	4.8		6.0	23.4		2.2	19.6	
Effective Green, g (s)	15.0	15.0		4.8	4.8		6.0	23.4		2.2	19.6	
Actuated g/C Ratio	0.26	0.26		0.08	0.08		0.11	0.41		0.04	0.34	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	501		85	107		128	999		46	791	
v/s Ratio Prot	c0.03	0.04			0.02		c0.08	0.08		0.01	c0.09	
v/s Ratio Perm	c0.05			0.00								
v/c Ratio	0.29	0.14		0.02	0.26		0.75	0.19		0.15	0.27	
Uniform Delay, d1	16.5	16.0		23.9	24.4		24.7	10.7		26.4	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		0.1	1.3		21.6	0.1		1.5	0.2	
Delay (s)	17.3	16.1		24.0	25.7		46.3	10.8		28.0	13.7	
Level of Service	B	B		C	C		D	B		C	B	
Approach Delay (s)		16.4			25.6			22.7			14.1	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			18.4								B	
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			56.9							21.6		
Intersection Capacity Utilization			70.8%								C	
Analysis Period (min)			15									
c Critical Lane Group												

NO PROJECT ALTERNATIVE
TRAFFIC CONTRIBUTIONS TO LOS E OR LOS F

PROJECT ALTERNATIVES: 2015 EXISTING PLUS ALTERNATIVE

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: No Project Alternative, Weekday PM Peak Hour, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1: King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No
16: 7 th / Mississippi / 16 th	NBT	0	357	0.0%	No
	SBL	10	85	11.8%	Yes
	WBT	73	469	15.6%	Yes
	EBT/R	27	425	6.3%	Yes

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: No Project Alternative, Saturday Evening, No Giants

No E → E or F → F intersections.

PROJECT ALTERNATIVES: 2040 CUMULATIVE PLUS ALTERNATIVE

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: No Project Alternative, Weekday PM Peak Hour, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact?
1: King / Third	NBR	17	481	3.5%	No
	EBL	0	924	0.0%	No
	WBT/R	0	984	0.0%	No
2: King / Fourth	SBT	5	625	0.8%	No
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT	0	810	0.0%	No
	SBR	0	340	0.0%	No
	NWL2 / L	5	1707	0.3%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT	0	565	0.0%	No
	NBR	0	140	0.0%	No
	SBT	2	956	0.2%	No
	EBT/R	0	1160	0.0%	No
6: Third / Channel	NBL	0	39	0.0%	No
	NBT/R	42	1563	2.7%	No
	SBL	0	58	0.0%	No
15: Owens / 16 th	NBL	0	138	0.0%	No
	EBL	0	137	0.0%	No
	WBT	107	831	12.9%	Yes
16: 7 th / Mississippi / 16 th	NBT	0	329	0.0%	No
	SBL	10	162	6.2%	Yes
	EBT/R	27	637	4.2%	No
18: Third / Mariposa	NBT/R	18	1257	1.4%	No
	EBL	0	205	0.0%	No
22: Third / Cesar Chavez	SBL	0	110	0.0%	No
	SBT/R	42	1200	3.5%	No
	EBL	4	227	1.8%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: No Project Alternative, Saturday Evening, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact?
4: Fifth / Harrison / I-80 WB off-ramp	SBT/R	0	840	0.0%	No
	NWR	0	455	0.0%	No

EXISTING PLUS NO PROJECT ALTERNATIVE
FREEWAY MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Alternative - No Project Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment							Effective		On-Ramp Data									
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
																						L _{A1}	L _{A2}	L _{Aeff}
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,124	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	639	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
M2	I-80 EB	Sterling/Bryant on-ramp	5	60.0	8,797	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,801	7,301	Right	1	No	45.0	1,106	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	5,657	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,302	4,790	Right	1	No	45.0	353	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
M3	I-280 SB	Mariposa on-ramp	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,370	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	331	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480	
M4	I-280 SB	Penn/25th on-ramp	3	60.0	4,480	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,991	4,991	Right	1	No	45.0	1,130	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	1,476	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,644	1,644	Right	1	No	45.0	239	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,252	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	712	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,232	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	393	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,526	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	369	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analys:

General Information				Adjacent Downstream Ramp Data											v ₁₂ Estimation				
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %				Flow Rate v _p (pcph)	L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	Bus %	RV %	E _T	E _R		f _{HV}	f _P	25-2	25-3	1		2
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No												0.597	0.597	5,717	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No												0.597	0.597	3,739	
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No												0.597	0.597	0	
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No												0.597	0.597	0	
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No												0.585	0.126	918	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No												0.585	0.231	1,104	
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No												0.585	0.280	0	
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No												0.585	0.280	0	
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No												0.591	0.591	2,387	
	I-280 SB	Mariposa on-ramp	Wkday Eve	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend	No												0.591	0.591	902	
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No												0.591	0.591	0	
	I-280 SB	Mariposa on-ramp	Wkend w/	No												0.591	0.591	0	
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No												0.587	0.587	2,931	
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend	No												0.587	0.587	966	
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No												0.587	0.587	0	
	I-280 SB	Penn/25th on-ramp	Wkend w/	No												0.587	0.587	0	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

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Analy:

General Information			Capacity Checks										Results								
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,801	6,900	Yes	2,832	Yes	No	5,849	7,101	4,600	Yes	1,252	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,302	6,900	No	1,852	No	No	3,739	4,451	4,600	No	712	2,200	No	35.5	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,301	11,500	No	8,533	11,500	No	3,192	Yes	Yes	2,920	4,153	4,600	No	1,232	2,100	No	35.7	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,790	11,500	No	5,183	11,500	No	1,843	No	Yes	1,916	2,309	4,600	No	393	2,100	No	21.7	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,565	6,900	No	1,652	No	No	2,387	3,913	4,600	No	1,526	2,100	No	32.3	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,895	6,900	No	624	No	No	902	1,271	4,600	No	369	2,100	No	12.2	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,991	7,050	No	6,250	7,050	No	2,060	No	No	2,931	4,190	4,600	No	1,259	2,100	No	35.4	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	1,644	7,050	No	1,911	7,050	No	679	No	No	966	1,232	4,600	No	266	2,100	No	12.8	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Alternative - No Project Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data		Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)			
<i>Existing</i>																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,358	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,084	7,084	Left	2	Yes	45.0	1,185	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	5,579	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,216	6,216	Left	2	Yes	45.0	840	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100
	D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,431	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,937	4,937	Right	1	Yes	45.0	701	50	0
I-280 NB		Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
I-280 NB		Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
I-280 NB		Mariposa off-ramp	Wkend	4	60	2,638	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,939	2,939	Right	1	Yes	45.0	270	50	0	50
I-280 NB		Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
I-280 NB		Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
I-280 NB		Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50
I-280 NB		Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information				Off-Ramp Volume Adjustment								Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period		PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,320	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	936	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
D2	I-280 NB	Mariposa off-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	781	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	301	No											
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 NB	Mariposa off-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation							
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	25-14	P _{FD} Equations			v ₁₂ (pcph)
																5	6	7	P _{FD}		
Existing																					
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No													0.522			0.260	3,101
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No													0.562			0.260	2,540
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No													0.760			0.260	0
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No													0.760			0.260	0
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No													0.601			0.436	2,593
	I-280 NB	Mariposa off-ramp	Wkday Eve	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkend	No													0.673			0.436	1,451
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No													0.760			0.436	0
	I-280 NB	Mariposa off-ramp	Wkend w/	No													0.760			0.436	0

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results						
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service
Existing																			
D1	I-80 WB	Fifth/Harrison off-ramp	7,084	9,200	No	1,992	No	No	3,101	4,400	No	5,763	6,900	No	1,320	4,100	No	30.0	D
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	6,216	9,200	No	1,838	No	No	2,540	4,400	No	5,280	6,900	No	936	4,100	No	25.2	C
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	4,937	9,200	No	1,172	No	No	2,593	4,400	No	4,156	6,900	No	781	2,100	No	26.1	C
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	2,939	9,200	No	744	No	No	1,451	4,400	No	2,638	6,900	No	301	2,100	No	16.3	B
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

EXISTING PLUS NO PROJECT ALTERNATIVE
TRANSIT ANALYSIS

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
TRANSIT CAPACITY UTILIZATION ANALYSIS - EXISTING PLUS NO PROJECT

ORIGIN / DESTINATION SERVICE PROVIDER	Weekday PM				
	No Project (outbound from site)				
	Existing Ridership	Project Trips	Existing + Project	Capacity	Percent Utilization
San Francisco					
T Third	1,945	655	2,600	3,808	68.3%
22 Fillmore	545	182	727	942	77.2%
SF Total	2,490	837	3,327	4,750	70.0%
		3,327			
East Bay					
BART	19,972	258	20,230	21,220	95.3%
AC Transit	2,275	30	2,305	3,926	58.7%
Ferries	805	11	816	1,615	50.5%
Subtotal	23,052	299	23,351	26,761	87.3%
North Bay					
Buses	1,389	15	1,404	2,817	49.8%
Ferries	968	10	978	1,959	49.9%
Subtotal	2,357	25	2,382	4,776	49.9%
South Bay					
BART	8,698	32	8,730	16,963	51.5%
Caltrain	2,405	96	2,501	3,100	80.7%
SamTrans	146	1	147	320	45.9%
Ferries	0	0	0	0	0.0%
Subtotal	11,249	129	11,378	20,383	55.8%
Regional Total	36,658	453	37,111	51,920	71.5%

No Project at Mission Bay Blocks 29-32 (1,056 ksf office + 31.7 kgsf retail)
PERSON TRANSIT TRIP SUMMARY - ALL LAND USES COMBINED

ORIGIN / DESTINATION SERVICE PROVIDER	WEEKDAY			SATURDAY		
	No Event PM Peak Hour (1 hr bet. 4 & 6 PM)			No Event Evening Peak Hour (1 hr bet. 7 & 9 PM)		
	In	Out	Total	In	Out	Total
Superdistrict 1	6	72	78	1	4	5
Superdistrict 2	5	92	97	1	5	6
Superdistrict 3	21	174	195	4	10	15
Superdistrict 4	2	67	69	0	3	3
East Bay	4	299	304	0	12	13
North Bay	0	25	25	0	1	1
South Bay	2	129	130	1	6	6
Out of Region	2	27	29	1	2	2
Total	42	885	927	8	43	51
SF Muni (incl. transfers)						
San Francisco	34	405	439	7	22	29
East Bay	4	299	304	0	12	13
North Bay	0	25	25	0	1	1
South Bay (except Caltrain)	0	33	34	0	1	2
Out of Region	2	27	29	1	2	2
Subtotal	41	789	830	8	38	46

REDUCED DEVELOPMENT ALTERNATIVE
TRAVEL DEMAND ANALYSIS

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 REDUCED-REDUCED ALTERNATIVE (40% reduction across all uses) - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees 105 employees
Retail	37,500 gsf
Quick Service Rest.	6,600 gsf
Sit-down Restaurant	30,900 gsf
XXX	0 xxx
XXX	0 xxx
Office	373,000 gsf

Person-trips by Mode	Daily Trips										PM Peak Hour Trips								Percent of Daily during PM Peak Hour							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Auto	71	2,379	754	2,286	0	0	3,081	8,571	52%	6	214	102	309	0	0	183	814	48%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	6.0%	9.5%
Transit	162	562	336	895	0	0	2,311	4,265	26%	14	51	45	121	0	0	312	543	32%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	13.5%	12.7%
Taxi/Coach (Event)								0	0%									0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%									0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	21	828	224	678	0	0	911	2,661	16%	2	75	30	92	0	0	54	252	15%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	5.9%	9.5%
Other	9	74	113	343	0	0	449	988	6%	1	7	15	46	0	0	25	94	5%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	5.5%	9.5%
Total	263	3,843	1,426	4,202	0	0	6,751	16,485	100%	22	346	192	567	0	0	574	1,702	100%	8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	8.5%	10.3%
Vehicle Trips	55	1,270	344	1,022	0	0	1,567	4,258		5	114	46	138	0	0	123	427		8.5%	9.0%	13.5%	13.5%	0.0%	0.0%	7.9%	10.0%
<i>Avg. veh. occupancy</i>	<i>1.30</i>	<i>1.87</i>	<i>2.15</i>	<i>2.24</i>	<i>0.00</i>	<i>0.00</i>	<i>1.97</i>	<i>2.01</i>		<i>1.30</i>	<i>1.87</i>	<i>2.15</i>	<i>2.24</i>	<i>0.00</i>	<i>0.00</i>	<i>1.49</i>	<i>1.91</i>									

Weekday Distribution	Total Daily Person-trips	PM Peak Hour Person-Trips								PM Peak Hour Transit-Trips								PM Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	1,715	2	21	24	72	0	0	50	168	1	7	5	15	0	0	26	54	0	5	4	13	0	0	6	28	7%	1.87
Superdistrict 2	1,990	2	31	26	78	0	0	61	198	1	6	5	13	0	0	32	57	0	12	9	27	0	0	13	61	14%	1.77
Superdistrict 3	7,147	5	203	80	242	0	0	149	680	2	21	19	54	0	0	63	159	1	60	14	43	0	0	25	143	33%	2.10
Superdistrict 4	1,094	2	18	14	40	0	0	42	115	1	3	3	8	0	0	24	38	0	8	4	11	0	0	9	32	7%	2.04
East Bay	1,889	6	15	21	57	0	0	141	241	5	6	9	22	0	0	106	147	1	5	5	14	0	0	19	43	10%	2.06
North Bay	285	1	7	2	7	0	0	18	35	0	1	0	1	0	0	9	11	0	4	0	1	0	0	5	11	3%	2.00
South Bay	1,814	4	33	19	54	0	0	99	210	2	5	3	5	0	0	45	59	2	14	8	23	0	0	44	91	21%	1.63
Out of Region	550	1	17	6	17	0	0	15	55	0	3	1	4	0	0	9	18	0	6	2	7	0	0	3	18	4%	1.67
Total	16,485	22	346	192	567	0	0	574	1,702	14	51	45	121	0	0	312	543	5	114	46	138	0	0	123	427	100%	1.91

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	55%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	45%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	0	163	86	267	0	0	49	564	22	183	107	300	0	0	525	1,138	22	346	192	567	0	0	574	1,702
Transit Trips	0	19	16	50	0	0	9	94	14	32	29	71	0	0	303	448	14	51	45	121	0	0	312	543
Vehicle Trips	0	55	21	66	0	0	12	154	5	59	25	72	0	0	111	273	5	114	46	138	0	0	123	427
	0%	48%	45%	47%	0%	0%	10%	36%	100%	52%	55%	53%	0%	0%	90%	64%								

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	4	4	12	0	0	2	23	0	5	4	13	0	0	7	29	0	9	8	25	0	0	9	52
Superdistrict 2	0	9	8	26	0	0	5	48	0	9	9	26	0	0	15	60	0	19	17	52	0	0	20	108
Superdistrict 3	0	60	16	51	0	0	9	137	1	61	17	53	0	0	31	163	1	121	34	104	0	0	40	300
Superdistrict 4	0	7	4	13	0	0	2	26	1	7	5	13	0	0	13	39	1	14	9	26	0	0	15	65
East Bay	0	4	5	16	0	0	3	28	1	5	6	18	0	0	29	60	1	8	12	35	0	0	32	89
North Bay	0	3	1	3	0	0	0	7	0	3	1	3	0	0	8	16	0	6	2	6	0	0	8	23
South Bay	0	13	7	23	0	0	4	47	2	15	9	26	0	0	49	101	2	27	17	49	0	0	53	148
Out of Region	0	5	2	6	0	0	1	14	0	5	2	6	0	0	4	17	0	10	4	12	0	0	5	31
Total	0	104	48	150	0	0	27	329	6	110	54	159	0	0	156	484	6	214	102	309	0	0	183	814

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 REDUCED-REDUCED ALTERNATIVE (40% reduction across all uses) - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH NO EVENT

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	3	2	7	0	0	1	13	1	4	3	8	0	0	24	41	1	7	5	15	0	0	26	54
Superdistrict 2	0	2	2	5	0	0	1	10	1	4	3	8	0	0	31	47	1	6	5	13	0	0	32	57
Superdistrict 3	0	9	8	25	0	0	5	47	2	12	10	29	0	0	58	112	2	21	19	54	0	0	63	159
Superdistrict 4	0	1	1	3	0	0	1	5	1	2	2	5	0	0	23	32	1	3	3	8	0	0	24	38
East Bay	0	1	2	7	0	0	1	11	5	5	7	14	0	0	104	135	5	6	9	22	0	0	106	147
North Bay	0	0	0	0	0	0	0	0	0	1	0	1	0	0	9	11	0	1	0	1	0	0	9	11
South Bay	0	1	0	1	0	0	0	3	2	3	2	4	0	0	45	56	2	5	3	5	0	0	45	59
Out of Region	0	1	1	2	0	0	0	4	0	2	1	2	0	0	9	14	0	3	1	4	0	0	9	18
Total	0	19	16	50	0	0	9	94	14	32	29	71	0	0	303	448	14	51	45	121	0	0	312	543

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	3	5	16	0	0	3	26	0	3	5	16	0	0	12	37	0	5	10	32	0	0	15	63
Superdistrict 2	0	3	2	6	0	0	1	13	0	4	2	7	0	0	8	21	0	7	4	13	0	0	9	33
Superdistrict 3	0	30	13	41	0	0	7	91	1	31	15	43	0	0	39	129	1	61	28	84	0	0	47	221
Superdistrict 4	0	0	1	3	0	0	1	5	0	1	1	3	0	0	2	7	0	1	2	6	0	0	3	12
East Bay	0	1	0	0	0	0	0	1	0	1	0	1	0	0	3	4	0	1	0	1	0	0	3	6
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
South Bay	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	1	0	1	0	0	1	4
Out of Region	0	2	0	0	0	0	0	3	0	2	0	0	0	0	1	3	0	4	0	1	0	0	1	6
Total	0	39	21	67	0	0	12	140	3	42	24	71	0	0	66	205	3	81	45	138	0	0	78	345

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	10	11	35	0	0	6	62	2	11	13	37	0	0	43	106	2	21	24	72	0	0	50	168
Superdistrict 2	0	15	12	37	0	0	7	71	2	17	14	41	0	0	54	128	2	31	26	78	0	0	61	198
Superdistrict 3	0	99	38	117	0	0	21	276	5	104	42	125	0	0	128	404	5	203	80	242	0	0	149	680
Superdistrict 4	0	8	6	19	0	0	3	36	2	10	8	21	0	0	39	79	2	18	14	40	0	0	42	115
East Bay	0	5	8	24	0	0	4	41	6	10	14	33	0	0	136	200	6	15	21	57	0	0	141	241
North Bay	0	3	1	3	0	0	0	7	1	4	2	4	0	0	17	27	1	7	2	7	0	0	18	35
South Bay	0	15	8	24	0	0	4	51	4	18	12	30	0	0	95	159	4	33	19	54	0	0	99	210
Out of Region	0	8	3	8	0	0	1	20	1	9	3	9	0	0	13	35	1	17	6	17	0	0	15	55
Total	0	163	86	267	0	0	49	564	22	183	107	300	0	0	525	1,138	22	346	192	567	0	0	574	1,702

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	2	6	0	0	1	12	0	3	2	6	0	0	5	16	0	5	4	13	0	0	6	28
Superdistrict 2	0	6	4	13	0	0	2	26	0	6	5	14	0	0	11	35	0	12	9	27	0	0	13	61
Superdistrict 3	0	29	7	21	0	0	4	61	1	30	8	22	0	0	21	82	1	60	14	43	0	0	25	143
Superdistrict 4	0	4	2	5	0	0	1	11	0	4	2	6	0	0	8	20	0	8	4	11	0	0	9	32
East Bay	0	2	2	6	0	0	1	12	1	3	3	7	0	0	18	31	1	5	5	14	0	0	19	43
North Bay	0	2	0	0	0	0	0	3	0	2	0	1	0	0	5	9	0	4	0	1	0	0	5	11
South Bay	0	6	3	10	0	0	2	21	2	8	5	13	0	0	42	69	2	14	8	23	0	0	44	91
Out of Region	0	3	1	4	0	0	1	8	0	3	1	4	0	0	2	10	0	6	2	7	0	0	3	18
Total	0	55	21	66	0	0	12	154	5	59	25	72	0	0	111	273	5	114	46	138	0	0	123	427

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32

REDUCED-REDUCED ALTERNATIVE (40% reduction across all uses) - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM

SUMMARY OF TRIPS WITH NO EVENT

Land Use	Intensity
Arena	0 attendees 105 employees
Retail	37,500 gsf
Quick Service Rest.	6,600 gsf
Sit-down Restaurant	30,900 gsf
XXX	0 xxx
XXX	0 xxx
Office	373,000 gsf

Person-trips by Mode	Daily Trips									Evening Peak Hour Trips								Percent of Daily during Late PM Peak Hour								
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	
Auto	71	2,784	939	2,847	0	0	407	7,048	53%	0	111	225	683	0	0	4	1,024	55%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	14.5%
Transit	162	657	418	1,114	0	0	929	3,281	25%	0	26	100	267	0	0	10	404	22%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	12.3%
Taxi/Coach (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bike (Event)								0	0%								0	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walk	21	969	278	845	0	0	118	2,231	17%	0	39	67	203	0	0	1	310	16%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	13.9%
Other	9	87	140	428	0	0	51	715	5%	0	3	34	103	0	0	1	140	7%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	19.6%
Total	263	4,497	1,776	5,234	0	0	1,506	13,275	100%	0	180	426	1,256	0	0	17	1,879	100%	0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	14.2%
Vehicle Trips	55	1,486	428	1,273	0	0	314	3,556		0	59	103	306	0	0	3	471		0.0%	4.0%	24.0%	24.0%	0.0%	0.0%	1.1%	13.3%
	2%	42%	12%	36%	0%	0%	9%	100%		0%	13%	22%	65%	0%	0%	1%	100%									
Avg. veh. occupancy	1.30	1.87	2.19	2.24	0.00	0.00	1.30	1.98		0.00	1.87	2.19	2.24	0.00	0.00	1.30	2.17									

Saturday Distribution	Total Daily Person-trips	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips								Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		
Superdistrict 1	1,296	0	11	53	159	0	0	1	225	0	3	12	33	0	0	1	49	0	3	9	28	0	0	0	40	8%	1.99
Superdistrict 2	1,543	0	16	58	173	0	0	2	248	0	3	11	29	0	0	1	43	0	6	19	59	0	0	0	85	18%	1.92
Superdistrict 3	6,010	0	106	177	537	0	0	4	823	0	11	41	120	0	0	2	174	0	31	32	96	0	0	1	159	34%	2.32
Superdistrict 4	854	0	9	30	88	0	0	1	129	0	1	7	17	0	0	1	26	0	4	8	23	0	0	0	36	8%	2.36
East Bay	1,416	0	8	47	127	0	0	5	187	0	3	20	48	0	0	4	75	0	3	11	31	0	0	1	44	9%	2.44
North Bay	239	0	4	5	14	0	0	1	24	0	1	1	1	0	0	0	3	0	2	1	2	0	0	0	6	1%	3.54
South Bay	1,447	0	17	43	120	0	0	3	184	0	2	6	11	0	0	2	20	0	8	18	50	0	0	1	77	16%	2.07
Out of Region	470	0	9	13	37	0	0	0	59	0	2	3	9	0	0	0	14	0	3	5	16	0	0	0	24	5%	1.68
Total	13,275	0	180	426	1,256	0	0	17	1,879	0	26	100	267	0	0	10	404	0	59	103	306	0	0	3	471	100%	2.17

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		XXX		XXX		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	100%	100%	50%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	0%	0%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound									Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Total Person Trips	0	85	189	591	0	0	0	865		0	95	237	665	0	0	17	1,013	0	180	426	1,256	0	0	17	1,879
	0%	47%	44%	47%	0%	0%	0%	46%		0%	53%	56%	53%	0%	0%	100%	54%								
Transit Trips	0	10	36	111	0	0	0	156		0	16	65	157	0	0	10	248	0	26	100	267	0	0	10	404
	0%	38%	35%	41%	0%	0%	0%	39%		0%	62%	65%	59%	0%	0%	100%	61%								
Vehicle Trips	0	29	46	145	0	0	0	220		0	31	56	160	0	0	3	251	0	59	103	306	0	0	3	471
	0%	48%	45%	47%	0%	0%	0%	47%		0%	52%	55%	53%	0%	0%	100%	53%								

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound									Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total		Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	2	9	28	0	0	0	39		0	2	9	28	0	0	0	40	0	5	18	56	0	0	0	79
Superdistrict 2	0	5	18	57	0	0	0	80		0	5	19	58	0	0	0	83	0	10	37	115	0	0	0	163
Superdistrict 3	0	31	36	114	0	0	0	181		0	32	39	117	0	0	1	188	0	63	75	231	0	0	1	369
Superdistrict 4	0	4	9	28	0	0	0	40		0	4	10	30	0	0	0	44	0	7	19	57	0	0	0	84
East Bay	0	2	12	36	0	0	0	50		0	2	14	40	0	0	1	58	0	4	26	77	0	0	1	108
North Bay	0	1	2	6	0	0	0	9		0	2	3	7	0	0	0	12	0	3	5	13	0	0	0	21
South Bay	0	7	16	50	0	0	0	73		0	8	21	57	0	0	2	87	0	14	37	108	0	0	2	160
Out of Region	0	3	4	13	0	0	0	20		0	3	4	13	0	0	0	21	0	5	9	27	0	0	0	40
Total	0	54	106	332	0	0	0	492		0	57	119	352	0	0	4	532	0	111	225	683	0	0	4	1,024

Event Center & Mixed-Use Development at Mission Bay Blocks 29-32
 REDUCED-REDUCED ALTERNATIVE (40% reduction across all uses) - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH NO EVENT

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	1	5	15	0	0	0	21	0	2	7	18	0	0	1	28	0	3	12	33	0	0	1	49
Superdistrict 2	0	1	4	12	0	0	0	17	0	2	7	17	0	0	1	26	0	3	11	29	0	0	1	43
Superdistrict 3	0	5	18	56	0	0	0	79	0	6	23	64	0	0	2	95	0	11	41	120	0	0	2	174
Superdistrict 4	0	0	2	7	0	0	0	9	0	1	4	10	0	0	1	16	0	1	7	17	0	0	1	26
East Bay	0	0	5	16	0	0	0	21	0	3	15	32	0	0	4	53	0	3	20	48	0	0	4	75
North Bay	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	3	0	1	1	1	0	0	0	3
South Bay	0	1	1	2	0	0	0	3	0	2	5	9	0	0	2	17	0	2	6	11	0	0	2	20
Out of Region	0	1	1	4	0	0	0	6	0	1	2	5	0	0	0	8	0	2	3	9	0	0	0	14
Total	0	10	36	111	0	0	0	156	0	16	65	157	0	0	10	248	0	26	100	267	0	0	10	404

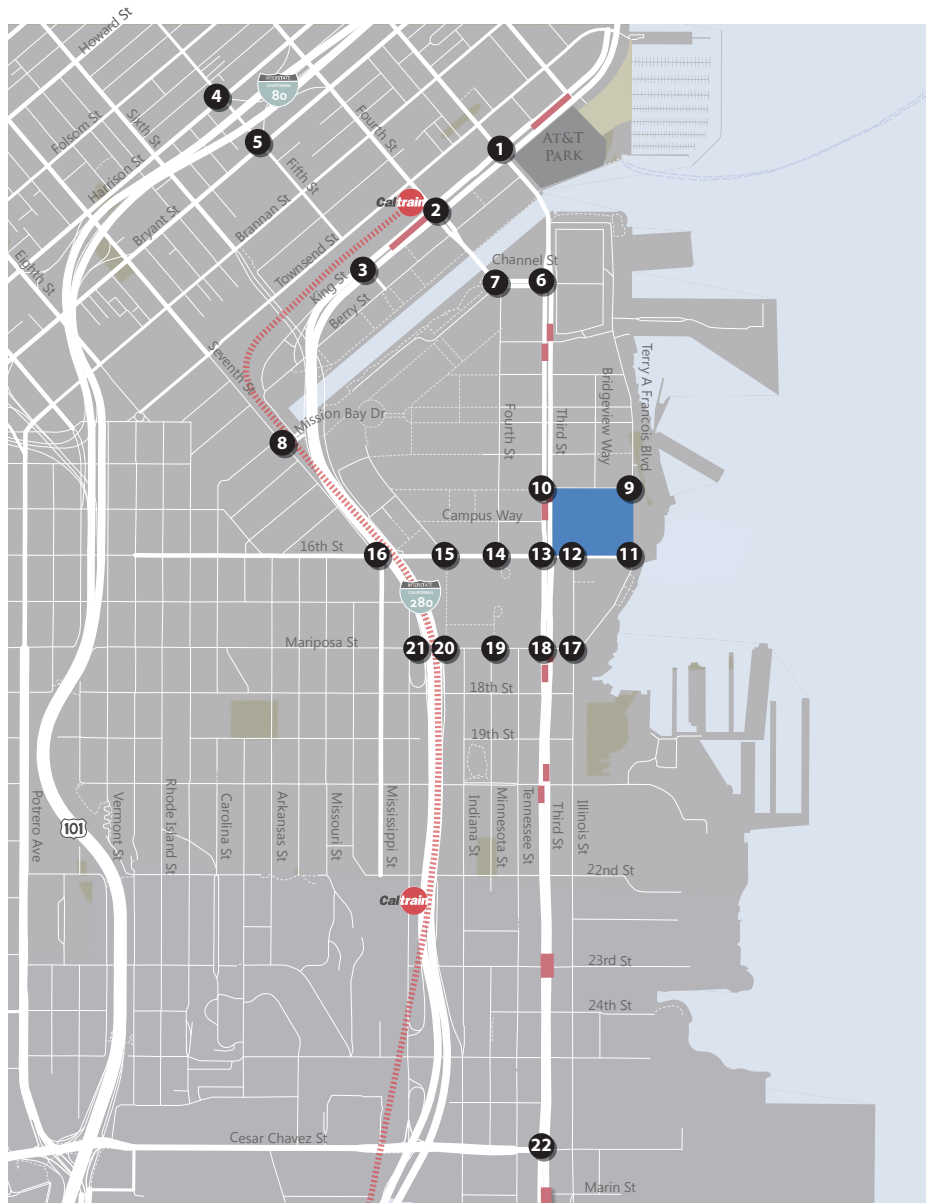
Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	1	11	34	0	0	0	47	0	2	12	36	0	0	0	50	0	3	23	70	0	0	0	96
Superdistrict 2	0	2	4	14	0	0	0	20	0	2	5	15	0	0	0	22	0	4	10	29	0	0	0	42
Superdistrict 3	0	16	29	91	0	0	0	135	0	16	32	95	0	0	1	145	0	32	61	186	0	0	1	280
Superdistrict 4	0	0	2	7	0	0	0	9	0	0	2	7	0	0	0	10	0	1	4	14	0	0	0	19
East Bay	0	0	0	1	0	0	0	2	0	0	1	1	0	0	0	2	0	1	1	2	0	0	0	4
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	1	0	0	0	2	0	0	0	1	0	0	0	2	0	1	1	2	0	0	0	3
Out of Region	0	1	0	1	0	0	0	2	0	1	0	1	0	0	0	2	0	2	1	2	0	0	0	5
Total	0	21	48	149	0	0	0	217	0	22	53	157	0	0	2	233	0	42	101	305	0	0	2	450

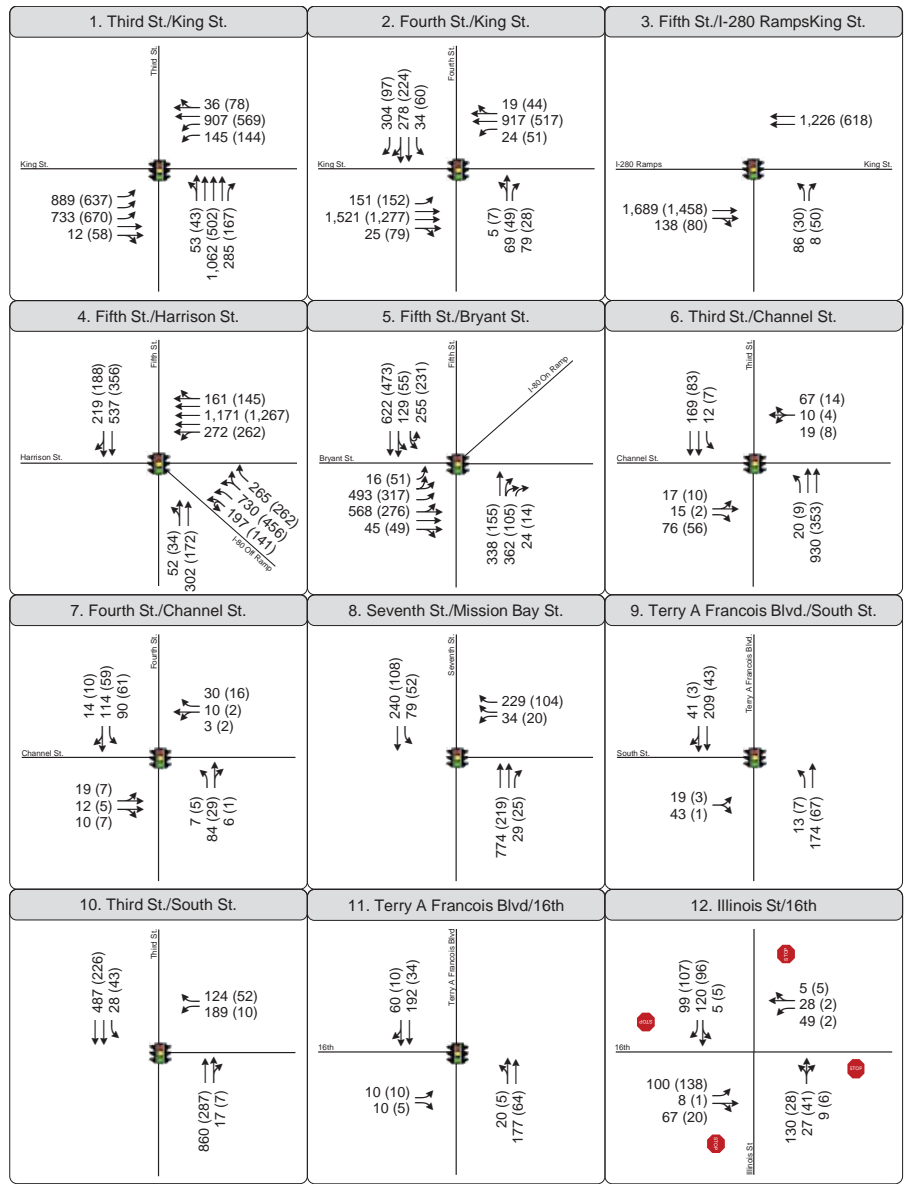
Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	5	25	77	0	0	0	107	0	6	28	83	0	0	1	118	0	11	53	159	0	0	1	225
Superdistrict 2	0	8	27	83	0	0	0	117	0	9	31	90	0	0	2	132	0	16	58	173	0	0	2	248
Superdistrict 3	0	52	83	260	0	0	0	395	0	54	94	277	0	0	4	428	0	106	177	537	0	0	4	823
Superdistrict 4	0	4	13	41	0	0	0	59	0	5	17	47	0	0	1	70	0	9	30	88	0	0	1	129
East Bay	0	3	17	53	0	0	0	73	0	5	30	74	0	0	5	114	0	8	47	127	0	0	5	187
North Bay	0	2	2	6	0	0	0	9	0	2	4	9	0	0	1	15	0	4	5	14	0	0	1	24
South Bay	0	8	17	53	0	0	0	78	0	10	26	67	0	0	3	106	0	17	43	120	0	0	3	184
Out of Region	0	4	6	18	0	0	0	28	0	4	7	20	0	0	0	31	0	9	13	37	0	0	0	59
Total	0	85	189	591	0	0	0	865	0	95	237	665	0	0	17	1,013	0	180	426	1,256	0	0	17	1,879

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total							
	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	XX	XX	Office	Total
Superdistrict 1	0	1	4	14	0	0	0	19	0	1	5	14	0	0	0	20	0	3	9	28	0	0	0	40
Superdistrict 2	0	3	9	29	0	0	0	41	0	3	10	30	0	0	0	44	0	6	19	59	0	0	0	85
Superdistrict 3	0	15	15	47	0	0	0	77	0	16	17	49	0	0	1	82	0	31	32	96	0	0	1	159
Superdistrict 4	0	2	4	11	0	0	0	17	0	2	4	12	0	0	0	19	0	4	8	23	0	0	0	36
East Bay	0	1	5	14	0	0	0	20	0	1	6	17	0	0	1	25	0	3	11	31	0	0	1	44
North Bay	0	1	0	1	0	0	0	2	0	1	1	2	0	0	0	4	0	2	1	2	0	0	0	6
South Bay	0	3	7	22	0	0	0	32	0	4	11	28	0	0	1	45	0	8	18	50	0	0	1	77
Out of Region	0	1	2	8	0	0	0	12	0	2	3	8	0	0	0	12	0	3	5	16	0	0	0	24
Total	0	29	46	145	0	0	0	220	0	31	56	160	0	0	3	251	0	59	103	306	0	0	3	471

EXISTING PLUS REDUCED DEVELOPMENT ALTERNATIVE
TRAFFIC VOLUME FIGURES
WEEKDAY PM PEAK / SATURDAY EVENING

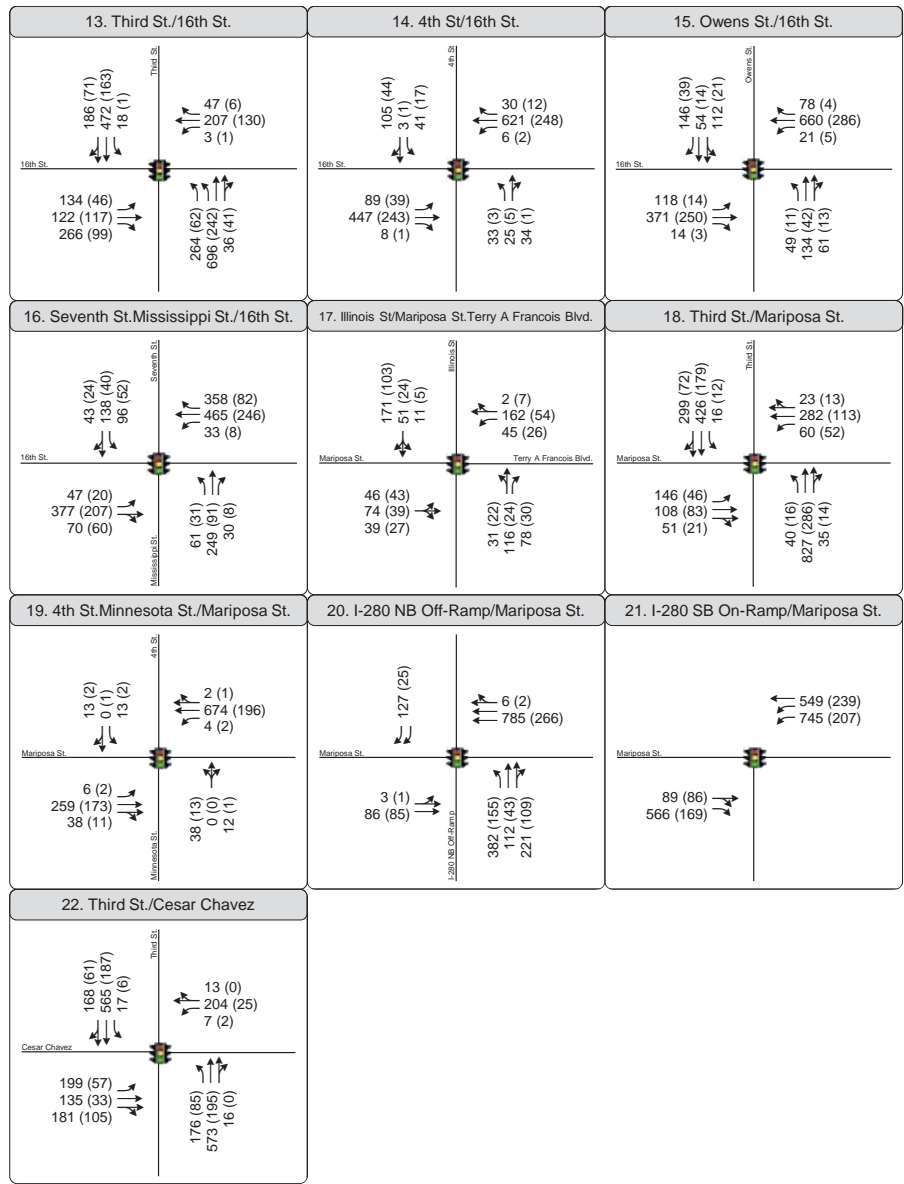
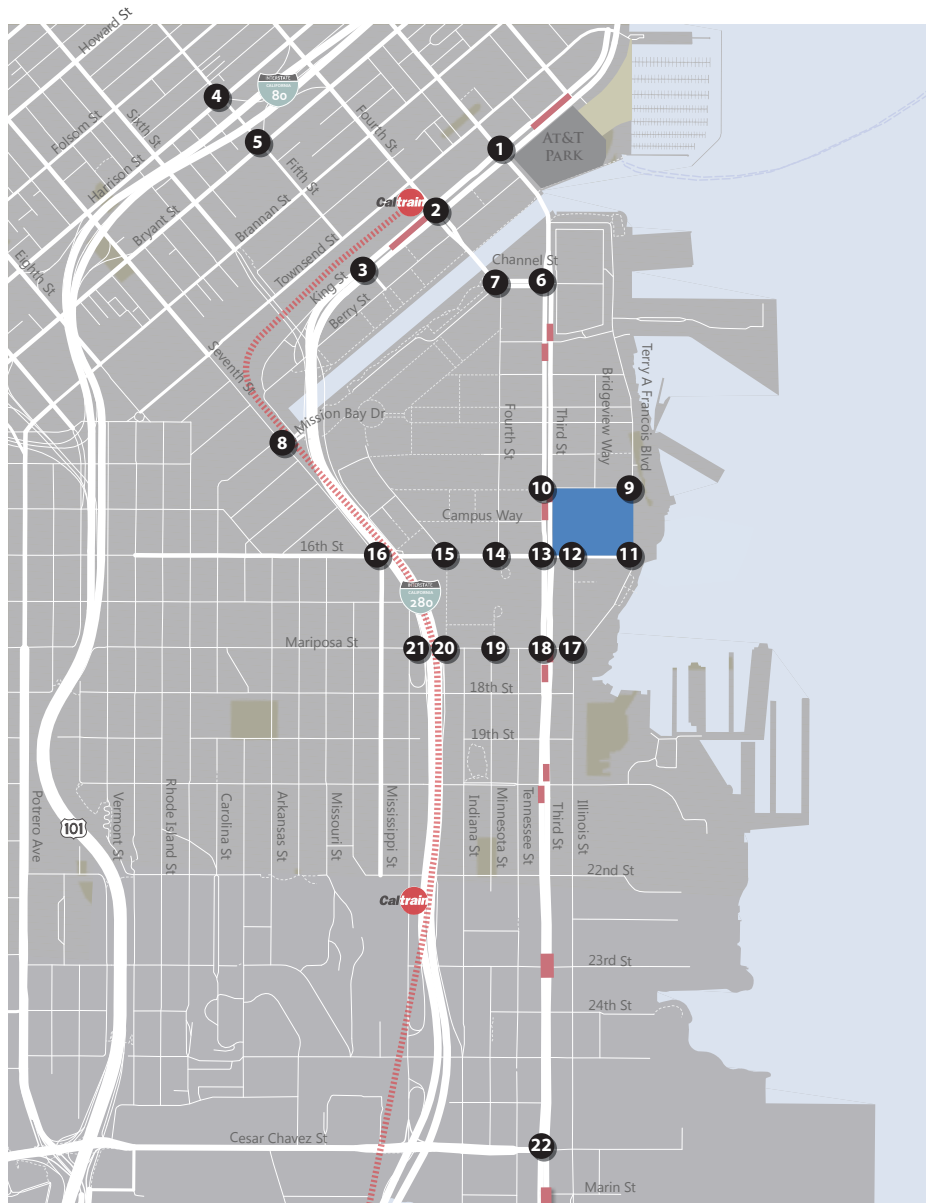


X Study Intersection
 Project Site
 Muni Stop
 ↗ Turn Lane



PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 17a
Peak Hour Traffic Volumes and Lane Configurations
Existing Plus Reduced Project Alternative (2015) Conditions



Study Intersection
 Project Site
 Muni Stop
 Turn Lane
 PM Peak (Saturday Peak)
 Peak Hour Traffic Volume
 Traffic Signal
 Stop Sign

Figure 17b
 Peak Hour Traffic Volumes and Lane Configurations
 Existing Plus Reduced Project Alternative (2015) Conditions

EXISTING PLUS REDUCED DEVELOPMENT ALTERNATIVE
INTERSECTION LEVEL OF SERVICE – WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↕		↔↔↔	↕↕			↔↔↔	↕			
Volume (vph)	889	733	12	145	907	36	53	1062	285	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3057		2987	3023			5480	941			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3057		2987	3023			5480	941			
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)	916	756	12	149	935	37	55	1095	294	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	198	0	0	0
Lane Group Flow (vph)	916	767	0	149	971	0	0	1150	96	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	40.5		13.2	37.0			35.9	35.9			
Effective Green, g (s)	18.2	40.5		13.2	37.0			35.9	35.9			
Actuated g/C Ratio	0.17	0.37		0.12	0.34			0.33	0.33			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	741	1125		358	1016			1788	307			
v/s Ratio Prot	c0.20	0.25		0.05	c0.32							
v/s Ratio Perm								0.21	0.10			
v/c Ratio	1.24	0.68		0.42	0.96			0.64	0.31			
Uniform Delay, d1	45.9	29.3		44.8	35.7			31.6	27.8			
Progression Factor	1.38	1.61		1.53	1.02			0.90	2.84			
Incremental Delay, d2	113.5	2.0		0.2	7.7			0.7	0.5			
Delay (s)	176.8	49.1		69.0	44.1			29.1	79.4			
Level of Service	F	D		E	D			C	E			
Approach Delay (s)		118.6			47.4			39.3			0.0	
Approach LOS		F			D			D			A	

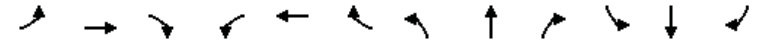
Intersection Summary

HCM 2000 Control Delay	72.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

5/12/2015



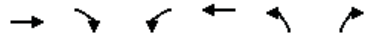
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	151	1521	25	24	917	19	5	69	79	34	278	304
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.84	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.68	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1459	4155		1296	2553			1585	858	1044	2355	581
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1459	4155		1296	2553			1542	858	778	2355	581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1552	26	24	936	19	5	70	81	35	284	310
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	53	0	42	118
Lane Group Flow (vph)	154	1577	0	24	954	0	0	75	28	35	369	65
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	190	1733		70	833			535	297	277	839	207
v/s Ratio Prot	0.11	c0.38		0.02	c0.37						c0.16	
v/s Ratio Perm								0.05	0.03	0.04		0.11
v/c Ratio	0.81	0.91		0.34	1.14			0.14	0.09	0.13	0.44	0.32
Uniform Delay, d1	46.5	30.1		50.1	37.0			24.6	24.2	23.9	27.0	25.7
Progression Factor	0.58	1.19		0.88	0.90			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.9		1.0	70.7			0.1	0.1	0.2	0.4	0.9
Delay (s)	29.5	36.9		45.0	104.2			24.8	24.4	24.1	27.4	26.5
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		36.2			102.7			24.6			27.0	
Approach LOS		D			F			C			C	

Intersection Summary

HCM 2000 Control Delay	52.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

5/12/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1689	138	0	1226	86	8
Ideal Flow (vphpl)	1850	1850	1850	1850	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2957			2998	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2957			2998	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1277	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1277	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1669			1692	512	451
v/s Ratio Prot	c0.64			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.14			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.2	26.0	24.5
Progression Factor	1.00			0.53	1.00	1.00
Incremental Delay, d2	69.5			1.0	0.7	0.0
Delay (s)	93.5			10.7	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	93.5			10.7	26.6	
Approach LOS	F			B	C	

Intersection Summary

HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/12/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↔
Volume (vph)	272	1171	161	52	302	537	219	197	730	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			1.00	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			4087	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			4087	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	214	785	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1028	256
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10			10					
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Perm
Protected Phases		6			4	4		7	7	
Permitted Phases	6			4						7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1226	293
v/s Ratio Prot						c0.33			0.25	
v/s Ratio Perm		0.30			0.20					c0.26
v/c Ratio		0.92			0.65	1.05			0.84	0.87
Uniform Delay, d1		29.4			26.7	31.0			29.5	29.9
Progression Factor		1.48			0.06	1.00			1.00	1.00
Incremental Delay, d2		6.6			0.5	47.9			7.0	28.4
Delay (s)		50.1			2.1	78.9			36.4	58.2
Level of Service		D			A	E			D	E
Approach Delay (s)		50.1			2.1	78.9			40.8	
Approach LOS		D			A	E			D	

Intersection Summary

HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

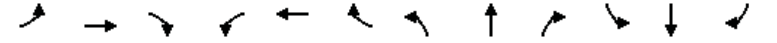
5/12/2015



Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔	↔	↔	↕	↔	↔	↔	↔	↕
Volume (vph)	16	493	568	45	338	362	24	255	129	622
Ideal Flow (vphpl)	1000	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.84		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.99		0.92		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	0.99
Satd. Flow (prot)		1313	1913		2130		1163		1327	2541
Fit Permitted		0.95	0.99		1.00		1.00		0.15	0.63
Satd. Flow (perm)		1313	1913		2130		1163		207	1622
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	530	611	48	363	389	26	274	139	669
RTOR Reduction (vph)	0	0	7	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	473	726	0	755	0	6	0	307	775
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	5	0	5	0	0	0	0	5
Parking (#/hr)			10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		22.5	22.5		23.0		23.0		42.0	42.0
Effective Green, g (s)		22.5	25.0		24.5		23.0		43.5	43.5
Actuated g/C Ratio		0.25	0.28		0.27		0.26		0.48	0.48
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		328	531		579		297		305	952
v/s Ratio Prot		0.36	c0.38		c0.35				c0.18	0.15
v/s Ratio Perm							0.01		0.30	0.24
v/c Ratio		1.44	1.37		1.42dr		0.02		1.01	0.81
Uniform Delay, d1		33.8	32.5		32.8		25.1		31.1	19.8
Progression Factor		1.00	1.00		1.00		1.00		1.10	1.15
Incremental Delay, d2		215.5	176.9		149.0		0.1		28.6	2.2
Delay (s)		249.2	209.4		181.8		25.2		62.9	25.0
Level of Service		F	F		F		C		E	C
Approach Delay (s)			225.0		177.1					35.8
Approach LOS			F		F					D
Intersection Summary										
HCM 2000 Control Delay			146.1							F
HCM 2000 Volume to Capacity ratio			1.08							
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				13.5	
Intersection Capacity Utilization			102.4%		ICU Level of Service				G	
Analysis Period (min)			15							
dr Defacto Right Lane. Recode with 1 though lane as a right lane.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↕	↕	↔	↕	↕
Volume (vph)	17	15	76	19	10	67	20	930	18	12	169	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.91		1.00	1.00		1.00	0.99	
Fit Protected		0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1569	1353		1426		1272	2531		1540	3039	
Fit Permitted		0.87	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1405	1353		1373		1272	2531		1540	3039	
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)	18	16	80	20	11	71	21	979	19	13	178	14
RTOR Reduction (vph)	0	0	54	0	48	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	34	26	0	54	0	21	997	0	13	186	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Effective Green, g (s)		32.1	32.1		32.1		13.8	38.5		13.5	38.5	
Actuated g/C Ratio		0.32	0.32		0.32		0.14	0.38		0.14	0.38	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Grp Cap (vph)		451	434		440		175	974		207	1170	
v/s Ratio Prot							0.02	c0.39		0.01	c0.06	
v/s Ratio Perm		0.02	0.02		c0.04							
v/c Ratio		0.08	0.06		0.12		0.12	1.02		0.06	0.16	
Uniform Delay, d1		23.6	23.5		24.0		37.8	30.8		37.7	20.1	
Progression Factor		1.00	1.00		1.00		1.21	0.21		1.00	1.00	
Incremental Delay, d2		0.3	0.3		0.6		1.0	30.5		0.6	0.3	
Delay (s)		23.9	23.8		24.6		46.6	36.9		38.3	20.4	
Level of Service		C	C		C		D	D		D	C	
Approach Delay (s)		23.8			24.6			37.1			21.6	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			33.0				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)			15.9				
Intersection Capacity Utilization			97.5%		ICU Level of Service			F				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Volume (vph)	19	12	10	3	10	30	7	84	6	90	114	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.99			1.00	1.00	0.84	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Fit Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2552			1434	1227	1153	1432		1377	1393	
Fit Permitted		0.95			1.00	1.00	0.80	1.00		0.95	1.00	
Satd. Flow (perm)		2493			1449	1227	971	1432		1377	1393	
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)	20	13	11	3	11	32	8	90	6	97	123	15
RTOR Reduction (vph)	0	10	0	0	0	16	0	4	0	0	5	0
Lane Group Flow (vph)	0	34	0	0	14	16	8	92	0	97	133	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		2.3			2.3	18.9	5.0	5.0		16.6	26.6	
Effective Green, g (s)		2.3			2.3	18.9	5.0	5.0		16.6	26.6	
Actuated g/C Ratio		0.06			0.06	0.49	0.13	0.13		0.43	0.68	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		147			85	753	124	184		587	952	
v/s Ratio Prot						0.01		c0.06		c0.07	0.10	
v/s Ratio Perm		c0.01			0.01	0.00	0.01					
v/c Ratio		0.23			0.16	0.02	0.06	0.50		0.17	0.14	
Uniform Delay, d1		17.5			17.4	5.2	14.9	15.8		6.9	2.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.9	0.0	0.2	2.1		0.1	0.1	
Delay (s)		18.3			18.3	5.2	15.1	17.9		7.0	2.2	
Level of Service		B			B	A	B	B		A	A	
Approach Delay (s)		18.3			9.2			17.7			4.2	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	38.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

5/12/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Volume (vph)	34	229	774	29	79	240
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	249	841	32	86	261
RTOR Reduction (vph)	0	222	0	5	0	0
Lane Group Flow (vph)	37	27	841	27	86	261
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2 5	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	8.7	8.7	47.6	42.6	9.7	62.3
Effective Green, g (s)	8.7	8.7	47.6	42.6	9.7	62.3
Actuated g/C Ratio	0.11	0.11	0.59	0.53	0.12	0.77
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	121	187	902	498	135	918
v/s Ratio Prot	c0.03		c0.55	0.01	c0.08	0.22
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.31	0.14	0.93	0.05	0.64	0.28
Uniform Delay, d1	33.4	32.8	15.2	9.4	34.0	2.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.4	16.0	0.0	9.5	0.2
Delay (s)	34.8	33.1	31.2	9.4	43.4	2.9
Level of Service	C	C	C	A	D	A
Approach Delay (s)	33.3		30.4			13.0
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

5/12/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑↔	
Volume (vph)	19	43	13	174	209	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.96		1.00	1.00	0.99	
Flpb, ped/bikes	0.99		0.98	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Fit Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1521		1680	1531	3062	
Fit Permitted	0.99		0.58	1.00	1.00	
Satd. Flow (perm)	1521		1027	1531	3062	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	48	14	193	232	46
RTOR Reduction (vph)	43	0	0	0	15	0
Lane Group Flow (vph)	26	0	14	193	263	0
Confl. Peds. (#/hr)	50	50	50		50	
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	10
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Actuated Green, G (s)	3.6		22.6	22.6	22.6	
Effective Green, g (s)	3.6		22.6	22.6	22.6	
Actuated g/C Ratio	0.10		0.64	0.64	0.64	
Clearance Time (s)	4.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	155		659	982	1965	
v/s Ratio Prot				c0.13	0.09	
v/s Ratio Perm	c0.02		0.01			
v/c Ratio	0.17		0.02	0.20	0.13	
Uniform Delay, d1	14.4		2.3	2.6	2.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.0	0.1	0.0	
Delay (s)	14.9		2.3	2.7	2.5	
Level of Service	B		A	A	A	
Approach Delay (s)	14.9			2.7	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

5/12/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑↔		↔	↑↔
Volume (vph)	189	124	860	17	28	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00		1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1584	1466	3406		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1584	1466	3406		1711	3421
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	210	138	956	19	31	541
RTOR Reduction (vph)	0	98	1	0	0	0
Lane Group Flow (vph)	210	40	974	0	31	541
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	28.7	28.7	50.1		5.9	61.1
Effective Green, g (s)	28.7	28.7	50.1		5.9	61.1
Actuated g/C Ratio	0.29	0.29	0.50		0.06	0.61
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	454	420	1706		100	2090
v/s Ratio Prot			c0.29		0.02	c0.16
v/s Ratio Perm	c0.13	0.03				
v/c Ratio	0.46	0.09	0.57		0.31	0.26
Uniform Delay, d1	29.3	26.1	17.4		45.1	9.0
Progression Factor	1.00	1.00	1.97		1.07	1.35
Incremental Delay, d2	0.7	0.1	0.9		1.8	0.1
Delay (s)	30.1	26.2	35.3		50.2	12.2
Level of Service	C	C	D		D	B
Approach Delay (s)	28.5		35.3			14.2
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

5/12/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	20	177	192	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		0.99	1.00	
Satd. Flow (prot)	1520	1343		3060	2948	
Flt Permitted	0.95	1.00		0.89	1.00	
Satd. Flow (perm)	1520	1343		2733	2948	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	12	24	208	226	71
RTOR Reduction (vph)	0	12	0	0	57	0
Lane Group Flow (vph)	12	0	0	232	240	0
Confl. Peds. (#/hr)	1	1	25			25
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.6	0.6		9.1	9.1	
Effective Green, g (s)	0.6	0.6		9.1	9.1	
Actuated g/C Ratio	0.01	0.01		0.20	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	20	17		552	596	
v/s Ratio Prot	c0.01				0.08	
v/s Ratio Perm		0.00		c0.08		
v/c Ratio	0.60	0.01		0.42	0.40	
Uniform Delay, d1	22.1	21.9		15.7	15.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.2	0.2		0.5	0.4	
Delay (s)	62.3	22.1		16.2	16.0	
Level of Service	E	C		B	B	
Approach Delay (s)	42.2			16.2	16.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 12: Illinois St & 16th


5/12/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	100	8	67	49	28	5	130	27	9	5	120	99
Peak Hour Factor	0.92	0.87	0.87	0.87	0.87	0.92	0.87	0.92	0.87	0.92	0.92	0.92
Hourly flow rate (vph)	109	9	77	56	32	5	149	29	10	5	130	108
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	109	86	56	38	189	136	108					
Volume Left (vph)	109	0	56	0	149	5	0					
Volume Right (vph)	0	77	0	5	10	0	108					
Hadj (s)	0.53	-0.59	0.53	-0.07	0.16	0.05	-0.67					
Departure Headway (s)	6.3	5.2	6.5	5.9	5.8	5.6	4.9					
Degree Utilization, x	0.19	0.12	0.10	0.06	0.30	0.21	0.15					
Capacity (veh/h)	534	646	514	565	598	609	696					
Control Delay (s)	9.6	7.8	9.0	8.1	11.3	8.9	7.5					
Approach Delay (s)	8.8		8.6		11.3	8.3						
Approach LOS	A		A		B	A						

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

5/12/2015




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	134	122	266	3	207	47	264	696	36	18	472	186
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1265	1365	1126	1283	1365	1099	2515	2568		1296	2464	
Fit Permitted	0.55	1.00	1.00	0.67	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	727	1365	1126	907	1365	1099	2515	2568		1296	2464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	147	134	292	3	227	52	290	765	40	20	519	204
RTOR Reduction (vph)	0	0	191	0	0	34	0	4	0	0	42	0
Lane Group Flow (vph)	147	134	101	3	227	18	290	801	0	20	681	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Effective Green, g (s)	34.5	34.5	34.5	34.5	34.5	34.5	14.0	37.8		12.0	35.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.14	0.38		0.12	0.36	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Grp Cap (vph)	250	470	388	312	470	379	352	970		155	882	
v/s Ratio Prot		0.10			0.17		0.12	c0.31		0.02	c0.28	
v/s Ratio Perm	c0.20		0.09	0.00		0.02						
v/c Ratio	0.59	0.29	0.26	0.01	0.48	0.05	0.82	0.83		0.13	0.77	
Uniform Delay, d1	26.9	23.8	23.6	21.5	25.7	21.8	41.8	28.1		39.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.76		1.16	1.19	
Incremental Delay, d2	9.8	1.5	1.6	0.1	3.5	0.2	8.4	3.3		1.7	6.3	
Delay (s)	36.7	25.3	25.2	21.6	29.3	22.0	35.2	24.6		47.4	40.3	
Level of Service	D	C	C	C	C	C	D	C		D	D	
Approach Delay (s)		28.2			27.9			27.4			40.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	89	447	8	6	621	30	33	25	34	41	3	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.92	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1411	1621	1706	1238	1621	1527		1491	1355	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.68	1.00		0.72	1.00	
Satd. Flow (perm)	1621	1706	1411	1621	1706	1238	1163	1527		1123	1355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	486	9	7	675	33	36	27	37	45	3	114
RTOR Reduction (vph)	0	0	4	0	0	18	0	28	0	0	85	0
Lane Group Flow (vph)	97	486	5	7	675	15	36	36	0	45	32	0
Confl. Peds. (#/hr)						50				50		50
Confl. Bikes (#/hr)						10			10			10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8					
Actuated Green, G (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Effective Green, g (s)	10.9	47.6	47.6	2.7	39.4	39.4	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.12	0.55	0.55	0.03	0.45	0.45	0.25	0.25		0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	931	770	50	770	559	292	383		282	340	
v/s Ratio Prot	c0.06	c0.28		0.00	c0.40			0.02			0.02	
v/s Ratio Perm			0.00			0.01	0.03					
v/c Ratio	0.48	0.52	0.01	0.14	0.88	0.03	0.12	0.09		0.16	0.09	
Uniform Delay, d1	35.5	12.6	9.0	41.1	21.7	13.3	25.2	25.0		25.5	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	2.1	0.0	1.3	11.0	0.0	0.2	0.1		0.3	0.1	
Delay (s)	37.3	14.7	9.0	42.4	32.7	13.3	25.4	25.2		25.7	25.2	
Level of Service	D	B	A	D	C	B	C	C		C	C	
Approach Delay (s)		18.3			31.9			25.3			25.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	118	371	14	21	660	78	49	134	61	112	54	146
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1500	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1049	1540	2934			2978	1072
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.64	1.00			0.67	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1049	1041	2934			2060	1072
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	123	386	15	22	688	81	51	140	64	117	56	152
RTOR Reduction (vph)	0	0	4	0	0	20	0	55	0	0	0	132
Lane Group Flow (vph)	123	386	11	22	688	61	51	149	0	0	173	20
Confl. Peds. (#/hr)								17				3
Confl. Bikes (#/hr)								36				
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	9.0	71.2	71.2	2.3	63.5	63.5	14.6	14.6			13.6	13.6
Effective Green, g (s)	9.0	71.2	71.2	2.3	63.5	63.5	14.6	14.6			13.6	13.6
Actuated g/C Ratio	0.09	0.70	0.70	0.02	0.63	0.63	0.14	0.14			0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	108	855	970	35	763	658	150	423			277	144
v/s Ratio Prot	c0.10	0.32		0.01	c0.57			0.05				
v/s Ratio Perm			0.01			0.06	0.05				c0.08	0.02
v/c Ratio	1.14	0.45	0.01	0.63	0.90	0.09	0.34	0.35			0.94dl	0.14
Uniform Delay, d1	46.0	6.5	4.5	49.0	16.1	7.4	38.9	39.0			41.3	38.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	128.8	1.7	0.0	30.3	13.8	0.1	1.4	0.5			4.3	0.5
Delay (s)	174.9	8.2	4.5	79.3	30.0	7.5	40.3	39.5			45.7	39.1
Level of Service	F	A	A	E	C	A	D	D			D	D
Approach Delay (s)		47.2			29.0			39.7			42.6	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	37.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	101.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Volume (vph)	47	377	70	33	465	358	61	249	30	96	138	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.90	1.00	1.00	0.96	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1337	929		1335	1126	859	1070	957	919	1070	1068	
Fit Permitted	0.18	1.00		0.31	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	248	929		439	1126	859	1070	957	919	1070	1068	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	50	401	74	35	495	381	65	265	32	102	147	46
RTOR Reduction (vph)	0	6	0	0	0	128	0	0	25	0	11	0
Lane Group Flow (vph)	50	469	0	35	495	253	65	265	7	102	182	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10						10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	53.8	53.8		53.1	53.1	62.1	11.9	25.1	25.1	9.0	22.2	
Effective Green, g (s)	53.8	53.8		53.1	53.1	62.1	11.9	25.1	25.1	9.0	22.2	
Actuated g/C Ratio	0.49	0.49		0.48	0.48	0.56	0.11	0.23	0.23	0.08	0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	151	453		230	542	522	115	217	209	87	214	
v/s Ratio Prot	0.01	c0.51		0.00	c0.44	0.04	0.06	c0.28		c0.10	0.17	
v/s Ratio Perm	0.15			0.07		0.25			0.01			
v/c Ratio	0.33	1.04		0.15	0.91	0.48	0.57	1.22	0.03	1.17	0.85	
Uniform Delay, d1	19.5	28.2		24.8	26.5	14.5	46.7	42.6	33.2	50.6	42.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	51.9		0.3	19.8	0.7	6.2	133.6	0.1	150.2	25.6	
Delay (s)	20.8	80.2		25.2	46.3	15.2	53.0	176.2	33.2	200.9	68.1	
Level of Service	C	F		C	D	B	D	F	C	F	E	
Approach Delay (s)		74.5			32.5			141.5			114.0	
Approach LOS		E			C			F			F	

Intersection Summary

HCM 2000 Control Delay	73.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	110.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c	Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (vph)	46	74	39	45	162	2	31	116	78	11	51	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		1.00		0.99	1.00			1.00	1.00		1.00	
Frt		0.97		1.00	1.00			1.00	0.85		0.90	
Fit Protected		0.99		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1695		1689	1797			1779	1500		1590	
Fit Permitted		0.85		0.69	1.00			0.91	1.00		0.98	
Satd. Flow (perm)		1466		1234	1797			1631	1500		1565	
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)	51	82	43	50	180	2	34	129	87	12	57	190
RTOR Reduction (vph)	0	14	0	0	1	0	0	0	65	0	139	0
Lane Group Flow (vph)	0	162	0	50	181	0	0	163	22	0	120	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		12.2		12.2	12.2			12.9	12.9		12.9	
Effective Green, g (s)		12.2		12.2	12.2			12.9	12.9		12.9	
Actuated g/C Ratio		0.24		0.24	0.24			0.26	0.26		0.26	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		358		301	439			421	387		404	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.11		0.04				c0.10	0.01		0.08	
v/c Ratio		0.45		0.17	0.41			0.39	0.06		0.30	
Uniform Delay, d1		16.0		14.8	15.8			15.2	13.9		14.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.9		0.3	0.6			0.6	0.1		0.4	
Delay (s)		16.9		15.1	16.5			15.8	14.0		15.3	
Level of Service		B		B	B			B	B		B	
Approach Delay (s)		16.9			16.2			15.2			15.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	
Volume (vph)	146	108	51	60	282	23	40	827	35	16	426	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	3219		1678	3371		1260	2501		1260	2331	
Fit Permitted	0.53	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	936	3219		1139	3371		1260	2501		1260	2331	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	115	54	64	300	24	43	880	37	17	453	318
RTOR Reduction (vph)	0	35	0	0	6	0	0	3	0	0	127	0
Lane Group Flow (vph)	155	134	0	64	318	0	43	914	0	17	644	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Effective Green, g (s)	34.7	34.7		34.7	34.7		11.9	34.9		14.9	37.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.12	0.35		0.15	0.38	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Grp Cap (vph)	324	1116		395	1169		149	872		187	883	
v/s Ratio Prot		0.04			0.09		0.03	c0.37		0.01	c0.28	
v/s Ratio Perm		c0.17		0.06								
v/c Ratio		0.48	0.12	0.16	0.27		0.29	1.05		0.09	0.73	
Uniform Delay, d1		25.6	22.2	22.6	23.5		40.2	32.5		36.7	26.6	
Progression Factor		1.00	1.00	1.00	1.00		0.91	0.80		1.55	0.62	
Incremental Delay, d2		5.0	0.2	0.9	0.6		3.7	40.1		0.7	3.8	
Delay (s)		30.6	22.5	23.5	24.1		40.2	66.3		57.6	20.3	
Level of Service		C	C	C	C		D	E		E	C	
Approach Delay (s)		26.3			24.0			65.1			21.1	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

5/12/2015



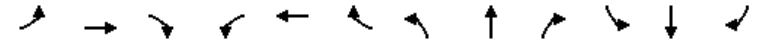
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Volume (vph)	6	259	38	4	674	2	38	0	12	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3356		1711	3420			1678		1711	1531	
Flt Permitted	0.30	1.00		0.56	1.00			0.84		0.72	1.00	
Satd. Flow (perm)	535	3356		1002	3420			1467		1300	1531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	282	41	4	733	2	41	0	13	14	0	14
RTOR Reduction (vph)	0	19	0	0	1	0	0	20	0	0	8	0
Lane Group Flow (vph)	7	304	0	4	734	0	0	34	0	14	6	0
Parking (#/hr)									5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			26.0		26.0	26.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)	214	1342		400	1368			635		563	663	
v/s Ratio Prot		0.09			c0.21						0.00	
v/s Ratio Perm	0.01			0.00			c0.02		0.01			
v/c Ratio	0.03	0.23		0.01	0.54			0.05		0.02	0.01	
Uniform Delay, d1	10.9	11.9		10.8	13.8			9.9		9.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.0	1.5			0.2		0.1	0.0	
Delay (s)	11.2	12.3		10.9	15.3			10.0		9.8	9.7	
Level of Service	B	B		B	B			B		A	A	
Approach Delay (s)		12.2			15.2			10.0			9.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

5/12/2015



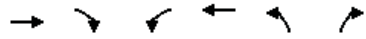
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	3	86	0	0	785	6	382	112	221	0	0	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				3.5
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	1.00				1.00
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3416			5126		1711	3080				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3246			5126		1711	3080				2694
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	88	0	0	801	6	390	114	226	0	0	130
RTOR Reduction (vph)	0	0	0	0	1	0	0	117	0	0	0	121
Lane Group Flow (vph)	0	91	0	0	806	0	390	223	0	0	0	9
Confl. Peds. (#/hr)												20
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		47.5			36.5		53.0	53.0				7.5
Effective Green, g (s)		47.5			36.5		53.0	53.0				7.5
Actuated g/C Ratio		0.43			0.33		0.48	0.48				0.07
Clearance Time (s)		4.5			4.5		5.0	5.0				3.5
Lane Grp Cap (vph)		1413			1700		824	1484				183
v/s Ratio Prot		c0.00			c0.16		c0.23	0.07				0.00
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.47		0.47	0.15				0.05
Uniform Delay, d1		18.3			29.1		19.1	15.9				47.9
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			1.0		1.9	0.2				0.5
Delay (s)		18.4			30.1		21.1	16.1				48.4
Level of Service		B			C		C	B				D
Approach Delay (s)		18.4			30.1		18.8					48.4
Approach LOS		B			C		B					D

Intersection Summary

HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

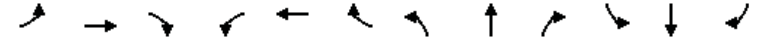
5/12/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔	0	0
Volume (vph)	89	566	745	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.89	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1501	1426	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1501	1426	3319	1801		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	584	768	566	0	0
RTOR Reduction (vph)	35	35	0	0	0	0
Lane Group Flow (vph)	308	298	768	566	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	38.1	38.1	21.9	70.0		
Effective Green, g (s)	38.1	38.1	21.9	70.0		
Actuated g/C Ratio	0.54	0.54	0.31	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	816	776	1038	1801		
v/s Ratio Prot	0.21		c0.23	0.31		
v/s Ratio Perm		c0.21				
v/c Ratio	0.38	0.38	0.74	0.31		
Uniform Delay, d1	9.1	9.2	21.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.3	2.8	0.1		
Delay (s)	9.4	9.5	24.3	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	9.5			14.0	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			12.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			53.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔	↔	↔	↔
Volume (vph)	199	135	181	7	204	13	176	573	16	17	565	168
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.93		1.00	0.99		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	0.98	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00		1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1188	1945		1139	1257		1215	2413		1215	2288	
Fit Permitted	0.36	1.00		0.55	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	454	1945		662	1257		1215	2413		1215	2288	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	207	141	189	7	212	14	183	597	17	18	589	175
RTOR Reduction (vph)	0	127	0	0	2	0	0	2	0	0	28	0
Lane Group Flow (vph)	207	203	0	7	224	0	183	612	0	18	736	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.0	33.0		21.9	21.9		17.3	46.6		4.1	33.4	
Effective Green, g (s)	33.0	33.0		21.9	21.9		17.3	46.6		4.1	33.4	
Actuated g/C Ratio	0.33	0.33		0.22	0.22		0.17	0.47		0.04	0.33	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	641		144	275		210	1124		49	764	
v/s Ratio Prot	c0.06	0.10			0.18		c0.15	0.25		0.01	c0.32	
v/s Ratio Perm	c0.29			0.01								
v/c Ratio	1.08	0.32		0.05	0.81		0.87	0.54		0.37	0.96	
Uniform Delay, d1	34.1	25.1		30.8	37.1		40.3	19.1		46.7	32.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.81	
Incremental Delay, d2	87.3	0.3		0.1	16.6		30.2	1.9		3.7	21.6	
Delay (s)	121.3	25.4		31.0	53.7		70.5	21.0		51.7	48.1	
Level of Service	F	C		C	D		E	C		D	D	
Approach Delay (s)		62.4			53.0			32.4			48.2	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			46.5									D
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			100.0							21.6		
Intersection Capacity Utilization			98.8%									F
Analysis Period (min)			15									
c Critical Lane Group												

EXISTING PLUS REDUCED DEVELOPMENT ALTERNATIVE
INTERSECTION LEVEL OF SERVICE – SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis

1: Third St. & King St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	637	670	58	144	569	78	43	502	167	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Lane Util. Factor	*0.97	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.90			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4480	3018		2987	2982			5516	1233			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4480	3018		2987	2982			5516	1233			
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)	708	744	64	160	632	87	48	558	186	0	0	0
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	152	0	0	0
Lane Group Flow (vph)	708	804	0	160	711	0	0	606	34	0	0	0
Confl. Peds. (#/hr)			100			100	100		100			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	25.4	59.6		11.2	45.4			20.3	20.3			
Effective Green, g (s)	25.4	59.6		11.2	45.4			20.3	20.3			
Actuated g/C Ratio	0.23	0.54		0.10	0.41			0.18	0.18			
Clearance Time (s)	6.8	5.3		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1034	1635		304	1230			1017	227			
v/s Ratio Prot	c0.16	0.27		0.05	c0.24							
v/s Ratio Perm								0.11	0.03			
v/c Ratio	0.68	0.49		0.53	0.58			0.60	0.15			
Uniform Delay, d1	38.6	15.7		46.9	24.9			41.1	37.6			
Progression Factor	0.57	0.25		1.34	0.25			1.13	3.43			
Incremental Delay, d2	1.7	0.9		0.5	0.2			0.8	0.3			
Delay (s)	23.8	4.9		63.1	6.4			47.3	129.5			
Level of Service	C	A		E	A			D	F			
Approach Delay (s)		13.7			16.7			66.6			0.0	
Approach LOS		B			B			E			A	

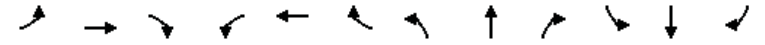
Intersection Summary

HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Fourth St. & King St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕↕	↔	↕↕	↕
Volume (vph)	152	1277	79	51	517	44	7	49	28	60	224	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.96	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4288		1296	2437			1542	853	1033	2869	580
Fit Permitted	0.95	1.00		0.95	1.00			0.94	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4288		1296	2437			1451	853	781	2869	580
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1359	84	54	550	47	7	52	30	64	238	103
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	26	0	3	79
Lane Group Flow (vph)	162	1439	0	54	593	0	0	59	4	64	245	14
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	17.5	65.8		8.9	55.6			15.4	15.4	16.4	16.4	16.4
Effective Green, g (s)	17.5	65.8		8.9	55.6			15.4	15.4	16.4	16.4	16.4
Actuated g/C Ratio	0.16	0.60		0.08	0.51			0.14	0.14	0.15	0.15	0.15
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	245	2565		104	1231			203	119	116	427	86
v/s Ratio Prot	0.11	c0.34		0.04	c0.24						c0.09	
v/s Ratio Perm								0.04	0.00	0.08		0.02
v/c Ratio	0.66	0.56		0.52	0.48			0.29	0.04	0.55	0.57	0.16
Uniform Delay, d1	43.5	13.4		48.5	17.8			42.4	40.9	43.4	43.5	40.8
Progression Factor	0.90	1.29		0.84	0.50			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.7		3.6	0.2			0.8	0.1	5.6	1.9	0.9
Delay (s)	44.4	17.9		44.2	9.1			43.2	41.0	49.0	45.4	41.7
Level of Service	D	B		D	A			D	D	D	D	D
Approach Delay (s)		20.6			12.0			42.5			45.1	
Approach LOS		C			B			D			D	

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	110.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Fifth St. & I-280 Ramps/King St.

5/12/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1458	80	3	618	30	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3052			3078	1540	1357
Fit Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	3052			2922	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1602	88	3	679	33	55
RTOR Reduction (vph)	1	0	0	0	0	21
Lane Group Flow (vph)	1689	0	0	682	33	35
Confl. Peds. (#/hr)		10	10			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases			6			8
Actuated Green, G (s)	91.2			91.2	7.5	7.5
Effective Green, g (s)	91.2			91.2	7.5	7.5
Actuated g/C Ratio	0.83			0.83	0.07	0.07
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2530			2422	105	92
v/s Ratio Prot	c0.55				0.02	
v/s Ratio Perm				0.23		c0.03
v/c Ratio	0.67			0.28	0.31	0.38
Uniform Delay, d1	3.6			2.1	48.8	49.0
Progression Factor	1.00			0.53	1.00	1.00
Incremental Delay, d2	1.4			0.1	1.7	2.6
Delay (s)	5.0			1.2	50.5	51.6
Level of Service	A			A	D	D
Approach Delay (s)	5.0			1.2	51.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			69.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
4: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/12/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	262	1267	145	34	172	356	188	141	456	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		3.5			3.0	3.0			3.0	3.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.98	1.00
Flpb, ped/bikes		0.99			0.99	1.00			1.00	1.00
Frt		0.99			1.00	0.95			0.99	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		5770			2846	2429			3989	1122
Fit Permitted		0.99			0.83	1.00			0.96	1.00
Satd. Flow (perm)		5770			2373	2429			3989	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	270	1306	149	35	177	367	194	145	470	270
RTOR Reduction (vph)	0	22	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1703	0	0	212	555	0	0	680	205
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Prot	Prot	Prot
Protected Phases		6			4	4		7	7	7
Permitted Phases	6			4						
Actuated Green, G (s)		22.4			20.4	20.4			14.7	14.7
Effective Green, g (s)		24.4			23.4	23.4			17.7	17.7
Actuated g/C Ratio		0.33			0.31	0.31			0.24	0.24
Clearance Time (s)		5.5			6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		1877			740	757			941	264
v/s Ratio Prot						c0.23			0.17	c0.18
v/s Ratio Perm		0.30			0.09					
v/c Ratio		0.91			0.29	0.73			0.72	0.78
Uniform Delay, d1		24.2			19.5	23.0			26.4	26.8
Progression Factor		1.00			0.70	1.00			1.00	1.00
Incremental Delay, d2		6.8			0.2	3.7			2.8	13.3
Delay (s)		31.0			13.8	26.7			29.2	40.1
Level of Service		C			B	C			C	D
Approach Delay (s)		31.0			13.8	26.7			31.7	
Approach LOS		C			B	C			C	
Intersection Summary										
HCM 2000 Control Delay					29.4				HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio					0.85					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	12.5
Intersection Capacity Utilization					85.0%				ICU Level of Service	E
Analysis Period (min)					15					
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
5: Fifth St. & Bryant St. & I-80 EB On-Ramp

5/12/2015



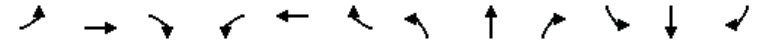
Movement	EBL2	EBL	EBT	EBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations		↔↔	↔↔↔		↕↔		↔		↔	↕↔
Volume (vph)	51	317	276	49	155	105	14	231	55	473
Ideal Flow (vphpl)	1400	1400	1400	1400	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5	2.0		2.5		4.0		2.5	2.5
Lane Util. Factor		0.81	0.81		0.91		0.91		0.91	0.91
Frbp, ped/bikes		1.00	0.99		0.88		0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00	1.00
Frt		1.00	0.98		0.94		0.85		1.00	1.00
Fit Protected		0.95	0.99		1.00		1.00		0.95	1.00
Satd. Flow (prot)		1700	2620		2297		1161		1327	2547
Fit Permitted		0.95	0.99		1.00		1.00		0.44	0.91
Satd. Flow (perm)		1700	2620		2297		1161		621	2322
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	63	391	341	60	191	130	17	285	68	584
RTOR Reduction (vph)	0	0	19	0	1	0	12	0	0	0
Lane Group Flow (vph)	0	337	499	0	322	0	3	0	292	645
Confl. Peds. (#/hr)	25			60		200				
Confl. Bikes (#/hr)				10		10	10			
Bus Blockages (#/hr)	0	0	8	0	5	0	0	0	0	5
Parking (#/hr)		10	10							10
Turn Type	Split	Split	NA		NA		Perm	pm+pt	pm+pt	NA
Protected Phases	2	2	2		8			7	7	4
Permitted Phases							8	4	4	
Actuated Green, G (s)		18.5	18.5		16.0		16.0		31.0	31.0
Effective Green, g (s)		18.5	21.0		17.5		16.0		32.5	32.5
Actuated g/C Ratio		0.25	0.28		0.23		0.21		0.43	0.43
Clearance Time (s)		4.5	4.5		4.0		4.0		4.0	4.0
Lane Grp Cap (vph)		419	733		535		247		386	1043
v/s Ratio Prot		c0.20	0.19		0.14				c0.13	0.10
v/s Ratio Perm							0.00		c0.20	0.16
v/c Ratio		0.80	0.68		0.60		0.01		0.76	0.62
Uniform Delay, d1		26.5	24.0		25.6		23.3		20.1	16.4
Progression Factor		1.00	1.00		1.00		1.00		0.88	0.89
Incremental Delay, d2		15.1	5.1		5.0		0.1		10.1	2.1
Delay (s)		41.6	29.1		30.6		23.4		27.8	16.7
Level of Service		D	C		C		C		C	B
Approach Delay (s)			34.0		30.3					20.2
Approach LOS			C		C					C

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Third St. & Channel St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↕↔		↔	↕↔		↔	↕↔	
Volume (vph)	10	2	56	8	4	14	9	353	2	7	83	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1570	1570	1570	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00	0.98		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Fit Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1550	1350		1464		1272	2541		1540	3038	
Fit Permitted		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1614	1350		1486		1272	2541		1540	3038	
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)	10	2	58	8	4	14	9	364	2	7	86	7
RTOR Reduction (vph)	0	0	54	0	13	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	12	4	0	13	0	9	365	0	7	88	0
Confl. Peds. (#/hr)	15		5	5		15			64			14
Confl. Bikes (#/hr)			2			1			16			14
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Effective Green, g (s)		1.9	1.9		1.9		0.6	9.0		0.6	9.3	
Actuated g/C Ratio		0.07	0.07		0.07		0.02	0.33		0.02	0.34	
Clearance Time (s)		4.9	4.9		4.9		5.2	5.5		5.5	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		111	93		103		27	834		33	1031	
v/s Ratio Prot							0.01	c0.14		0.00	c0.03	
v/s Ratio Perm	0.01	0.00			c0.01							
v/c Ratio	0.11	0.04			0.13		0.33	0.44		0.21	0.09	
Uniform Delay, d1	12.0	11.9			12.0		13.2	7.2		13.2	6.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2			0.6		2.6	0.4		1.2	0.0	
Delay (s)	12.4	12.1			12.5		15.8	7.6		14.3	6.2	
Level of Service	B	B			B		B	A		B	A	
Approach Delay (s)	12.1				12.5			7.8			6.8	
Approach LOS	B				B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	27.4	Sum of lost time (s)	15.9
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Fourth St. & Channel St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	5	7	2	2	16	5	29	1	61	59	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.83	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Fit Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2371			1413	1230	1146	1438		1377	1379	
Fit Permitted		0.95			1.00	1.00	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		2306			1448	1230	1206	1438		1377	1379	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	8	6	8	2	2	18	6	33	1	70	68	11
RTOR Reduction (vph)	0	8	0	0	0	8	0	1	0	0	3	0
Lane Group Flow (vph)	0	14	0	0	4	10	6	33	0	70	76	0
Confl. Peds. (#/hr)	28		3	3		28	213		19			213
Confl. Bikes (#/hr)			1						18			10
Parking (#/hr)		2										
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		Prot	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		1.1			1.1	20.8	1.2	1.2		19.7	25.9	
Effective Green, g (s)		1.1			1.1	20.8	1.2	1.2		19.7	25.9	
Actuated g/C Ratio		0.03			0.03	0.56	0.03	0.03		0.53	0.70	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		68			43	857	39	46		733	965	
v/s Ratio Prot						0.01		c0.02		c0.05	0.05	
v/s Ratio Perm		c0.01			0.00	0.00	0.00					
v/c Ratio		0.21			0.09	0.01	0.15	0.72		0.10	0.08	
Uniform Delay, d1		17.5			17.5	3.6	17.4	17.7		4.3	1.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.9	0.0	1.8	41.6		0.0	0.0	
Delay (s)		19.1			18.4	3.6	19.2	59.3		4.3	1.8	
Level of Service		B			B	A	B	E		A	A	
Approach Delay (s)		19.1			6.3			53.3			3.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	37.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Seventh St. & Mission Bay St.

5/12/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	20	104	219	25	52	108
Ideal Flow (vphpl)	1400	1400	1200	1200	1400	1400
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.88	*0.75	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1134	1743	1535	848	1134	1194
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1134	1743	1535	848	1134	1194
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	120	252	29	60	124
RTOR Reduction (vph)	0	107	0	17	0	0
Lane Group Flow (vph)	23	13	252	12	60	124
Confl. Peds. (#/hr)	60	1		5		
Confl. Bikes (#/hr)		1		30		
Turn Type	Prot	Perm	NA	custom	Prot	NA
Protected Phases	4		2	5	1	6
Permitted Phases		4		2		
Actuated Green, G (s)	5.7	5.7	27.3	22.3	5.2	37.5
Effective Green, g (s)	5.7	5.7	27.3	22.3	5.2	37.5
Actuated g/C Ratio	0.11	0.11	0.51	0.42	0.10	0.70
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	121	186	787	435	110	841
v/s Ratio Prot	c0.02		c0.16	0.01	c0.05	0.10
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.19	0.07	0.32	0.03	0.55	0.15
Uniform Delay, d1	21.6	21.4	7.5	9.1	22.9	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	0.2	0.0	5.4	0.1
Delay (s)	22.4	21.5	7.8	9.1	28.3	2.7
Level of Service	C	C	A	A	C	A
Approach Delay (s)	21.7		7.9			11.0
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Terry A Francois Blvd/Terry A Francois Blvd. & South St.

5/12/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y		Y	
Volume (vph)	3	1	7	67	43	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frbp, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	0.97		0.98	1.00	1.00	
Frt	0.97		1.00	1.00	0.99	
Fit Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1598		1672	1531	3120	
Fit Permitted	0.96		0.72	1.00	1.00	
Satd. Flow (perm)	1598		1266	1531	3120	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	4	1	8	80	51	4
RTOR Reduction (vph)	1	0	0	0	1	0
Lane Group Flow (vph)	4	0	8	80	54	0
Confl. Peds. (#/hr)	50	50	50			50
Confl. Bikes (#/hr)		10				30
Parking (#/hr)				10	10	
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	0.9		21.7	21.7	21.7	
Effective Green, g (s)	0.9		21.7	21.7	21.7	
Actuated g/C Ratio	0.03		0.67	0.67	0.67	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	44		842	1019	2076	
v/s Ratio Prot	c0.00			c0.05	0.02	
v/s Ratio Perm			0.01			
v/c Ratio	0.09		0.01	0.08	0.03	
Uniform Delay, d1	15.5		1.8	1.9	1.9	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.9		0.0	0.0	0.0	
Delay (s)	16.4		1.8	2.0	1.9	
Level of Service	B		A	A	A	
Approach Delay (s)	16.4			1.9	1.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	32.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 10: Third St. & South St.

5/12/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	
Volume (vph)	10	52	287	7	43	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.9		5.1	4.9
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.94	1.00		1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1635	1445	3399		1711	3421
Fit Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1635	1445	3399		1711	3421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	56	309	8	46	243
RTOR Reduction (vph)	0	52	1	0	0	0
Lane Group Flow (vph)	11	4	316	0	46	243
Confl. Peds. (#/hr)	71	22		46	46	
Confl. Bikes (#/hr)		10		10		
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8				
Actuated Green, G (s)	4.2	4.2	36.8		2.9	44.8
Effective Green, g (s)	4.2	4.2	36.8		2.9	44.8
Actuated g/C Ratio	0.07	0.07	0.62		0.05	0.76
Clearance Time (s)	5.3	5.3	4.9		5.1	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	115	102	2112		83	2588
v/s Ratio Prot			c0.09		c0.03	0.07
v/s Ratio Perm	c0.01	0.00				
v/c Ratio	0.10	0.04	0.15		0.55	0.09
Uniform Delay, d1	25.7	25.6	4.7		27.5	1.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.2	0.1		7.8	0.1
Delay (s)	26.1	25.8	4.8		35.3	2.0
Level of Service	C	C	A		D	A
Approach Delay (s)	25.8		4.8			7.3
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	15.3
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Terry A Francois Blvd./Terry A Francois Blvd & 16th

5/12/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	5	5	64	34	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1521	1344		2873	2769	
Flt Permitted	0.95	1.00		0.93	1.00	
Satd. Flow (perm)	1521	1344		2683	2769	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	12	6	6	75	40	12
RTOR Reduction (vph)	0	6	0	0	10	0
Lane Group Flow (vph)	12	0	0	81	42	0
Confl. Peds. (#/hr)	1	1	25			25
Parking (#/hr)				5	5	
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	0.7	0.7		6.6	6.6	
Effective Green, g (s)	0.7	0.7		6.6	6.6	
Actuated g/C Ratio	0.02	0.02		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	25	22		416	430	
v/s Ratio Prot	c0.01				0.02	
v/s Ratio Perm		0.00		c0.03		
v/c Ratio	0.48	0.00		0.19	0.10	
Uniform Delay, d1	20.7	20.6		15.6	15.4	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	0.1		0.2	0.1	
Delay (s)	34.5	20.6		15.9	15.5	
Level of Service	C	C		B	B	
Approach Delay (s)	29.9			15.9	15.5	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			17.4	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.06			
Actuated Cycle Length (s)			42.5	Sum of lost time (s)		15.0
Intersection Capacity Utilization			22.5%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
12: Illinois St & 16th

5/12/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	138	1	20	2	2	5	28	41	6	5	96	107
Peak Hour Factor	0.92	0.79	0.79	0.79	0.79	0.92	0.79	0.92	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	150	1	25	3	3	5	35	45	8	5	104	116
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total (vph)	150	27	3	8	88	110	116					
Volume Left (vph)	150	0	3	0	35	5	0					
Volume Right (vph)	0	25	0	5	8	0	116					
Hadj (s)	0.53	-0.63	0.53	-0.44	0.06	0.06	-0.67					
Departure Headway (s)	5.8	4.6	6.0	5.0	5.3	5.2	4.4					
Degree Utilization, x	0.24	0.03	0.00	0.01	0.13	0.16	0.14					
Capacity (veh/h)	589	731	558	664	647	667	775					
Control Delay (s)	9.5	6.6	7.8	6.9	9.1	7.9	7.0					
Approach Delay (s)	9.0		7.1		9.1	7.4						
Approach LOS	A		A		A	A						
Intersection Summary												
Delay			8.3									
Level of Service			A									
Intersection Capacity Utilization			33.9%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
13: Third St. & 16th St.

5/12/2015

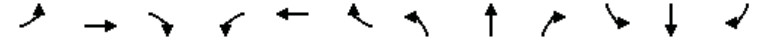


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	46	117	99	1	130	6	62	242	41	1	163	71
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	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	1.00	0.85	1.00	0.98		1.00	0.95	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1279	1365	1128	1290	1365	1114	2515	2525		1296	2456	
Fit Permitted	0.66	1.00	1.00	0.67	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	894	1365	1128	914	1365	1114	2515	2525		1296	2456	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	52	131	111	1	146	7	70	272	46	1	183	80
RTOR Reduction (vph)	0	0	90	0	0	6	0	12	0	0	49	0
Lane Group Flow (vph)	52	131	21	1	146	1	70	306	0	1	214	0
Confl. Peds. (#/hr)	41		14	14		41			39			8
Confl. Bikes (#/hr)			9			10			4			14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	7.9	7.9	7.9	7.9	7.9	7.9	3.6	17.1		0.8	14.3	
Effective Green, g (s)	7.9	7.9	7.9	7.9	7.9	7.9	3.6	17.1		0.8	14.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.09	0.41		0.02	0.34	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.2		5.0	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	170	259	214	173	259	212	218	1040		24	846	
v/s Ratio Prot		0.10			c0.11		0.03	c0.12		0.00	c0.09	
v/s Ratio Perm	0.06		0.02	0.00		0.00						
v/c Ratio	0.31	0.51	0.10	0.01	0.56	0.01	0.32	0.29		0.04	0.25	
Uniform Delay, d1	14.4	15.1	13.9	13.6	15.2	13.6	17.8	8.2		20.0	9.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.6	0.2	0.0	2.8	0.0	0.9	0.2		0.7	0.2	
Delay (s)	15.5	16.6	14.1	13.6	18.0	13.6	18.7	8.3		20.7	9.9	
Level of Service	B	B	B	B	B	B	B	A		C	A	
Approach Delay (s)		15.4			17.8			10.2			10.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	15.7
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Construction Driveway/4th St & 16th St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	39	243	1	2	248	12	3	5	1	17	1	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00		1.00	0.93	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.92	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	1706	1450	1621	1706	1255	1621	1663		1493	1356	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.75	1.00	
Satd. Flow (perm)	1621	1706	1450	1621	1706	1255	1239	1663		1185	1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	253	1	2	258	12	3	5	1	18	1	46
RTOR Reduction (vph)	0	0	0	0	0	6	0	1	0	0	37	0
Lane Group Flow (vph)	41	253	1	2	258	6	3	5	0	18	10	0
Confl. Peds. (#/hr)	50					50						50
Confl. Bikes (#/hr)						10						10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6		8				4	
Permitted Phases			2			6	8					4
Actuated Green, G (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Effective Green, g (s)	7.4	47.2	47.2	2.4	42.2	42.2	14.9	14.9		14.9	14.9	
Actuated g/C Ratio	0.09	0.59	0.59	0.03	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	1012	860	48	905	666	232	311		222	254	
v/s Ratio Prot	c0.03	c0.15		0.00	c0.15		0.01	0.00			0.01	
v/s Ratio Perm			0.00			0.01	0.00					c0.02
v/c Ratio	0.27	0.25	0.00	0.04	0.29	0.01	0.01	0.02		0.08	0.04	
Uniform Delay, d1	33.5	7.7	6.6	37.4	10.3	8.8	26.3	26.3		26.7	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6	0.0	0.4	0.2	0.0	0.0	0.0		0.2	0.1	
Delay (s)	34.5	8.3	6.6	37.8	10.5	8.8	26.3	26.4		26.8	26.5	
Level of Service	C	A	A	D	B	A	C	C		C	C	
Approach Delay (s)		11.9			10.6			26.3			26.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 16th St. & Owens St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	14	250	3	5	286	4	11	42	13	21	14	39
Ideal Flow (vphpl)	1500	1500	1900	1900	1500	1500	1900	1900	1900	1500	1900	1500
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Lane Util. Factor	1.00	*0.95	1.00	1.00	*0.95	1.00	1.00	0.95			0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1215	1215	1378	1540	1215	1049	1540	2967			2989	1074
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1215	1215	1378	1540	1215	1049	1543	2967			2941	1074
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	281	3	6	321	4	12	47	15	24	16	44
RTOR Reduction (vph)	0	0	2	0	0	2	0	13	0	0	0	39
Lane Group Flow (vph)	16	281	1	6	321	2	12	49	0	0	40	5
Confl. Peds. (#/hr)						17						3
Confl. Bikes (#/hr)						36						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		4			4
Actuated Green, G (s)	0.7	13.6	13.6	0.4	12.3	12.3	4.2	4.2			3.2	3.2
Effective Green, g (s)	0.7	13.6	13.6	0.4	12.3	12.3	4.2	4.2			3.2	3.2
Actuated g/C Ratio	0.02	0.44	0.44	0.01	0.39	0.39	0.13	0.13			0.10	0.10
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	27	529	600	19	478	413	207	399			301	110
v/s Ratio Prot	c0.01	0.23		0.00	c0.26			c0.02				
v/s Ratio Perm			0.00			0.00	0.01				0.01	0.00
v/c Ratio	0.59	0.53	0.00	0.32	0.67	0.00	0.06	0.12			0.13	0.04
Uniform Delay, d1	15.1	6.5	5.0	15.3	7.8	5.7	11.8	11.9			12.7	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	30.3	1.0	0.0	9.3	3.7	0.0	0.1	0.1			0.2	0.2
Delay (s)	45.4	7.5	5.0	24.6	11.5	5.7	11.9	12.0			12.9	12.8
Level of Service	D	A	A	C	B	A	B	B			B	B
Approach Delay (s)		9.5			11.6			12.0			12.9	
Approach LOS		A			B			B			B	

Intersection Summary

HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	31.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Mississippi St./Seventh St. & 16th St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	20	207	60	8	246	82	31	91	8	52	40	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	*0.80		1.00	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80	*0.80
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.92	1.00	1.00	0.95	1.00	0.97	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Fit Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1326	917		1333	1126	881	1070	957	911	1070	1036	
Fit Permitted	0.37	1.00		0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	521	917		742	1126	881	1070	957	911	1070	1036	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	244	71	9	289	96	36	107	9	61	47	28
RTOR Reduction (vph)	0	10	0	0	0	43	0	0	8	0	22	0
Lane Group Flow (vph)	24	305	0	9	289	53	36	107	1	61	53	0
Confl. Peds. (#/hr)	28		6	6		28			4			11
Confl. Bikes (#/hr)			9			50			7			15
Parking (#/hr)			10			10			10			
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	33.2	33.2		32.6	32.6	40.0	7.5	11.9	11.9	7.4	11.8	
Effective Green, g (s)	33.2	33.2		32.6	32.6	40.0	7.5	11.9	11.9	7.4	11.8	
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.55	0.10	0.16	0.16	0.10	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	249	417		335	502	543	109	156	148	108	167	
v/s Ratio Prot	0.00	c0.33		0.00	c0.26	0.01	0.03	c0.11		c0.06	0.05	
v/s Ratio Perm	0.04			0.01		0.05			0.00			
v/c Ratio	0.10	0.73		0.03	0.58	0.10	0.33	0.69	0.01	0.56	0.32	
Uniform Delay, d1	11.8	16.3		11.3	15.0	7.9	30.4	28.8	25.6	31.3	27.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	6.5		0.0	1.6	0.1	1.8	11.8	0.0	6.6	1.1	
Delay (s)	11.9	22.8		11.4	16.6	8.0	32.2	40.6	25.6	37.9	28.2	
Level of Service	B	C		B	B	A	C	D	C	D	C	
Approach Delay (s)		22.0			14.4			37.7			32.5	
Approach LOS		C			B			D			C	

Intersection Summary

HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Illinois St./Illinois St & Mariposa St./Terry A Francois Blvd.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Volume (vph)	43	39	27	26	54	7	22	24	30	5	24	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		0.99		1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes		0.99		0.99	1.00			1.00	1.00		1.00	
Frt		0.97		1.00	0.98			1.00	0.85		0.89	
Fit Protected		0.98		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)		1430		1688	1762			1751	1501		1342	
Fit Permitted		0.85		0.78	1.00			0.84	1.00		0.99	
Satd. Flow (perm)		1239		1391	1762			1514	1501		1328	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	54	49	34	32	68	9	28	30	38	6	30	129
RTOR Reduction (vph)	0	15	0	0	6	0	0	0	31	0	105	0
Lane Group Flow (vph)	0	122	0	32	71	0	0	58	7	0	60	0
Confl. Peds. (#/hr)	13		16	16		13	16		19	19		16
Parking (#/hr)		10	10								10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		4		4	8			
Actuated Green, G (s)		11.6		11.6	11.6			8.7	8.7		8.7	
Effective Green, g (s)		11.6		11.6	11.6			8.7	8.7		8.7	
Actuated g/C Ratio		0.25		0.25	0.25			0.19	0.19		0.19	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		313		351	445			286	284		251	
v/s Ratio Prot				0.04								
v/s Ratio Perm	c0.10		0.02			0.04	0.00			c0.05		
v/c Ratio	0.39		0.09	0.16		0.20	0.03			0.24		
Uniform Delay, d1	14.2		13.1	13.4		15.7	15.1			15.8		
Progression Factor	1.00		1.00	1.00		1.00	1.00			1.00		
Incremental Delay, d2	0.8		0.1	0.2		0.4	0.0			0.5		
Delay (s)	15.0		13.2	13.5		16.0	15.2			16.3		
Level of Service	B		B	B		B	B			B		
Approach Delay (s)	15.0			13.4		15.7				16.3		
Approach LOS	B			B		B				B		

Intersection Summary		
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.21	B
Actuated Cycle Length (s)	45.9	Sum of lost time (s)
Intersection Capacity Utilization	51.9%	14.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

HCM Signalized Intersection Capacity Analysis
18: Third St. & Mariposa St.

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕			↕	↕		↕	
Volume (vph)	46	83	21	52	113	13	16	286	14	12	179	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1400	1400	1400	1400	1400	1400
Total Lost time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1666	3294		1678	3352		1260	2498		1260	2390	
Fit Permitted	0.66	1.00		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1158	3294		1195	3352		1260	2498		1260	2390	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	95	24	60	130	15	18	329	16	14	206	83
RTOR Reduction (vph)	0	16	0	0	9	0	0	3	0	0	40	0
Lane Group Flow (vph)	53	103	0	60	136	0	18	342	0	14	249	0
Confl. Peds. (#/hr)	34		24	24		34			16			15
Confl. Bikes (#/hr)			2			6			6			19
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Effective Green, g (s)	30.1	30.1		30.1	30.1		6.8	43.9		2.6	39.7	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.07	0.48		0.03	0.43	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	378	1076		390	1095		93	1190		35	1030	
v/s Ratio Prot		0.03			0.04		0.01	c0.14		0.01	c0.10	
v/s Ratio Perm	0.05			c0.05								
v/c Ratio	0.14	0.10		0.15	0.12		0.19	0.29		0.40	0.24	
Uniform Delay, d1	21.9	21.5		22.0	21.8		40.1	14.6		44.0	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		0.2	0.1		1.0	0.6		7.3	0.1	
Delay (s)	22.0	21.6		22.2	21.8		41.1	15.2		51.3	16.8	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		21.7			21.9			16.5			18.4	
Approach LOS		C			C			B			B	

Intersection Summary		
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.24	B
Actuated Cycle Length (s)	92.1	Sum of lost time (s)
Intersection Capacity Utilization	80.1%	15.5
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		D

HCM Signalized Intersection Capacity Analysis
19: Minnesota St./4th St. & Mariposa St.

5/12/2015



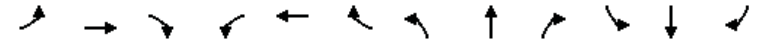
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	2	173	11	2	196	1	13	0	1	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1711	3390		1711	3419			1705		1711	1621	
Flt Permitted	0.62	1.00		0.63	1.00			0.83		0.75	1.00	
Satd. Flow (perm)	1112	3390		1127	3419			1479		1346	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	188	12	2	213	1	14	0	1	2	1	2
RTOR Reduction (vph)	0	9	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	2	191	0	2	213	0	0	6	0	2	2	0
Parking (#/hr)								5				
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.2	7.2		7.2	7.2			10.8		10.8	10.8	
Effective Green, g (s)	7.2	7.2		7.2	7.2			10.8		10.8	10.8	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.39		0.39	0.39	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	285	871		289	879			570		519	625	
v/s Ratio Prot		0.06			c0.06						0.00	
v/s Ratio Perm	0.00			0.00			c0.00			0.00		
v/c Ratio	0.01	0.22		0.01	0.24			0.01		0.00	0.00	
Uniform Delay, d1	7.7	8.2		7.7	8.2			5.3		5.3	5.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.1		0.0	0.1			0.0		0.0	0.0	
Delay (s)	7.7	8.3		7.7	8.4			5.3		5.3	5.3	
Level of Service	A	A		A	A			A		A	A	
Approach Delay (s)		8.3			8.4			5.3			5.3	
Approach LOS		A			A			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.10	
Actuated Cycle Length (s)	28.0	Sum of lost time (s)
Intersection Capacity Utilization	21.2%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: I-280 NB Off-Ramp & Mariposa St.

5/12/2015



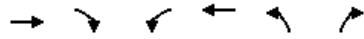
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Volume (vph)	1	85	0	0	266	2	155	43	109	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0				5.0
Lane Util. Factor		0.95			*0.95		1.00	0.95				0.88
Frt		1.00			1.00		1.00	0.89				0.85
Flt Protected		1.00			1.00		0.95	1.00				1.00
Satd. Flow (prot)		3420			5127		1711	3054				2694
Flt Permitted		0.95			1.00		0.95	1.00				1.00
Satd. Flow (perm)		3265			5127		1711	3054				2694
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	1	106	0	0	332	2	194	54	136	0	0	31
RTOR Reduction (vph)	0	0	0	0	1	0	0	81	0	0	0	29
Lane Group Flow (vph)	0	107	0	0	333	0	194	109	0	0	0	2
Turn Type	Prot	NA			NA		Split	NA				Over
Protected Phases	1	6			2		8	8				1
Permitted Phases												
Actuated Green, G (s)		35.5			26.5		31.0	31.0				4.0
Effective Green, g (s)		35.5			26.5		31.0	31.0				4.0
Actuated g/C Ratio		0.47			0.35		0.41	0.41				0.05
Clearance Time (s)		4.5			4.5		5.0	5.0				5.0
Lane Grp Cap (vph)		1533			1787		697	1245				141
v/s Ratio Prot		c0.00			c0.07		c0.11	0.04				0.00
v/s Ratio Perm		0.03										
v/c Ratio		0.07			0.19		0.28	0.09				0.01
Uniform Delay, d1		11.2			17.2		15.0	13.8				34.1
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		0.1			0.2		1.0	0.1				0.1
Delay (s)		11.2			17.5		16.0	14.0				34.3
Level of Service		B			B		B	B				C
Approach Delay (s)		11.2			17.5			15.0				34.3
Approach LOS		B			B			B				C

Intersection Summary		
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.23	
Actuated Cycle Length (s)	76.0	Sum of lost time (s)
Intersection Capacity Utilization	32.3%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: I-280 SB On-Ramp & Mariposa St.

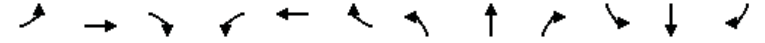
5/12/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔↔	↔		
Volume (vph)	86	169	207	239	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0		
Lane Util. Factor	0.95	0.95	0.97	1.00		
Frbp, ped/bikes	0.99	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	0.95	0.85	1.00	1.00		
Fit Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1609	1428	3319	1801		
Fit Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1609	1428	3319	1801		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	105	206	252	291	0	0
RTOR Reduction (vph)	19	49	0	0	0	0
Lane Group Flow (vph)	144	99	252	291	0	0
Confl. Peds. (#/hr)		5	5			
Confl. Bikes (#/hr)		5				
Turn Type	NA	Perm	Prot	NA		
Protected Phases	4		3	8		
Permitted Phases		4				
Actuated Green, G (s)	40.1	40.1	9.9	60.0		
Effective Green, g (s)	40.1	40.1	9.9	60.0		
Actuated g/C Ratio	0.67	0.67	0.17	1.00		
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1075	954	547	1801		
v/s Ratio Prot	0.09		c0.08	c0.16		
v/s Ratio Perm		0.07				
v/c Ratio	0.13	0.10	0.46	0.16		
Uniform Delay, d1	3.6	3.5	22.6	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.1	0.0	0.6	0.0		
Delay (s)	3.7	3.6	23.3	0.0		
Level of Service	A	A	C	A		
Approach Delay (s)	3.6			10.8	0.0	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			8.2		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.24			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			23.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
22: Third St. & Cesar Chavez

5/12/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔		↔	↔↔		↔	↔↔	↔
Volume (vph)	57	33	105	2	25	0	85	195	0	6	187	61
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00		1.00	1.00		1.00	0.96	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1186	1897		1155	1279		1215	2431		1215	2297	
Fit Permitted	0.41	1.00		0.65	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	508	1897		795	1279		1215	2431		1215	2297	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	64	37	118	2	28	0	96	219	0	7	210	69
RTOR Reduction (vph)	0	85	0	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	64	70	0	2	28	0	96	219	0	7	254	0
Confl. Peds. (#/hr)	100		100	100		100			100			100
Confl. Bikes (#/hr)			10			10			10			10
Parking (#/hr)		5	5									
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	17.4	17.4		6.5	6.5		8.6	25.4		2.5	19.3	
Effective Green, g (s)	17.4	17.4		6.5	6.5		8.6	25.4		2.5	19.3	
Actuated g/C Ratio	0.28	0.28		0.11	0.11		0.14	0.41		0.04	0.31	
Clearance Time (s)	5.3	5.3		5.3	5.3		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	535		83	134		169	1002		49	719	
v/s Ratio Prot	c0.03	0.04			0.02		c0.08	0.09		0.01	c0.11	
v/s Ratio Perm	c0.06			0.00								
v/c Ratio	0.31	0.13		0.02	0.21		0.57	0.22		0.14	0.35	
Uniform Delay, d1	17.0	16.5		24.7	25.2		24.8	11.7		28.5	16.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		0.1	0.8		4.3	0.1		1.3	0.3	
Delay (s)	17.9	16.6		24.8	26.0		29.1	11.8		29.9	16.6	
Level of Service	B	B		C	C		C	B		C	B	
Approach Delay (s)		17.0			25.9			17.1			17.0	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.3								B	
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			61.6							21.6		
Intersection Capacity Utilization			70.8%								C	
Analysis Period (min)			15									
c Critical Lane Group												

REDUCED DEVELOPMENT ALTERNATIVE
TRAFFIC CONTRIBUTIONS TO LOS E OR LOS F

PROJECT ALTERNATIVES: 2015 EXISTING PLUS ALTERNATIVE

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: Reduced Project Alternative, Weekday PM Peak Hour, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	Total Volumes	% Project Contribution	Impact ?
1: King / Third	EBL	0	889	0.0%	No
3: King / Fifth / I-280 Ramps	EBT	0	1689	0.0%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT/R	0	700	0.0%	No
	SBL/L2	0	384	0.0%	No
	EBT/R	0	613	0.0%	No
16: 7 th / Mississippi / 16 th	NBT	0	357	0.0%	No
	SBL	21	96	21.9%	Yes
	WBT	69	465	14.8%	Yes
	EBT/R	49	447	11.0%	Yes

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: Reduced Project Alternative, Saturday Evening, No Giants

No E → E or F → F intersections.

PROJECT ALTERNATIVES: 2040 CUMULATIVE PLUS ALTERNATIVE

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: Reduced Project Alternative, Weekday PM Peak Hour, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact ?
1: King / Third	NBR	13	481	2.7%	No
	EBL	0	924	0.0%	No
	WBT/R	0	984	0.0%	No
2: King / Fourth	SBT	10	625	1.6%	No
	EBL	0	346	0.0%	No
	WBT/R	0	986	0.0%	No
4: Fifth / Harrison / I-80 WB off-ramp	SBT	0	810	0.0%	No
	SBR	0	340	0.0%	No
	NWL2 / L	12	1707	0.7%	No
5: Fifth / Bryant / I-80 EB on-ramp	NBT	0	565	0.0%	No
	NBR	0	140	0.0%	No
	SBT	4	956	0.4%	No
	EBT/R	0	1160	0.0%	No
6: Third / Channel	NBL	0	39	0.0%	No
	NBT/R	32	1563	2.0%	No
	SBL	0	58	0.0%	No
15: Owens / 16 th	NBL	0	138	0.0%	No
	EBL	0	137	0.0%	No
	WBT	99	831	11.9%	Yes
16: 7 th / Mississippi / 16 th	NBT	0	329	0.0%	No
	SBL	21	162	13.0%	Yes
	EBT/R	49	637	7.7%	Yes
18: Third / Mariposa	NBT/R	31	1257	2.4%	No
	EBL	0	205	0.0%	No
22: Third / Cesar Chavez	SBL	0	110	0.0%	No
	SBT/R	41	1200	3.4%	No
	EBL	6	227	2.6%	No

Project Contributions to Critical Movements at Intersections Operating at LOS E or F: Reduced Project Alternative, Saturday Evening, No Giants

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact?
4: Fifth / Harrison / I-80 WB off-ramp	SBT/R	0	840	0.0%	No
	NWR	0	455	0.0%	No

¹ Volumes presented are 2040 Cumulative Plus Project, No Event for the corresponding time period.

EXISTING PLUS REDUCED DEVELOPMENT ALTERNATIVE
FREEWAY MERGE AND DIVERGE LOS

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Alternative - R2 Project Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		On-Ramp Data								
Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Flow Rate v _p (pcph)	Type	Lanes	Lane Add?	S _{FR} (mph)	V _R (vph)	Accel Lane (ft)			
																						L _{A1}	L _{A2}	L _{Aeff}
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	3	60.0	7,673	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	8,549	8,549	Left	1	No	60.0	1,110	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	5,018	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	5,590	5,590	Left	1	No	60.0	653	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
	I-80 EB	Fifth/Bryant on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	1	No	60.0	0	700	0	700	
M2	I-80 EB	Sterling/Bryant on-ramp	5	60.0	8,783	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	9,785	7,285	Right	1	No	45.0	1,099	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	5,671	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,318	4,802	Right	1	No	45.0	360	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
	I-80 EB	Sterling/Bryant on-ramp	5	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	250	0	250	
M3	I-280 SB	Mariposa on-ramp	3	60.0	3,625	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,039	4,039	Right	1	No	45.0	1,311	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	1,370	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	1,526	1,526	Right	1	No	45.0	376	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	No	45.0	0	480	0	480	
	I-280 SB	Mariposa on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	480	0	480	
M4	I-280 SB	Penn/25th on-ramp	3	60.0	4,421	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	4,926	4,926	Right	1	No	45.0	1,130	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	1,521	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	1,695	1,695	Right	1	No	45.0	239	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	
	I-280 SB	Penn/25th on-ramp	3	60.0	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.98	1.00	0	0	Right	1	No	45.0	0	350	0	350	

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			On-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	On-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,237	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	728	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,224	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	401	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
M3	I-280 SB	Mariposa on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,461	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	419	No											
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No											
	I-280 SB	Mariposa on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	1,259	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	266	No											
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											
	I-280 SB	Penn/25th on-ramp	Wkend w/	0.92	Level	5.0%	0.0%	1.5	1.2	0.98	1.00	0	No											

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
 Analyst:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation					
Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Volume				Truck/ Bus %			Flow Rate		L _{EQ}		P _{FM} Equations			v ₁₂ (pcph)	
				Distance	(vph)	PHF	Terrain	RV %	E _T	E _R	f _{HV}	f _P	v _p (pcph)	25-2	25-3	1	2		3
Existing																			
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	No													0.597	0.597	5,717
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend	No													0.597	0.597	3,739
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	No													0.597	0.597	0
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	No													0.597	0.597	0
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	No													0.585	0.127	923
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend	No													0.585	0.230	1,102
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	No													0.585	0.280	0
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	No													0.585	0.280	0
M3	I-280 SB	Mariposa on-ramp	Wkday PM	No													0.591	0.591	2,387
	I-280 SB	Mariposa on-ramp	Wkday Eve	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend	No													0.591	0.591	902
	I-280 SB	Mariposa on-ramp	Wkday PM w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkday Late w/	No													0.591	0.591	0
	I-280 SB	Mariposa on-ramp	Wkend w/	No													0.591	0.591	0
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	No													0.587	0.587	2,893
	I-280 SB	Penn/25th on-ramp	Wkday Eve	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend	No													0.587	0.587	995
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	No													0.587	0.587	0
	I-280 SB	Penn/25th on-ramp	Wkend w/	No													0.587	0.587	0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Juri
Analy:

General Information			Capacity Checks											Results							
Freeway/ Direction	On-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V ₃ , V _{av/34} (pcphpl)	V ₃ , V _{av/34} > 2,700?	V ₃ , V _{av/34} > 1.5*V _{12/2} ?	V _{12a} (pcph)	V _{R12a} (pcph)	Max V _{R12a} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																					
M1	I-80 EB	Fifth/Bryant on-ramp	Wkday PM	8,549	6,900	Yes	9,785	6,900	Yes	2,832	Yes	No	5,849	7,085	4,600	Yes	1,237	2,200	No	-	F
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend	5,590	6,900	No	6,318	6,900	No	1,852	No	No	3,739	4,466	4,600	No	728	2,200	No	35.6	E
	I-80 EB	Fifth/Bryant on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
	I-80 EB	Fifth/Bryant on-ramp	Wkend w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,200	No	1.1	A
M2	I-80 EB	Sterling/Bryant on-ramp	Wkday PM	7,285	11,500	No	8,510	11,500	No	3,181	Yes	Yes	2,914	4,139	4,600	No	1,224	2,100	No	35.6	E
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend	4,802	11,500	No	5,203	11,500	No	1,850	No	Yes	1,921	2,322	4,600	No	401	2,100	No	21.8	C
	I-80 EB	Sterling/Bryant on-ramp	Wkday PM w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Eve w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkday Late w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
	I-80 EB	Sterling/Bryant on-ramp	Wkend w/	0	11,500	No	0	11,500	No	0	No	No	0	0	4,600	No	0	2,100	No	3.9	A
M3	I-280 SB	Mariposa on-ramp	Wkday PM	4,039	6,900	No	5,499	6,900	No	1,652	No	No	2,387	3,847	4,600	No	1,461	2,100	No	31.8	D
	I-280 SB	Mariposa on-ramp	Wkday Eve	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend	1,526	6,900	No	1,945	6,900	No	624	No	No	902	1,321	4,600	No	419	2,100	No	12.6	B
	I-280 SB	Mariposa on-ramp	Wkday PM w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Eve w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkday Late w/	0	6,900	No	0	6,900	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
	I-280 SB	Mariposa on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	2.5	A
M4	I-280 SB	Penn/25th on-ramp	Wkday PM	4,926	7,050	No	6,185	7,050	No	2,033	No	No	2,893	4,152	4,600	No	1,259	2,100	No	35.1	E
	I-280 SB	Penn/25th on-ramp	Wkday Eve	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend	1,695	7,050	No	1,961	7,050	No	699	No	No	995	1,262	4,600	No	266	2,100	No	13.0	B
	I-280 SB	Penn/25th on-ramp	Wkday PM w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Eve w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkday Late w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A
	I-280 SB	Penn/25th on-ramp	Wkend w/	0	7,050	No	0	7,050	No	0	No	No	0	0	4,600	No	0	2,100	No	3.3	A

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction San Francisco Agency or Company Fehr & Peers
 Analysis Year Alternative - R2 Project Date 2/1/2015
 Analyst DW Project Description GSW - based on Central SoMa and Seawall Lot analysis

General Information			Freeway Data			Freeway Volume Adjustment								Effective		Off-Ramp Data									
Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S _{FF} (mph)	V (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate V _D (pcph)	Flow Rate V _D (pcph)	Type	Lanes	Lane Drop?	S _{FR} (mph)	V _R (vph)	Decel Lane (ft)				
																							L _{D1}	L _{D2}	L _{Defl}
Existing																									
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	4	60	6,365	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	7,091	7,091	Left	2	Yes	45.0	1,192	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkend	4	60	5,598	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	6,237	6,237	Left	2	Yes	45.0	859	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Left	2	Yes	45.0	0	50	0	100	
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4	60	4,445	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	4,952	4,952	Right	1	Yes	45.0	715	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkday Eve	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkday Late	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkend	4	60	2,675	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	2,980	2,980	Right	1	Yes	45.0	307	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkday PM w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkday Late w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	
	I-280 NB	Mariposa off-ramp	Wkend w/	4	60	0	0.92	Level	5.0%	0.0%	1.5	1.20	0.976	1.00	0	0	Right	1	Yes	45.0	0	50	0	50	

**HCM 2000
Diverge Ramp Junctions
Capacity Analysis**

Juri
Analy:

General Information			Off-Ramp Volume Adjustment									Adjacent Upstream Ramp Data												
Freeway/ Direction	Off-ramp	Analysis Time Period	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v _p (pcph)	
Existing																								
D1	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	1,328	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	957	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-80 WB	Fifth/Harrison off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
D2	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	797	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	342	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												
	I-280 NB	Mariposa off-ramp	0.92	Level	5.0%	0.0%	1.5	1.2	0.976	1.00	0	No												

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information				Adjacent Downstream Ramp Data										v ₁₂ Estimation								
Freeway/ Direction	Off-ramp	Analysis Time Period		Exists?	Distance	Volume (vph)	PHF	Terrain	Truck/ Bus %	RV %	E _T	E _R	f _{HV}	f _P	Flow Rate v ₀ (pcph)	L _{EQ} 25-13	L _{EQ} 25-14	P _{FD} Equations			P _{FD}	v ₁₂ (pcph)
Existing																						
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkend	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	No																		
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	No																		
D2	I-280 NB	Mariposa off-ramp	Wkday PM	No																		
	I-280 NB	Mariposa off-ramp	Wkday Eve	No																		
	I-280 NB	Mariposa off-ramp	Wkday Late	No																		
	I-280 NB	Mariposa off-ramp	Wkend	No																		
	I-280 NB	Mariposa off-ramp	Wkday PM w/	No																		
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	No																		
	I-280 NB	Mariposa off-ramp	Wkday Late w/	No																		
	I-280 NB	Mariposa off-ramp	Wkend w/	No																		

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Juri
 Analy:

General Information			Capacity Checks										Results							
Freeway/ Direction	Off-ramp	Analysis Time Period	V _{F1} (pcph)	Max V _{F1} (pcph)	LOS F?	V ₃ , V _{av34} (pcphpl)	V ₃ , V _{av34} > 2,700?	V ₃ , V _{av34} > 1.5*V ₁₂ /2?	V _{12a} (pcph)	Max V ₁₂ (pcph)	LOS F?	V _{FO} (pcph)	Max V _{FO} (pcph)	LOS F?	V _R (pcph)	Max V _R (pcph)	LOS F?	Density, D (pcplpm)	Level of Service	
Existing																				
D1	I-80 WB	Fifth/Harrison off-ramp	Wkday PM	7,091	9,200	No	1,991	No	No	3,109	4,400	No	5,763	6,900	No	1,328	4,100	No	30.1	D
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend	6,237	9,200	No	1,837	No	No	2,563	4,400	No	5,280	6,900	No	957	4,100	No	25.4	C
	I-80 WB	Fifth/Harrison off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
	I-80 WB	Fifth/Harrison off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	4,100	No	3.4	A
D2	I-280 NB	Mariposa off-ramp	Wkday PM	4,952	9,200	No	1,172	No	No	2,608	4,400	No	4,156	6,900	No	797	2,100	No	26.2	C
	I-280 NB	Mariposa off-ramp	Wkday Eve	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend	2,980	9,200	No	744	No	No	1,492	4,400	No	2,638	6,900	No	342	2,100	No	16.6	B
	I-280 NB	Mariposa off-ramp	Wkday PM w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Eve w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkday Late w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A
	I-280 NB	Mariposa off-ramp	Wkend w/	0	9,200	No	0	No	No	0	4,400	No	0	6,900	No	0	2,100	No	3.8	A

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
TRAVEL DEMAND ANALYSIS

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH NO EVENT

Land Use	Piers 30-32		Seawall Lot 330		Total Project	
	Intensity	% of total	Intensity	% of total	Intensity	Total
Arena	0 attend.	0%		0%	0 attend.	0%
	100 empl.	100%		0%	100 empl.	100%
Retail	18,000 gsf	45%	22,390 gsf	55%	40,390 gsf	100%
Quick Service Rest.	36,000 gsf	100%	0 gsf	0%	36,000 gsf	100%
Sit-down Restaurant	36,000 gsf	83%	7,464 gsf	17%	43,464 gsf	100%
Residential	0 units	0%	176 units	100%	176 units	100%
Hotel	0 rooms	0%	227 rooms	100%	227 rooms	100%
Office	35,600 gsf	100%	0 gsf	0%	35,600 gsf	100%

Person-trips by Mode	Daily Trips										Piers 30-32		SWL 330		PM Peak Hour Trips										Piers 30-32		SWL 330		Percent of Daily during PM Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total			Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total				
Auto	97	1,134	1,078	1,629	566	575	238	5,317	36%		3,268	2,049	8	102	146	220	98	60	21	655	37%		402	252	8.5%	9.0%	13.5%	13.5%	17.3%	10.4%	8.8%	12.3%						
Transit	129	581	980	1,254	333	458	226	3,961	27%		2,633	1,328	11	52	132	169	58	66	26	514	29%		333	181	8.5%	9.0%	13.5%	13.5%	17.3%	14.3%	11.5%	13.0%						
Taxi/Coach (Event)								0	0%		-	-								0	0%		-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Bike (Event)								0	0%		-	-								0	0%		-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Walk	17	1,066	722	1,357	571	460	148	4,341	30%		2,487	1,855	1	96	98	183	99	27	6	510	29%		300	210	8.5%	9.0%	13.5%	13.5%	17.3%	5.8%	4.1%	11.7%						
Other	6	370	157	281	46	96	33	988	7%		593	395	1	33	21	38	8	7	2	109	6%		70	39	8.5%	9.0%	13.5%	13.5%	17.3%	6.8%	5.3%	11.0%						
Total	250	3,150	2,938	4,520	1,515	1,589	644	14,607	100%		8,980	5,627	21	284	397	610	262	159	55	1,787	100%		1,104	683	8.5%	9.0%	13.5%	13.5%	17.3%	10.0%	8.5%	12.2%						
Vehicle Trips	63	488	531	719	524	260	121	2,705			1,528	1,177	5	44	72	97	91	34	13	355			190	165	8.5%	9.0%	13.5%	13.5%	17.3%	13.0%	10.6%	13.1%						
Avg. veh. occupancy	1.54	2.32	2.03	2.27	1.06	2.21	1.97	1.97			2.14	1.74	1.54	2.32	2.03	2.27	1.06	1.76	1.63	1.84			2.12	1.53														

Weekday Distribution	Total Daily Person-Trip	PM Peak Hour Person-Trips										PM Peak Hour Transit-Trips										PM Peak Hour Vehicle-Trips										Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total							
Superdistrict 1	3,122	3	53	77	130	91	26	8	387	1	8	16	23	17	7	2	74	0	6	5	8	21	2	1	43	12%	1.50					
Superdistrict 2	1,690	3	21	56	86	9	23	8	206	2	8	25	32	2	12	5	85	1	4	10	14	2	5	2	38	11%	1.70					
Superdistrict 3	2,062	4	25	56	81	73	24	9	272	2	7	24	31	13	12	5	94	1	4	12	14	17	6	3	57	16%	1.64					
Superdistrict 4	942	2	10	33	45	9	15	6	120	1	4	14	16	2	7	3	47	1	2	8	10	2	4	2	29	8%	1.69					
East Bay	1,816	5	34	57	72	23	28	11	231	3	9	23	21	7	14	6	83	1	5	9	13	14	4	1	47	13%	2.20					
North Bay	691	1	14	21	31	2	9	3	82	1	3	5	4	0	3	1	17	0	3	7	11	2	3	1	28	8%	1.84					
South Bay	1,419	3	24	36	46	55	18	7	190	1	4	12	12	17	7	3	56	1	7	13	13	33	8	3	78	22%	1.52					
Out of Region	2,864	0	102	61	119	0	15	3	301	0	9	15	29	0	4	1	58	0	12	7	14	0	2	0	36	10%	3.06					
Total	14,607	21	284	397	610	262	159	55	1,787	11	52	132	169	58	66	26	514	5	44	72	97	91	34	13	355	100%	1.84					

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		Residential		Hotel		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	33%	0%	50%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	67%	100%	50%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound										Outbound										Total									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total						
Total Person Trips	0	131	140	282	174	32	5	763	21	153	257	329	88	127	50	1,024	21	284	397	610	262	159	55	1,787						
Transit Trips	0	21	36	72	38	8	1	177	11	32	96	97	19	57	25	337	11	52	132	169	58	66	26	514						
Vehicle Trips	0	19	27	43	60	5	1	149	5	25	51	54	30	29	12	206	5	44	72	97	91	34	13	355						

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound										Outbound										Total										Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total						
Superdistrict 1	0	5	4	8	15	1	0	32	0	5	6	9	8	3	1	31	0	9	10	17	23	3	1	64	13	17	30	20	14	34						
Superdistrict 2	0	3	6	13	1	1	0	25	1	4	12	15	1	6	2	40	1	6	18	27	2	7	2	64	18	29	47	6	11	18						
Superdistrict 3	0	3	7	14	12	2	0	38	1	5	15	17	6	8	3	56	1	8	22	32	18	10	4	94	21	36	57	18	20	37						
Superdistrict 4	0	1	4	8	1	1	0	16	1	2	10	11	1	5	2	32	1	4	14	19	2	6	2	48	12	23	35	5	9	14						
East Bay	0	5	7	15	10	2	0	39	2	7	18	19	5	10	4	65	2	13	25	34	15	12	4	104	22	43	65	17	22	40						
North Bay	0	3	5	10	1	1	0	21	1	4	9	12	1	4	2	31	1	7	14	22	2	5	2	52	15	22	37	6	9	15						
South Bay	0	8	6	12	24	1	0	51	2	10	16	16	12	9	4	68	2	17	21	27	36	11	4	119	19	38	58	32	29	61						
Out of Region	0	19	11	21	0	2	0	53	0	19	12	22	0	3	1	56	0	38	22	43	0	6	1	110	37	39	76	17	18	34						
Total	0	47	50	101	65	11	2	276	8	55	95	119	33	48	19	379	8	102	146	220	98	60	21	655	156	246	402	120	132	252						

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH NO EVENT

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	4	5	11	11	1	0	32	1	5	11	13	6	6	2	42	1	8	16	23	17	7	2	74	16	27	42	16	16	32
Superdistrict 2	0	3	7	14	1	2	0	27	2	5	18	18	1	11	5	59	2	8	25	32	2	12	5	85	20	42	62	7	17	24
Superdistrict 3	0	2	7	13	9	2	0	33	2	4	17	18	4	10	4	61	2	7	24	31	13	12	5	94	19	41	60	14	20	34
Superdistrict 4	0	1	3	6	1	1	0	13	1	3	10	9	1	7	3	34	1	4	14	16	2	7	3	47	9	23	33	4	10	14
East Bay	0	3	4	8	5	1	0	21	3	6	19	14	2	13	6	63	3	9	23	21	7	14	6	83	12	41	53	9	21	30
North Bay	0	1	1	1	0	0	0	4	1	2	4	3	0	3	1	13	1	3	5	4	0	3	1	17	2	9	11	1	4	6
South Bay	0	1	2	5	11	1	0	20	1	3	9	8	6	6	3	35	1	4	12	12	17	7	3	56	7	21	28	13	15	28
Out of Region	0	4	7	14	0	2	0	27	0	4	8	15	0	2	1	31	0	9	15	29	0	4	1	58	21	23	44	6	7	14
Total	0	21	36	72	38	8	1	177	11	32	96	97	19	57	25	337	11	52	132	169	58	66	26	514	106	226	333	70	111	181

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	17	22	43	34	5	1	122	1	18	29	46	17	11	4	127	1	35	51	90	52	16	4	248	66	81	146	56	46	102
Superdistrict 2	0	4	6	13	3	1	0	28	0	4	7	13	2	2	0	28	0	7	13	26	5	3	1	56	19	20	39	9	8	17
Superdistrict 3	0	5	4	9	27	1	0	47	0	5	6	9	14	2	1	37	0	10	10	18	41	3	1	84	14	17	31	33	20	53
Superdistrict 4	0	1	2	5	3	1	0	13	0	1	3	5	2	1	0	12	0	3	5	10	5	2	0	25	7	8	15	6	4	10
East Bay	0	6	4	9	1	1	0	20	0	6	5	9	0	2	1	23	0	11	9	18	1	3	1	43	14	16	30	6	7	13
North Bay	0	2	1	3	0	0	0	7	0	2	1	3	0	0	0	7	0	5	3	5	0	1	0	14	5	5	10	2	2	4
South Bay	0	1	2	3	1	0	0	8	0	1	2	3	1	1	0	8	0	3	3	6	2	1	0	16	5	5	10	3	3	6
Out of Region	0	28	12	24	0	3	0	66	0	28	12	24	0	3	0	66	0	56	24	47	0	5	1	133	44	44	88	22	22	44
Total	0	64	54	108	71	12	2	311	2	66	65	113	36	21	6	308	2	129	119	221	107	33	8	619	174	196	369	137	113	250

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	25	31	62	60	7	1	186	3	28	46	68	30	19	7	201	3	53	77	130	91	26	8	387	94	124	218	92	77	168
Superdistrict 2	0	9	20	39	6	4	1	79	3	12	36	46	3	18	7	126	3	21	56	86	9	23	8	206	57	90	147	22	36	58
Superdistrict 3	0	10	18	37	48	4	1	118	4	14	38	45	24	20	8	153	4	25	56	81	73	24	9	272	54	93	147	65	60	125
Superdistrict 4	0	4	10	20	6	2	0	42	2	6	23	25	3	13	5	78	2	10	33	45	9	15	6	120	28	54	82	14	24	38
East Bay	0	14	15	31	15	3	1	80	5	19	42	41	8	25	11	150	5	34	57	72	23	28	11	231	48	100	148	32	50	83
North Bay	0	7	7	14	1	2	0	31	1	8	14	17	1	7	3	51	1	14	21	31	2	9	3	82	22	36	58	9	15	24
South Bay	0	10	10	20	37	2	0	79	3	14	26	26	18	16	7	111	3	24	36	46	55	18	7	190	31	64	95	48	46	94
Out of Region	0	51	29	59	0	7	1	147	0	51	31	60	0	8	2	153	0	102	61	119	0	15	3	301	102	106	208	45	47	92
Total	0	131	140	282	174	32	5	763	21	153	257	329	88	127	50	1,024	21	284	397	610	262	159	55	1,787	436	668	1,104	327	356	683

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	3	2	3	14	0	0	22	0	3	3	4	7	2	1	20	0	6	5	8	21	2	1	43	6	9	15	16	11	28
Superdistrict 2	0	2	3	6	1	1	0	13	1	2	7	8	1	4	2	25	1	4	10	14	2	5	2	38	9	17	26	4	8	12
Superdistrict 3	0	2	3	6	11	1	0	22	1	3	9	8	6	6	2	35	1	4	12	14	17	6	3	57	9	21	29	14	14	28
Superdistrict 4	0	1	2	4	1	0	0	9	1	2	6	6	1	3	1	19	1	2	8	10	2	4	2	29	6	13	20	3	6	9
East Bay	0	2	3	6	9	1	0	21	1	3	6	7	5	3	1	26	1	5	9	13	14	4	1	47	9	15	24	12	11	23
North Bay	0	1	3	5	1	1	0	11	0	2	5	6	1	2	1	17	0	3	7	11	2	3	1	28	8	12	20	3	5	8
South Bay	0	3	2	5	22	1	0	33	1	4	10	8	11	7	3	45	1	7	13	13	33	8	3	78	8	23	31	25	22	47
Out of Region	0	6	3	7	0	1	0	17	0	6	4	7	0	1	0	19	0	12	7	14	0	2	0	36	12	13	25	5	6	11
Total	0	19	21	43	60	5	1	149	5	25	51	54	30	29	12	206	5	44	72	97	91	34	13	355	66	124	190	83	82	165

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - SATURDAY DAILY AND LATE PM PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH NO EVENT

Land Use	Piers 30-32		Seawall Lot 330		Total Project	
	Intensity	% of total	Intensity	% of total	Intensity	Total
Arena	0 attend.	0%	0	0%	0 attend.	0%
	100 empl.	100%	0	0%	100 empl.	100%
Retail	18,000 gsf	45%	22,390 gsf	55%	40,390 gsf	100%
Quick Service Rest.	36,000 gsf	100%	0 gsf	0%	36,000 gsf	100%
Sit-down Restaurant	36,000 gsf	83%	7,464 gsf	17%	43,464 gsf	100%
Residential	0 units	0%	176 units	100%	176 units	100%
Hotel	0 rooms	0%	227 rooms	100%	227 rooms	100%
Office	35,600 gsf	100%	0 gsf	0%	35,600 gsf	100%

Person-trips by Mode	Daily Trips										Evening Peak Hour Trips								Percent of Daily during Late PM Peak Hour											
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total		
Auto	97	1,327	1,343	2,029	552	576	56	5,980	36%	3,768	2,212	0	60	312	471	62	72	0	976	36%	729	248	0.0%	4.5%	23.2%	23.2%	11.2%	12.5%	0.0%	16.3%
Transit	129	680	1,221	1,561	325	460	74	4,450	27%	3,021	1,429	0	31	284	363	36	79	0	792	30%	598	194	0.0%	4.5%	23.2%	23.2%	11.2%	17.1%	0.0%	17.8%
Taxi/Coach (Event)								0	0%	-	-							0	0%	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Bike (Event)								0	0%	-	-							0	0%	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Walk	17	1,247	900	1,690	557	461	10	4,883	30%	2,883	2,000	0	56	209	393	62	32	0	752	28%	559	193	0.0%	4.5%	23.2%	23.2%	11.2%	7.0%	0.0%	15.4%
Other	6	433	195	349	45	96	4	1,128	7%	687	441	0	19	45	81	5	8	0	159	6%	121	38	0.0%	4.5%	23.2%	23.2%	11.2%	8.1%	0.0%	14.1%
Total	250	3,687	3,659	5,630	1,478	1,593	144	16,441	100%	10,359	6,082	0	166	850	1,308	166	191	0	2,680	100%	2,007	673	0.0%	4.5%	23.2%	23.2%	11.2%	12.0%	0.0%	16.3%
Vehicle Trips	63	571	662	895	511	260	36	2,999		1,757	1,241	0	26	154	208	57	40	0	485		337	148	0.0%	4.5%	23.2%	23.2%	11.2%	15.5%	0.0%	16.2%
	2%	19%	22%	30%	17%	9%	1%	100%		0%	6%	32%	43%	12%	8%	0%	100%		0%	6%	32%	43%	12%	8%	0%	100%				
Avg. veh. occupancy	1.54	2.32	2.03	2.27	1.06	2.21	1.54	1.99		2.14	1.78	0.00	2.32	2.03	2.27	1.06	1.76	0.00	2.01		2.16	1.68								

Saturday Distribution	Total Daily Person-Trip	Evening Peak Hour Person-Trips								Evening Peak Hour Transit-Trips								Evening Peak Hour Vehicle-Trips								Avg. Veh. Occ.	
		Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total		
Superdistrict 1	3,483	0	31	164	278	57	31	0	562	0	5	34	50	11	8	0	108	0	3	11	16	13	3	0	46	10%	1.76
Superdistrict 2	1,917	0	13	120	183	6	27	0	349	0	5	53	69	1	15	0	142	0	2	22	30	1	6	0	61	13%	1.80
Superdistrict 3	2,280	0	14	120	174	46	29	0	384	0	4	52	67	8	14	0	145	0	2	26	31	11	8	0	77	16%	1.85
Superdistrict 4	1,062	0	6	70	96	6	18	0	196	0	2	29	34	1	9	0	75	0	1	17	22	1	5	0	46	9%	1.77
East Bay	2,048	0	20	122	155	15	34	0	346	0	6	48	46	5	17	0	121	0	3	19	29	9	5	0	65	13%	2.42
North Bay	787	0	8	45	66	1	11	0	132	0	2	10	9	0	4	0	24	0	2	16	24	1	4	0	47	10%	1.86
South Bay	1,565	0	14	78	99	35	22	0	247	0	2	25	27	11	8	0	73	0	4	27	27	21	9	0	88	18%	1.70
Out of Region	3,298	0	60	130	255	0	18	0	464	0	5	33	62	0	5	0	105	0	7	16	29	0	2	0	55	11%	3.08
Total	16,441	0	166	850	1,308	166	191	0	2,680	0	31	284	363	36	79	0	792	0	26	154	208	57	40	0	485	100%	2.01

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		Residential		Hotel		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	0%	50%	0%	50%	0%	50%	0%	50%	100%	33%	0%	50%	0%	50%
Outbound	100%	50%	100%	50%	100%	50%	100%	50%	0%	67%	100%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound										Outbound										Total											
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total
Total Person Trips	0	77	300	603	110	38	0	1,128	0	89	550	704	56	153	0	1,551	0	166	850	1,308	166	191	0	2,680	0	166	850	1,308	166	191	0	2,680
Transit Trips	0	12	77	155	24	10	0	279	0	19	206	207	12	69	0	513	0	31	284	363	36	79	0	792	0	31	284	363	36	79	0	792
Vehicle Trips	0	11	45	91	38	6	0	192	0	14	108	117	19	35	0	293	0	26	154	208	57	40	0	485	0	26	154	208	57	40	0	485
	0%	44%	30%	44%	67%	14%	0%	40%	0%	56%	70%	56%	34%	86%	0%	60%	0%	26	154	208	57	40	0	485	0%	26	154	208	57	40	0	485

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound										Outbound										Total										Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total						
Superdistrict 1	0	3	9	17	9	1	0	39	0	3	13	19	5	3	0	43	0	5	21	36	14	4	0	81	24	30	54	15	13	28						
Superdistrict 2	0	1	13	27	1	2	0	44	0	2	25	32	0	7	0	66	0	4	38	58	1	9	0	110	36	52	88	8	14	22						
Superdistrict 3	0	2	15	30	8	2	0	57	0	3	32	37	4	10	0	85	0	5	47	68	11	12	0	142	41	64	105	16	21	37						
Superdistrict 4	0	1	9	18	1	1	0	30	0	1	21	23	0	6	0	52	0	2	30	41	1	8	0	81	24	40	64	6	12	17						
East Bay	0	3	16	31	6	2	0	59	0	4	38	40	3	12	0	98	0	8	53	72	9	14	0	156	43	73	116	15	25	40						
North Bay	0	2	11	21	1	1	0	36	0	2	19	25	0	5	0	51	0	4	29	46	1	6	0	87	29	40	69	7	11	18						
South Bay	0	5	12	25	15	2	0	59	0	6	33	33	8	11	0	91	0	10	46	59	23	13	0	150	35	63	99	24	28	51						
Out of Region	0	11	23	45	0	3	0	82	0	11	25	46	0	4	0	86	0	22	47	92	0	7	0	168	65	68	133	17	18	35						
Total	0	27	107	216	41	14	0	406	0	32	205	255	21	58	0	571	0	60	312	471	62	72	0	976	298	430	729	107	141	248						

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - SATURDAY DAILY AND LATE PM PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH NO EVENT

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	2	11	23	7	1	0	45	0	3	23	27	4	7	0	63	0	5	34	50	11	8	0	108	31	47	78	14	16	30
Superdistrict 2	0	2	15	30	1	2	0	49	0	3	38	39	0	13	0	93	0	5	53	69	1	15	0	142	40	72	112	9	21	30
Superdistrict 3	0	1	14	29	6	2	0	52	0	3	37	38	3	12	0	93	0	4	52	67	8	14	0	145	39	70	109	13	23	36
Superdistrict 4	0	1	7	14	1	1	0	23	0	2	22	20	0	8	0	52	0	2	29	34	1	9	0	75	19	39	58	4	13	17
East Bay	0	2	8	17	3	1	0	31	0	4	40	29	2	16	0	90	0	6	48	46	5	17	0	121	23	66	89	8	24	32
North Bay	0	1	1	3	0	0	0	5	0	1	8	6	0	3	0	18	0	2	10	9	0	4	0	24	4	14	18	1	5	6
South Bay	0	1	5	10	7	1	0	24	0	2	20	16	4	7	0	48	0	2	25	27	11	8	0	73	14	34	48	10	15	24
Out of Region	0	3	15	31	0	2	0	50	0	3	17	31	0	3	0	54	0	5	33	62	0	5	0	105	42	45	86	9	10	18
Total	0	12	77	155	24	10	0	279	0	19	206	207	12	69	0	513	0	31	284	363	36	79	0	792	211	386	598	67	127	194

Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superdistrict 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Out of Region	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	10	46	93	22	6	0	176	0	11	62	99	11	13	0	196	0	20	108	192	33	19	0	373	128	149	277	49	47	96
Superdistrict 2	0	2	14	28	2	2	0	48	0	2	15	28	1	2	0	49	0	4	29	56	3	4	0	97	38	39	77	10	9	19
Superdistrict 3	0	3	10	19	17	1	0	50	0	3	12	20	9	2	0	46	0	6	22	39	26	4	0	97	27	30	57	23	16	40
Superdistrict 4	0	1	5	10	2	1	0	19	0	1	6	11	1	1	0	20	0	2	11	21	3	2	0	39	14	16	30	5	5	10
East Bay	0	3	9	18	0	1	0	32	0	3	11	19	0	2	0	36	0	7	20	38	1	3	0	68	26	29	54	7	7	14
North Bay	0	1	3	6	0	0	0	10	0	1	3	6	0	1	0	11	0	3	6	12	0	1	0	22	8	9	17	2	2	4
South Bay	0	1	3	7	1	0	0	12	0	1	4	7	0	1	0	13	0	2	7	14	1	1	0	25	9	10	19	3	3	6
Out of Region	0	16	25	51	0	3	0	95	0	16	25	51	0	3	0	96	0	33	50	101	0	6	0	191	74	75	149	21	21	42
Total	0	37	115	232	45	15	0	444	0	38	139	242	23	25	0	467	0	76	254	474	67	40	0	911	324	356	680	120	111	231

Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	15	66	133	38	8	0	260	0	16	98	146	19	23	0	302	0	31	164	278	57	31	0	562	182	226	408	77	76	154
Superdistrict 2	0	5	42	84	4	5	0	141	0	7	78	99	2	22	0	208	0	13	120	183	6	27	0	349	114	163	278	27	45	71
Superdistrict 3	0	6	39	78	31	5	0	159	0	8	81	96	15	24	0	225	0	14	120	174	46	29	0	384	107	164	271	52	61	113
Superdistrict 4	0	2	21	42	4	3	0	72	0	4	49	54	2	15	0	124	0	6	70	96	6	18	0	196	57	95	152	15	29	44
East Bay	0	8	33	66	10	4	0	122	0	11	89	89	5	30	0	224	0	20	122	155	15	34	0	346	92	168	259	30	56	86
North Bay	0	4	15	30	1	2	0	52	0	5	30	36	0	9	0	80	0	8	45	66	1	11	0	132	42	62	104	10	18	28
South Bay	0	6	21	42	23	3	0	95	0	8	57	57	12	19	0	152	0	14	78	99	35	22	0	247	59	107	166	36	45	81
Out of Region	0	30	63	127	0	8	0	228	0	30	67	129	0	10	0	236	0	60	130	255	0	18	0	464	181	187	369	46	49	95
Total	0	77	300	603	110	38	0	1,128	0	89	550	704	56	153	0	1,551	0	166	850	1,308	166	191	0	2,680	834	1,173	2,007	294	378	673

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	0	2	4	7	9	0	0	22	0	2	7	9	4	2	0	24	0	3	11	16	13	3	0	46	11	15	26	11	9	20
Superdistrict 2	0	1	6	13	1	1	0	22	0	1	16	17	0	5	0	39	0	2	22	30	1	6	0	61	18	30	48	4	9	14
Superdistrict 3	0	1	6	13	7	1	0	28	0	2	19	18	4	7	0	49	0	2	26	31	11	8	0	77	17	35	52	11	14	25
Superdistrict 4	0	1	5	9	1	1	0	16	0	1	12	12	0	4	0	30	0	1	17	22	1	5	0	46	13	23	35	3	7	10
East Bay	0	1	6	13	6	1	0	27	0	2	13	16	3	4	0	37	0	3	19	29	9	5	0	65	18	27	45	10	10	20
North Bay	0	1	6	11	1	1	0	19	0	1	10	13	0	3	0	28	0	2	16	24	1	4	0	47	15	22	37	4	6	10
South Bay	0	2	5	10	14	1	0	32	0	2	22	17	7	8	0	57	0	4	27	27	21	9	0	88	14	37	51	17	20	37
Out of Region	0	4	7	14	0	1	0	26	0	4	9	15	0	2	0	29	0	7	16	29	0	2	0	55	21	23	43	5	6	11
Total	0	11	45	91	38	6	0	192	0	14	108	117	19	35	0	293	0	26	154	208	57	40	0	485	126	211	337	66	82	148

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Piers 30-32		Seawall Lot 330		Total Project	
	Intensity	% of total	Intensity	% of total	Intensity	Total
Arena	18,064 attend.	100%		0%	18,064 attend.	100%
	925 empl.	100%		0%	925 empl.	100%
Retail	18,000 gsf	45%	22,390 gsf	55%	40,390 gsf	100%
Quick Service Rest.	36,000 gsf	100%	0 gsf	0%	36,000 gsf	100%
Sit-down Restaurant	36,000 gsf	83%	7,464 gsf	17%	43,464 gsf	100%
Residential	0 units	0%	176 units	100%	176 units	100%
Hotel	0 rooms	0%	227 rooms	100%	227 rooms	100%
Office	35,600 gsf	100%	0 gsf	0%	35,600 gsf	100%

Person-trips by Mode	Daily Trips										PM Peak Hour Trips										Percent of Daily during PM Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total		
Auto	13,324	302	1,078	434	566	575	238	16,517	35%	15,134	1,383	2,202	27	146	59	98	60	21	2,613	35%	2,430	183	16.5%	9.0%	13.5%	13.5%	17.3%	10.4%	8.8%	15.8%
Transit	20,817	216	980	394	333	458	226	23,425	50%	22,446	979	3,459	19	132	53	58	66	26	3,813	51%	3,670	143	16.6%	9.0%	13.5%	13.5%	17.3%	14.3%	11.5%	16.3%
Taxi/Coach (Event)	751							751	2%	751	-	114							114	2%	114	-	15.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.1%
Bike (Event)	539							539	1%	539	-	87							87	1%	87	-	16.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.1%
Walk	2,121	227	722	291	571	460	148	4,539	10%	3,333	1,206	405	20	98	39	99	27	6	694	9%	551	144	19.1%	9.0%	13.5%	13.5%	17.3%	5.8%	4.1%	15.3%
Other	426	79	157	63	46	96	33	899	2%	703	196	77	7	21	9	8	7	2	130	2%	110	20	18.1%	9.0%	13.5%	13.5%	17.3%	6.8%	5.3%	14.5%
Total	37,978	824	2,938	1,182	1,515	1,589	644	46,670	100%	42,906	3,764	6,344	74	397	160	262	159	55	7,450	100%	6,961	490	16.7%	9.0%	13.5%	13.5%	17.3%	10.0%	8.5%	16.0%
Vehicle Trips	5,420	146	531	214	524	260	121	7,215		6,314	901	961	13	72	29	91	34	13	1,212		1,076	136	17.7%	9.0%	13.5%	13.5%	17.3%	13.0%	10.6%	16.8%
	75%	2%	7%	3%	7%	4%	2%	100%				79%	1%	6%	2%	7%	3%	1%	100%											
Avg. veh. occupancy	2.60	2.06	2.03	2.03	1.08	2.21	1.97	2.39		2.52	1.53	2.41	2.06	2.03	2.03	1.06	1.76	1.63	2.25		2.36	1.34								

Weekday Distribution	Total Daily Person-Trip	PM Peak Hour Person-Trips										PM Peak Hour Transit-Trips										PM Peak Hour Vehicle-Trips										Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total							
Superdistrict 1	6,821	918	13	77	31	91	26	8	1,163	385	2	16	6	17	7	2	436	73	1	5	2	21	2	1	106	9%	1.91					
Superdistrict 2	2,739	381	7	56	23	9	23	8	506	234	3	25	10	2	12	5	291	62	1	10	4	2	5	2	87	7%	1.73					
Superdistrict 3	3,463	457	8	56	23	73	24	9	650	262	3	24	10	13	12	5	328	86	2	12	5	17	6	3	130	11%	1.70					
Superdistrict 4	2,212	342	4	33	13	9	15	6	422	186	2	14	5	2	7	3	219	62	1	8	3	2	4	2	82	7%	1.96					
East Bay	13,136	1,894	11	57	23	23	28	11	2,047	1,239	4	23	9	7	14	6	1,302	220	2	9	4	14	4	1	254	21%	2.73					
North Bay	4,468	541	4	21	8	2	9	3	589	218	1	5	2	0	3	1	230	119	1	7	3	2	3	1	136	11%	2.49					
South Bay	11,102	1,577	7	36	15	55	18	7	1,716	844	2	12	5	17	7	3	888	292	3	13	5	33	8	3	356	29%	2.23					
Out of Region	2,730	233	21	61	25	0	15	3	357	91	2	15	6	0	4	1	119	47	3	7	3	0	2	0	62	5%	2.69					
Total	46,670	6,344	74	397	160	262	159	55	7,450	3,459	19	132	53	58	66	26	3,813	961	13	72	29	91	34	13	1,212	100%	2.25					

Assumptions for PM Peak Hour bet. 4 PM & 6 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		Residential		Hotel		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	33%	0%	50%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	67%	100%	50%	100%	50%

PM Peak Hour bet. 4 PM & 6 PM	Inbound										Outbound										Total									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total						
Total Person Trips	6,298	26	140	56	174	32	5	6,731	46	48	257	103	88	127	50	719	6,344	74	397	160	262	159	55	7,450						
Transit Trips	3,435	4	36	14	38	8	1	3,537	24	15	96	39	19	57	25	276	3,459	19	132	53	58	66	26	3,813						
Vehicle Trips	927	4	21	9	60	5	1	1,027	34	9	51	20	30	29	12	185	961	13	72	29	91	34	13	1,212						

PM Peak Hour bet. 4 PM & 6 PM Auto Trips	Inbound										Outbound										Total										Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total						
Superdistrict 1	137	1	4	2	15	1	0	159	1	1	6	2	8	3	1	22	138	2	10	4	23	3	1	181	143	10	153	17	11	28						
Superdistrict 2	103	1	6	3	1	1	0	115	2	2	12	5	1	6	2	29	105	2	18	7	2	7	2	144	111	20	132	4	8	12						
Superdistrict 3	146	1	7	3	12	2	0	171	3	2	15	6	6	8	3	43	149	3	22	9	18	10	4	214	156	27	183	14	16	31						
Superdistrict 4	120	0	4	2	1	1	0	129	2	1	10	4	1	5	2	25	122	2	14	6	2	6	2	154	126	18	144	3	8	10						
East Bay	589	1	7	3	10	2	0	612	4	3	18	7	5	10	4	51	593	4	25	10	15	12	4	663	599	33	633	13	18	31						
North Bay	297	1	5	2	1	1	0	307	1	1	9	4	1	4	2	21	298	2	14	6	2	5	2	329	304	15	319	3	6	9						
South Bay	676	2	6	2	24	1	0	711	4	3	16	6	12	9	4	54	680	5	21	9	36	11	4	765	685	30	715	27	24	51						
Out of Region	117	4	11	4	0	2	0	138	0	4	12	5	0	3	1	25	117	8	22	9	0	6	1	163	133	18	151	5	6	11						
Total	2,184	9	50	20	65	11	2	2,342	18	18	95	38	33	48	19	270	2,202	27	146	59	98	60	21	2,613	2,257	173	2,430	85	98	183						

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - WEEKDAY DAILY AND PM PEAK HOUR BETWEEN 4 AND 6 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

PM Peak Hour bet. 4 PM & 6 PM Transit Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	383	1	5	2	11	1	0	404	2	2	11	4	6	6	2	32	385	2	16	6	17	7	2	436	391	19	410	13	13	26
Superdistrict 2	230	1	7	3	1	2	0	243	4	3	18	7	1	11	5	48	234	3	25	10	2	12	5	291	239	34	273	3	14	17
Superdistrict 3	257	0	7	3	9	2	0	278	4	2	17	7	4	10	4	51	262	3	24	10	13	12	5	328	267	33	300	11	17	28
Superdistrict 4	183	0	3	1	1	1	0	190	3	2	10	4	1	7	3	29	186	2	14	5	2	7	3	219	187	20	208	2	9	11
East Bay	1,233	1	4	2	5	1	0	1,245	6	3	19	8	2	13	6	57	1,239	4	23	9	7	14	6	1,302	1,239	38	1,277	6	19	25
North Bay	217	0	1	0	0	0	0	218	1	1	4	2	0	3	1	12	218	1	5	2	0	3	1	230	218	8	226	1	4	4
South Bay	841	0	2	1	11	1	0	856	3	2	9	4	6	6	3	32	844	2	12	5	17	7	3	888	844	18	863	12	13	25
Out of Region	91	1	7	3	0	2	0	103	0	1	8	3	0	2	1	16	91	2	15	6	0	4	1	119	101	12	113	3	4	6
Total	3,435	4	36	14	38	8	1	3,537	24	15	96	39	19	57	25	276	3,459	19	132	53	58	66	26	3,813	3,486	184	3,670	51	92	143

PM Peak Hour bet. 4 PM & 6 PM Bike (Event)	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	31							31	0							31	0	0	0	0	0	0	0	31	31	0	31	0	0	0
Superdistrict 2	9							9	0							9	0	0	0	0	0	0	0	9	9	0	9	0	0	0
Superdistrict 3	11							11	0							11	0	0	0	0	0	0	0	11	11	0	11	0	0	0
Superdistrict 4	9							9	0							9	0	0	0	0	0	0	0	9	9	0	9	0	0	0
East Bay	11							11	0							11	0	0	0	0	0	0	0	11	11	0	11	0	0	0
North Bay	4							4	0							4	0	0	0	0	0	0	0	4	4	0	4	0	0	0
South Bay	11							11	0							11	0	0	0	0	0	0	0	11	11	0	11	0	0	0
Out of Region	2							2	0							2	0	0	0	0	0	0	0	2	2	0	2	0	0	0
Total	87	0	0	0	0	0	0	87	0	0	0	0	0	0	0	87	0	0	0	0	0	0	0	87	87	0	87	0	0	0

PM Peak Hour bet. 4 PM & 6 PM Taxi/Walk/Other	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	361	3	22	9	34	5	1	435	3	5	29	12	17	11	4	80	364	8	51	20	52	16	4	515	392	47	440	43	33	76
Superdistrict 2	34	1	6	3	3	1	0	48	0	1	7	3	2	2	0	15	34	2	13	5	5	3	1	63	43	10	53	6	4	10
Superdistrict 3	35	1	4	2	27	1	0	70	0	1	6	2	14	2	1	26	35	2	10	4	41	3	1	97	41	9	50	29	17	46
Superdistrict 4	25	0	2	1	3	1	0	33	0	0	3	1	2	1	0	8	25	1	5	2	5	2	0	41	29	5	33	4	3	7
East Bay	50	1	4	2	1	1	0	59	0	1	5	2	0	2	1	12	51	2	9	4	1	3	1	71	57	8	65	3	3	6
North Bay	20	0	1	1	0	0	0	23	0	1	1	1	0	0	0	3	20	1	3	1	0	1	0	26	22	2	25	1	1	1
South Bay	43	0	2	1	1	0	0	47	0	0	2	1	1	1	0	4	43	1	3	1	2	1	0	52	45	3	48	2	2	4
Out of Region	24	6	12	5	0	3	0	49	0	6	12	5	0	3	0	25	24	11	24	9	0	5	1	74	42	19	61	7	7	13
Total	592	13	54	22	71	12	2	765	4	15	65	26	36	21	6	173	596	27	119	48	107	33	8	938	671	103	775	94	70	163

PM Peak Hour bet. 4 PM & 6 PM Total Person Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	912	5	31	12	60	7	1	1,029	6	8	46	18	30	19	7	134	918	13	77	31	91	26	8	1,163	957	77	1,034	72	57	129
Superdistrict 2	375	2	20	8	6	4	1	415	7	5	36	15	3	18	7	91	381	7	56	23	9	23	8	506	402	65	467	13	26	39
Superdistrict 3	449	2	18	7	48	4	1	530	8	6	38	15	24	20	8	120	457	8	56	23	73	24	9	650	475	69	544	55	51	105
Superdistrict 4	337	1	10	4	6	2	0	360	5	3	23	9	3	13	5	62	342	4	33	13	9	15	6	422	351	43	393	9	19	29
East Bay	1,884	3	15	6	15	3	1	1,928	10	8	42	17	8	25	11	120	1,894	11	57	23	23	28	11	2,047	1,906	80	1,986	22	40	61
North Bay	538	1	7	3	1	2	0	552	3	3	14	6	1	7	3	36	541	4	21	8	2	9	3	589	548	26	574	4	11	15
South Bay	1,571	2	10	4	37	2	0	1,626	7	5	26	11	18	16	7	90	1,577	7	36	15	55	18	7	1,716	1,585	51	1,636	41	39	80
Out of Region	233	10	29	12	0	7	1	292	1	11	31	13	0	8	2	66	233	21	61	25	0	15	3	357	277	49	327	14	16	31
Total	6,298	26	140	56	174	32	5	6,731	46	48	257	103	88	127	50	719	6,344	74	397	160	262	159	55	7,450	6,501	460	6,961	230	259	490

PM Peak Hour bet. 4 PM & 6 PM Vehicle-Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	65	1	2	1	14	0	0	82	8	1	3	1	7	2	1	23	73	1	5	2	21	2	1	106	68	14	81	15	9	24
Superdistrict 2	58	0	3	1	1	1	0	65	4	1	7	3	1	4	2	22	62	1	10	4	2	5	2	87	62	16	78	2	6	8
Superdistrict 3	81	0	3	1	11	1	0	97	5	1	9	4	6	6	2	33	86	2	12	5	17	6	3	130	85	20	105	12	13	25
Superdistrict 4	58	0	2	1	1	0	0	64	4	1	6	2	1	3	1	18	62	1	8	3	2	4	2	82	61	13	75	2	5	7
East Bay	216	0	3	1	9	1	0	231	4	1	6	2	5	3	1	23	220	2	9	4	14	4	1	254	220	14	234	10	9	19
North Bay	117	0	3	1	1	1	0	123	2	1	5	2	1	2	1	13	119	1	7	3	2	3	1	136	121	10	131	2	4	6
South Bay	286	1	2	1	22	1	0	313	6	2	10	4	11	7	3	43	292	3	13	5	33	8	3	356	289	23	313	23	20	43
Out of Region	46	1	3	1	0	1	0	53	1	1	4	2	0	1	0	9	47	3	7	3	0	2	0	62	51	7	58	2	2	4
Total	927	4	21	9	60	5	1	1,027	34	9	51	20	30	29	12	185	961	13	72	29	91	34	13	1,212	958	117	1,076	69	68	136

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Land Use	Piers 30-32		Seawall Lot 330		Total Project	
	Intensity	% of total	Intensity	% of total	Intensity	Total
Arena	18,064 attend.	100%	0%	0%	18,064 attend.	100%
	925 empl.	100%	0%	0%	925 empl.	100%
Retail	18,000 gsf	45%	22,390 gsf	55%	40,390 gsf	100%
Quick Service Rest.	36,000 gsf	100%	0 gsf	0%	36,000 gsf	100%
Sit-down Restaurant	36,000 gsf	83%	7,464 gsf	17%	43,464 gsf	100%
Residential	0 units	0%	176 units	100%	176 units	100%
Hotel	0 rooms	0%	227 rooms	100%	227 rooms	100%
Office	35,600 gsf	100%	0 gsf	0%	35,600 gsf	100%

Person-trips by Mode	Daily Trips										Evening Peak Hour Trips										Percent of Daily during Late PM Peak Hour									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Piers 30-32	SWL 330	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total		
Auto	14,737	354	1,343	541	552	576	56	18,159	38%	16,742	1,417	4,906	16	312	126	62	72	0	5,493	39%	5,329	164	33.3%	4.5%	23.2%	23.2%	11.2%	12.5%	0.0%	30.3%
Transit	20,646	253	1,221	491	325	460	74	23,470	50%	22,461	1,009	6,891	11	284	114	36	79	0	7,416	52%	7,275	141	33.4%	4.5%	23.2%	23.2%	11.2%	17.1%	0.0%	31.6%
Taxi/Coach (Event)	542							542	1%	542	-	190						190	1%	190	-	35.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.0%	
Bike (Event)	795							795	2%	795	-	278						278	2%	278	-	35.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.0%	
Walk	1,031	265	900	362	557	461	10	3,586	8%	2,359	1,227	316	12	209	84	62	32	0	716	5%	600	116	30.7%	4.5%	23.2%	23.2%	11.2%	7.0%	0.0%	20.0%
Other	227	92	195	79	45	96	4	737	2%	532	205	63	4	45	18	5	8	0	144	1%	126	18	27.9%	4.5%	23.2%	23.2%	11.2%	8.1%	0.0%	19.5%
Total	37,978	964	3,659	1,472	1,478	1,593	144	47,289	100%	43,430	3,859	12,645	43	850	342	166	191	0	14,236	100%	13,797	439	33.3%	4.5%	23.2%	23.2%	11.2%	12.0%	0.0%	30.1%
80%	2%	8%	3%	3%	3%	0%	0%	100%		89%	0%	8%	0%	2%	1%	0%	0%	100%												
Vehicle Trips	5,931	171	662	266	511	260	36	7,838		6,926	912	1,913	8	154	62	57	40	0	2,234		2,121	113	32.2%	4.5%	23.2%	23.2%	11.2%	15.5%	0.0%	28.5%
	76%	2%	8%	3%	7%	3%	0%	100%		86%	0%	7%	3%	3%	2%	0%	0%	100%												
Avg. veh. occupancy	2.58	2.06	2.03	2.03	1.08	2.21	1.54	2.39		2.50	1.55	2.66	2.06	2.03	2.03	1.06	1.76	0.00	2.54		2.60	1.46								

Saturday Distribution	Total Daily Person-Trip	Evening Peak Hour Person-Trips										Evening Peak Hour Transit-Trips										Evening Peak Hour Vehicle-Trips										Avg. Veh. Occ.
		Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total							
Superdistrict 1	6,264	1,403	7	164	66	57	31	0	1,729	712	1	34	14	11	8	0	780	136	1	11	4	13	3	0	168	8%	2.22					
Superdistrict 2	2,618	435	4	120	48	6	27	0	640	259	2	53	21	1	15	0	351	53	1	22	9	1	6	0	92	4%	2.14					
Superdistrict 3	3,295	525	5	120	48	46	29	0	774	303	2	52	21	8	14	0	401	71	1	26	10	11	8	0	126	6%	2.13					
Superdistrict 4	2,065	419	2	70	28	6	18	0	543	222	1	29	12	1	9	0	274	64	1	17	7	1	5	0	94	4%	2.26					
East Bay	13,571	4,173	6	122	49	15	34	0	4,399	2,708	2	48	19	5	17	0	2,799	520	1	19	8	9	5	0	562	25%	2.69					
North Bay	5,237	1,644	2	45	18	1	11	0	1,722	625	1	10	4	0	4	0	643	364	1	16	6	1	4	0	392	18%	2.64					
South Bay	11,401	3,541	4	78	31	35	22	0	3,710	1,870	1	25	10	11	8	0	1,924	598	1	27	11	21	9	0	667	30%	2.58					
Out of Region	2,837	506	12	130	53	0	18	0	719	192	1	33	13	0	5	0	244	106	1	16	6	0	2	0	132	6%	2.76					
Total	47,289	12,645	43	850	342	166	191	0	14,236	6,891	11	284	114	36	79	0	7,416	1,913	8	154	62	57	40	0	2,234	100%	2.54					

Assumptions for Evening Peak Hour bet. 7 PM & 9 PM	Arena		Retail		Q.S. Rest.		Sit-down Rest.		Residential		Hotel		Office	
	Empl.	Attend.	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work	Work	Non-work
Inbound	95%	100%	0%	50%	0%	50%	0%	50%	100%	33%	0%	50%	0%	50%
Outbound	5%	0%	100%	50%	100%	50%	100%	50%	0%	67%	100%	50%	100%	50%

Evening Peak Hour bet. 7 PM & 9 PM	Inbound										Outbound										Total									
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total						
Total Person Trips	12,645	15	300	121	110	38	0	13,229	0	28	550	221	56	153	0	1,007	12,645	43	850	342	166	191	0	14,236						
Transit Trips	6,891	2	77	31	24	10	0	7,036	0	9	206	83	12	69	0	380	6,891	11	284	114	36	79	0	7,416						
Vehicle Trips	1,866	2	45	18	38	6	0	1,975	47	5	108	44	19	35	0	258	1,913	8	154	62	57	40	0	2,234						
	98%	29%	30%	30%	67%	14%	0%	88%	2%	71%	70%	70%	34%	86%	0%	12%														

Evening Peak Hour bet. 7 PM & 9 PM Auto Trips	Inbound										Outbound										Total										Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total						
Superdistrict 1	279	1	9	3	9	1	0	302	0	1	13	5	5	3	0	27	279	1	21	9	14	4	0	329	290	18	308	11	9	21						
Superdistrict 2	122	0	13	5	1	2	0	144	0	1	25	10	0	7	0	43	122	1	38	15	1	9	0	187	140	33	174	4	10	13						
Superdistrict 3	166	0	15	6	8	2	0	197	0	1	32	13	4	10	0	59	166	2	47	19	11	12	0	257	186	43	230	11	16	27						
Superdistrict 4	150	0	9	4	1	1	0	165	0	1	21	8	0	6	0	37	150	1	30	12	1	8	0	201	162	28	190	3	9	12						
East Bay	1,365	1	16	6	6	2	0	1,396	0	2	38	15	3	12	0	70	1,365	2	53	21	9	14	0	1,466	1,386	51	1,437	10	19	29						
North Bay	965	0	11	4	1	1	0	983	0	1	19	8	0	5	0	32	965	1	29	12	1	6	0	1,015	980	25	1,005	3	7	10						
South Bay	1,578	1	12	5	15	2	0	1,613	0	2	33	13	8	11	0	67	1,578	3	46	18	23	13	0	1,680	1,595	45	1,640	18	22	40						
Out of Region	281	2	23	9	0	3	0	317	0	2	25	10	0	4	0	41	281	5	47	19	0	7	0	358	312	34	346	6	7	13						
Total	4,906	5	107	43	41	14	0	5,117	0	10	205	82	21	58	0	376	4,906	16	312	126	62	72	0	5,493	5,052	277	5,329	65	99	164						

Event Center and Mixed Use Development at Piers 30-32 and Seawall Lot 330
 PROJECT TRIP GENERATION - SATURDAY DAILY AND EVENING PEAK HOUR BETWEEN 7 AND 9 PM
 SUMMARY OF TRIPS WITH BASKETBALL GAME

Evening Peak Hour bet. 7 PM & 9 PM Transit Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	712	0	11	5	7	1	0	737	0	1	23	9	4	7	0	43	712	1	34	14	11	8	0	780	727	31	758	9	12	22
Superdistrict 2	259	0	15	6	1	2	0	282	0	2	38	15	0	13	0	68	259	2	53	21	1	15	0	351	279	52	330	4	17	20
Superdistrict 3	303	0	14	6	6	2	0	331	0	1	37	15	3	12	0	69	303	2	52	21	8	14	0	401	323	51	373	9	19	27
Superdistrict 4	222	0	7	3	1	1	0	233	0	1	22	9	0	8	0	40	222	1	29	12	1	9	0	274	231	30	261	2	10	12
East Bay	2,708	0	8	3	3	1	0	2,724	0	2	40	16	2	16	0	75	2,708	2	48	19	5	17	0	2,799	2,719	54	2,773	5	21	26
North Bay	625	0	1	1	0	0	0	628	0	0	8	3	0	3	0	16	625	1	10	4	0	4	0	643	627	11	638	1	4	5
South Bay	1,870	0	5	2	7	1	0	1,885	0	1	20	8	4	7	0	39	1,870	1	25	10	11	8	0	1,924	1,877	27	1,903	8	13	21
Out of Region	192	1	15	6	0	2	0	216	0	1	17	7	0	3	0	28	192	1	33	13	0	5	0	244	213	24	236	3	5	8
Total	6,891	2	77	31	24	10	0	7,036	0	9	206	83	12	69	0	380	6,891	11	284	114	36	79	0	7,416	6,995	279	7,275	41	100	141

Evening Peak Hour bet. 7 PM & 9 PM Bike (Event)	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	97							97	0							97	97	0	0	0	0	0	0	97	97	0	97	0	0	0
Superdistrict 2	23							23	0							23	23	0	0	0	0	0	0	23	23	0	23	0	0	0
Superdistrict 3	29							29	0							29	29	0	0	0	0	0	0	29	29	0	29	0	0	0
Superdistrict 4	24							24	0							24	24	0	0	0	0	0	0	24	24	0	24	0	0	0
East Bay	41							41	0							41	41	0	0	0	0	0	0	41	41	0	41	0	0	0
North Bay	19							19	0							19	19	0	0	0	0	0	0	19	19	0	19	0	0	0
South Bay	38							38	0							38	38	0	0	0	0	0	0	38	38	0	38	0	0	0
Out of Region	6							6	0							6	6	0	0	0	0	0	0	6	6	0	6	0	0	0
Total	278	0	0	0	0	0	0	278	0	0	0	0	0	0	0	278	278	0	0	0	0	0	0	278	278	0	278	0	0	0

Evening Peak Hour bet. 7 PM & 9 PM Taxi/Walk/Other	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	314	2	46	19	22	6	0	409	0	3	62	25	11	13	0	114	314	5	108	44	33	19	0	523	377	84	461	32	30	62
Superdistrict 2	30	0	14	6	2	2	0	54	0	0	15	6	1	2	0	25	30	1	29	12	3	4	0	79	49	20	69	5	5	10
Superdistrict 3	27	1	10	4	17	1	0	60	0	1	12	5	9	2	0	29	27	1	22	9	26	4	0	89	40	16	57	20	12	32
Superdistrict 4	23	0	5	2	2	1	0	33	0	0	6	3	1	1	0	11	23	0	11	5	3	2	0	44	30	8	38	3	3	6
East Bay	59	1	9	4	0	1	0	74	0	1	11	4	0	2	0	19	59	1	20	8	1	3	0	92	71	15	86	3	4	6
North Bay	34	0	3	1	0	0	0	39	0	0	3	1	0	1	0	5	34	1	6	2	0	1	0	44	38	4	42	1	1	2
South Bay	55	0	3	1	1	0	0	61	0	0	4	2	0	1	0	7	55	0	7	3	1	1	0	68	59	5	65	2	1	3
Out of Region	27	3	25	10	0	3	0	68	0	3	25	10	0	3	0	42	27	7	50	20	0	6	0	110	62	35	97	7	7	14
Total	569	7	115	46	45	15	0	798	0	9	139	56	23	25	0	251	569	16	254	102	67	40	0	1,049	726	189	915	72	62	134

Evening Peak Hour bet. 7 PM & 9 PM Total Person Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	1,403	3	66	27	38	8	0	1,545	0	5	98	39	19	23	0	184	1,403	7	164	66	57	31	0	1,729	1,492	133	1,625	53	52	104
Superdistrict 2	435	1	42	17	4	5	0	504	0	3	78	31	2	22	0	136	435	4	120	48	6	27	0	640	492	105	597	13	31	43
Superdistrict 3	525	1	39	16	31	5	0	617	0	3	81	33	15	24	0	157	525	5	120	48	46	29	0	774	578	110	688	39	47	86
Superdistrict 4	419	0	21	8	4	3	0	455	0	2	49	20	2	15	0	88	419	2	70	28	6	18	0	543	447	66	513	8	22	30
East Bay	4,173	2	33	13	10	4	0	4,235	0	5	89	36	5	30	0	164	4,173	6	122	49	15	34	0	4,399	4,218	121	4,338	17	43	61
North Bay	1,644	1	15	6	1	2	0	1,668	0	2	30	12	0	9	0	53	1,644	2	45	18	1	11	0	1,722	1,664	41	1,705	4	12	17
South Bay	3,541	1	21	8	23	3	0	3,597	0	3	57	23	12	19	0	113	3,541	4	78	31	35	22	0	3,710	3,569	77	3,646	28	36	64
Out of Region	506	6	63	25	0	8	0	608	0	6	67	27	0	10	0	111	506	12	130	53	0	18	0	719	592	93	685	16	18	34
Total	12,645	15	300	121	110	38	0	13,229	0	28	550	221	56	153	0	1,007	12,645	43	850	342	166	191	0	14,236	13,051	746	13,797	178	262	439

Evening Peak Hour bet. 7 PM & 9 PM Vehicle-Trips	Inbound								Outbound								Total								Piers 30-32			Seawall Lot 330		
	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	Arena	Retail	QS Rest.	Sd Rest.	Resid.	Hotel	Office	Total	In	Out	Total	In	Out	Total
Superdistrict 1	120	0	4	1	9	0	0	134	16	1	7	3	4	2	0	33	136	1	11	4	13	3	0	168	125	26	151	10	7	17
Superdistrict 2	49	0	6	3	1	1	0	60	4	1	16	6	0	5	0	32	53	1	22	9	1	6	0	92	58	25	83	2	7	9
Superdistrict 3	66	0	6	3	7	1	0	83	5	1	19	8	4	7	0	43	71	1	26	10	11	8	0	126	75	31	106	8	12	20
Superdistrict 4	60	0	5	2	1	1	0	68	4	0	12	5	0	4	0	26	64	1	17	7	1	5	0	94	66	21	86	2	6	7
East Bay	513	0	6	3	6	1	0	529	7	1	13	5	3	4	0	33	520	1	19	8	9	5	0	5						

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LOS SUMMARY TABLE

Event Center and Mixed-Use Development at Piers 30-32 and Seawall Lot 330
Existing LOS Table - No Overlapping SF Giants Game

Int No	Study Intersection	Existing		Existing		Existing Plus Project		Existing Plus Project		Existing Plus No Event		Existing Plus No Event	
		Weekday 4-6 PM		Weekend 7-9 PM		Weekday 4-6 PM		Weekend 7-9 PM		Weekday 4-6 PM		Weekend 7-9 PM	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Broadway/The Embarcadero	36.7	D	26.1	C	37.4	D	29.2	C	36.9	D	26.4	C
2	Washington/The Embarcadero	30.5	C	31.4	C	38.0	D	33.3	C	31.5	C	31.9	C
3	Mission/The Embarcadero	79.5	E	12.8	B	>80 (1.13)	F	12.9	B	>80 (1.06)	F	13	B
4	Howard/The Embarcadero	>80 (1.13)	F	38.3	D	>80 (1.38)	F	>80 (1.1)	F	>80 (1.18)	F	46	D
5	Folsom St./The Embarcadero	61.9	E	21.3	C	>80 (1.39)	F	54.9	D	66.8	E	21.2	C
6	Harrison St./The Embarcadero	71.0	E	21.0	C	>80 (1.01)	F	25.1	C	>80 (0.93)	F	23.9	C
7	Bryant St./The Embarcadero	>80 (1.51)	F	22.9	C	>80 (1.08)	F	> 80	F	>80 (2.17)	F	>80 (1.04)	F
9	Brannan St./The Embarcadero	39.1	D	23.9	C	42.4	D	33.4	C	37.6	D	26.2	C
10	Townsend St./The Embarcadero	58.1	E	19.1	B	70.4	E	27.2	C	62.6	E	23.1	C
11	King St./Second St.	55.8	E	33.9	C	63.1	E	39.4	D	59.6	E	36.8	D
12	King St./Third St.	72.7	E	26.6	C	>80 (0.99)	F	39.8	D	>80 (0.95)	F	32.5	C
13	King St./Fourth St.	51.9	D	22.6	C	59.5	E	56.8	E	56.0	E	30.8	C
14	King/I-280 Ramps/Fifth St.	59.2	E	< 10	A	72.8	E	< 10	A	56.0	E	< 10	A
15	Harrison St/Main St	>80 (0.91)	F	22.0	C	>80 (1.07)	F	51.1	D	>80 (0.93)	F	22.5	C
16	Bryant St/Main St	21.2	C	7.4	A	24.2	C	8.4	A	32.5	C	7	A
17	Mission St/Beale St	33.8	C	12.0	B	41.8	D	13.2	B	37.1	D	12.1	B
18	Bryant St./Beale St.	54.0	D	26.8	C	>80 (1.15)	F	63.6	E	>80 (1.13)	F	50.2	D
19	Harrison St./Fremont St.	32.4	C	18.0	B	38.8	D	34.5	C	34.4	C	17.6	B
20	Folsom St./Fremont St.	53.6	D	30.2	C	>80 (0.75)	F	54.2	D	54.0	D	30.2	C
21	Harrison St./First St.	>80 (1.13)	F	28.3	C	>80 (1.28)	F	79.4	E	>80 (1.17)	F	36.3	D
22	Howard St./Fourth St.	52.2	D	28.7	C	54.4	D	29.5	C	53.1	D	28.8	C
23	Harrison St./Fourth St.	41.8	D	21.8	C	44.5	D	23.1	C	42.0	D	21.9	C
24	Bryant St./Fourth St.	>80 (0.76)	F	27.1	C	>80 (0.87)	F	32.9	C	>80 (0.77)	F	27.1	C
25	Harrison St./Fifth St.	48.4	D	27.1	C	>80 (1.07)	F	55.2	E	60.9	E	29	C
27	Brannan St./Second St.	20.2	C	10.7	B	28.2	C	15.3	B	21.3	C	11.2	B
28	Bryant St./Second St.	>80 (1.23)	F	25.9	C	>80 (1.27)	F	38.5	D	>80 (1.24)	F	28.3	C

Intersections at LOS E or LOS F	13	0	17	6	16	1
Project-specific Impacts	--	--	8	6	6	1
Contribution to Existing LOS E & F	--	--	4	0	2	0
No Contribution to Existing LOS E/F	--	--	5	0	8	0

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING – WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	50	293	197	617	4	694	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.3	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95	1.00	0.95	
Frpb, ped/bikes	1.00	0.82	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	1.00	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1128	2987	3079	1540	3074	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1540	1128	2987	3079	1540	3074	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	312	210	656	4	738	5
RTOR Reduction (vph)	0	201	0	0	0	1	0
Lane Group Flow (vph)	53	111	210	656	4	742	0
Confl. Peds. (#/hr)		191					110
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.0	5.9	37.6	
Effective Green, g (s)	39.0	39.0	20.0	50.9	8.8	39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.46	0.08	0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9	6.2	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	546	399	543	1424	123	1089	
v/s Ratio Prot			0.07		0.00	c0.24	
v/s Ratio Perm	0.03	c0.10		c0.21			
v/c Ratio	0.10	0.28	0.39	0.46	0.03	0.68	
Uniform Delay, d1	23.7	25.4	39.6	20.2	46.7	30.2	
Progression Factor	1.00	1.00	1.52	1.87	1.00	1.00	
Incremental Delay, d2	0.1	0.4	0.4	0.9	0.5	3.5	
Delay (s)	23.8	25.8	60.4	38.6	47.2	33.7	
Level of Service	C	C	E	D	D	C	
Approach Delay (s)	25.5			43.9		33.7	
Approach LOS	C			D		C	
Intersection Summary							
HCM 2000 Control Delay			36.7				HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.51				
Actuated Cycle Length (s)			110.0			Sum of lost time (s) 16.7	
Intersection Capacity Utilization			77.9%			ICU Level of Service D	
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	115	156	117	713	11	938	38
Ideal Flow (vphpl)	1900	1900	1400	1400	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frpb, ped/bikes	1.00	0.84	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	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	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1158	2201	3260	1377	3912	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1540	1158	2201	3260	1377	3912	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	170	127	775	12	1020	41
RTOR Reduction (vph)	0	100	0	0	0	4	0
Lane Group Flow (vph)	125	70	127	775	12	1057	0
Confl. Peds. (#/hr)		188	131				131
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.6	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	630	473	420	1256	132	1138	
v/s Ratio Prot			0.06	c0.24	0.01	c0.27	
v/s Ratio Perm	c0.08	0.06					
v/c Ratio	0.20	0.15	0.30	0.62	0.09	0.93	
Uniform Delay, d1	20.9	20.4	38.2	27.3	45.3	37.9	
Progression Factor	1.00	1.00	1.14	1.18	1.23	0.45	
Incremental Delay, d2	0.2	0.1	0.2	1.3	1.1	11.9	
Delay (s)	21.1	20.6	43.6	33.5	57.0	29.1	
Level of Service	C	C	D	C	E	C	
Approach Delay (s)	20.8			35.0		29.4	
Approach LOS	C			C		C	
Intersection Summary							
HCM 2000 Control Delay			30.5				HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.56				
Actuated Cycle Length (s)			110.0			Sum of lost time (s) 15.7	
Intersection Capacity Utilization			74.4%			ICU Level of Service D	
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
Page 2

HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	167	71	0	1132	1116	140
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		*0.50	*0.40	
Frpb, ped/bikes	1.00	0.84		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1157		2047	1584	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1157		2047	1584	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	178	76	0	1204	1187	149
RTOR Reduction (vph)	0	35	0	0	4	0
Lane Group Flow (vph)	178	41	0	1204	1332	0
Confl. Peds. (#/hr)	307	110				80
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	24.2	24.2		74.2	74.2	
Effective Green, g (s)	26.6	24.2		75.4	75.4	
Actuated g/C Ratio	0.24	0.22		0.69	0.69	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	372	254		1403	1085	
v/s Ratio Prot	c0.12			0.59	c0.84	
v/s Ratio Perm		0.04				
v/c Ratio	0.48	0.16		0.86	1.23	
Uniform Delay, d1	35.8	34.7		13.2	17.3	
Progression Factor	1.00	1.00		2.51	1.01	
Incremental Delay, d2	1.0	0.3		5.0	108.0	
Delay (s)	36.7	35.0		38.1	125.5	
Level of Service	D	C		D	F	
Approach Delay (s)	36.2			38.1	125.5	
Approach LOS	D			D	F	

Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	164	120	1	148	966	2	899	286
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	7.1		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.80	1.00	*0.76	1.00
Frpb, ped/bikes	1.00	0.93		1.00	1.00	1.00	1.00	0.95
Flpb, ped/bikes	0.91	1.00		0.99	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1397	1286		1281	3275	1296	2074	1098
Fit Permitted	0.95	1.00		0.27	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1397	1286		360	3275	1296	2074	1098
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	171	125	1	154	1006	2	936	298
RTOR Reduction (vph)	0	73	0	0	0	0	0	174
Lane Group Flow (vph)	171	52	0	155	1006	2	936	124
Confl. Peds. (#/hr)	120	72		46				46
Turn Type	Perm	Perm	custom	Prot	NA	Prot	NA	custom
Protected Phases				5		1		
Permitted Phases	4	4	5		2		6	6
Actuated Green, G (s)	42.9	42.9		12.1	39.8	7.0	35.6	35.6
Effective Green, g (s)	46.0	42.9		15.0	42.7	9.3	37.0	37.0
Actuated g/C Ratio	0.42	0.39		0.14	0.39	0.08	0.34	0.34
Clearance Time (s)	7.1	7.1		6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	584	501		49	1271	109	697	369
v/s Ratio Prot						0.00		
v/s Ratio Perm	c0.12	0.04		c0.43	0.31		c0.45	0.11
v/c Ratio	0.29	0.10		3.16	0.79	0.02	1.34	0.34
Uniform Delay, d1	21.2	21.3		47.5	29.7	46.2	36.5	27.3
Progression Factor	1.00	1.00		0.75	0.57	1.22	0.90	0.89
Incremental Delay, d2	0.3	0.1		1018.0	4.4	0.0	155.2	0.2
Delay (s)	21.5	21.4		1053.8	21.4	56.5	187.9	24.4
Level of Service	C	C		F	C	E	F	C
Approach Delay (s)	21.5				159.2		148.3	
Approach LOS	C				F		F	

Intersection Summary			
HCM 2000 Control Delay	139.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	218	173	31	63	897	995	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1700	1700
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.78		1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	950		1593	2946	2810	
Flt Permitted	0.95	1.00		0.22	1.00	1.00	
Satd. Flow (perm)	3090	950		361	2946	2810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	229	182	33	66	944	1047	26
RTOR Reduction (vph)	0	107	0	0	0	1	0
Lane Group Flow (vph)	229	75	0	99	944	1072	0
Confl. Peds. (#/hr)	84	266					223
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases		4	5				
Actuated Green, G (s)	42.3	42.3		15.6	55.7	33.7	
Effective Green, g (s)	45.3	45.3		18.6	58.7	36.7	
Actuated g/C Ratio	0.41	0.41		0.17	0.53	0.33	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	391		61	1572	937	
v/s Ratio Prot	0.07				0.32	c0.38	
v/s Ratio Perm		c0.08		c0.27			
v/c Ratio	0.18	0.19		1.62	0.60	1.14	
Uniform Delay, d1	20.6	20.7		45.7	17.6	36.6	
Progression Factor	1.00	1.00		0.83	1.96	0.17	
Incremental Delay, d2	0.3	1.1		334.8	1.4	66.0	
Delay (s)	20.9	21.7		372.9	36.0	72.1	
Level of Service	C	C		F	D	E	
Approach Delay (s)	21.3				68.0	72.1	
Approach LOS	C				E	E	
Intersection Summary							
HCM 2000 Control Delay			62.1		HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			0.80				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		9.4
Intersection Capacity Utilization			95.3%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (vph)	170	214	0	821	1007	192	
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600	
Total Lost time (s)	6.8	6.8		5.4	5.4		
Lane Util. Factor	1.00	1.00		*0.90	*0.80		
Frbp, ped/bikes	1.00	0.96		1.00	0.98		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		
Frt	1.00	0.85		1.00	0.98		
Flt Protected	0.95	1.00		1.00	1.00		
Satd. Flow (prot)	1540	1318		2917	2085		
Flt Permitted	0.95	1.00		1.00	1.00		
Satd. Flow (perm)	1540	1318		2917	2085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	185	233	0	892	1095	209	
RTOR Reduction (vph)	0	18	0	0	11	0	
Lane Group Flow (vph)	185	215	0	892	1293	0	
Confl. Peds. (#/hr)	73	40				140	
Confl. Bikes (#/hr)						117	
Turn Type	Prot	Perm		NA	NA		
Protected Phases	4			2	6		
Permitted Phases		4					
Actuated Green, G (s)	41.2	41.2		56.6	56.6		
Effective Green, g (s)	41.2	41.2		56.6	56.6		
Actuated g/C Ratio	0.37	0.37		0.51	0.51		
Clearance Time (s)	6.8	6.8		5.4	5.4		
Lane Grp Cap (vph)	576	493		1500	1072		
v/s Ratio Prot	0.12			0.31	c0.62		
v/s Ratio Perm		c0.16					
v/c Ratio	0.32	0.44		0.59	1.21		
Uniform Delay, d1	24.5	25.7		18.7	26.7		
Progression Factor	1.00	1.00		1.82	0.62		
Incremental Delay, d2	1.5	2.8		1.0	93.6		
Delay (s)	25.9	28.5		35.0	110.1		
Level of Service	C	C		C	F		
Approach Delay (s)	27.4				35.0	110.1	
Approach LOS	C				C	F	
Intersection Summary							
HCM 2000 Control Delay			71.2		HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			0.88				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		12.2
Intersection Capacity Utilization			91.7%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

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DRAFT - SUBJECT TO REVIEW

TR-787

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	34	4	227	7	9	4	1	190	763	0	17	1128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600
Total Lost time (s)	6.9	6.9			6.9			6.5	6.5		5.9	5.2
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95		*0.90	*0.90
Frbp, ped/bikes	1.00	0.97			0.99			1.00	1.00		1.00	1.00
Flpb, ped/bikes	0.96	1.00			1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.85			0.98			1.00	1.00		1.00	1.00
Fit Protected	0.95	1.00			0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1481	1334			1531			1296	2593		1167	2456
Fit Permitted	0.74	1.00			0.85			0.21	1.00		0.95	1.00
Satd. Flow (perm)	1159	1334			1325			291	2593		1167	2456
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	4	247	8	10	4	1	207	829	0	18	1226
RTOR Reduction (vph)	0	201	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	37	50	0	0	19	0	0	208	829	0	18	1226
Confl. Peds. (#/hr)	45		24	24		45				173		
Confl. Bikes (#/hr)			2							52		
Turn Type	Perm	NA		Perm	NA		custom	Prot	NA		Prot	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8			5					
Actuated Green, G (s)	20.4	20.4			20.4			20.5	41.5		28.8	50.5
Effective Green, g (s)	20.4	20.4			20.4			20.5	41.5		28.8	50.5
Actuated g/C Ratio	0.19	0.19			0.19			0.19	0.38		0.26	0.46
Clearance Time (s)	6.9	6.9			6.9			6.5	6.5		5.9	5.2
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	214	247			245			54	978		305	1127
v/s Ratio Prot		c0.04							0.32		0.02	c0.50
v/s Ratio Perm	0.03				0.01			c0.71				
v/c Ratio	0.17	0.20			0.08			3.85	0.85		0.06	1.09
Uniform Delay, d1	37.7	37.9			37.0			44.8	31.4		30.4	29.8
Progression Factor	1.00	1.00			1.00			0.77	0.81		1.42	1.26
Incremental Delay, d2	0.4	0.4			0.1			1315.2	6.8		0.0	41.2
Delay (s)	38.1	38.3			37.2			1349.6	32.3		43.2	78.8
Level of Service	D	D			D			F	C		D	E
Approach Delay (s)		38.3			37.2				296.5			76.1
Approach LOS		D			D				F			E

Intersection Summary			
HCM 2000 Control Delay	157.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015

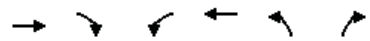


Movement	SBR	SBT
Lane Configurations	↔	↔
Volume (vph)	76	
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)	5.2	
Lane Util. Factor	*0.90	
Frbp, ped/bikes	0.88	
Flpb, ped/bikes	1.00	
Frt	0.85	
Fit Protected	1.00	
Satd. Flow (prot)	917	
Fit Permitted	1.00	
Satd. Flow (perm)	917	
Peak-hour factor, PHF	0.92	
Adj. Flow (vph)	83	
RTOR Reduction (vph)	45	
Lane Group Flow (vph)	38	
Confl. Peds. (#/hr)	77	
Confl. Bikes (#/hr)	80	
Turn Type	Perm	
Protected Phases		
Permitted Phases	6	
Actuated Green, G (s)	50.5	
Effective Green, g (s)	50.5	
Actuated g/C Ratio	0.46	
Clearance Time (s)	5.2	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	420	
v/s Ratio Prot		
v/s Ratio Perm	0.04	
v/c Ratio	0.09	
Uniform Delay, d1	16.8	
Progression Factor	2.58	
Incremental Delay, d2	0.0	
Delay (s)	43.3	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary	

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑	↑	
Volume (veh/h)	296	2	2	174	6	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	333	2	2	196	7	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked						
vC, conflicting volume			335		534	167
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			335		534	167
iC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	94
cM capacity (veh/h)			1221		475	847

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	222	113	198	60
Volume Left	0	0	2	7
Volume Right	0	2	0	53
cSH	1700	1700	1221	778
Volume to Capacity	0.13	0.07	0.00	0.08
Queue Length 95th (ft)	0	0	0	6
Control Delay (s)	0.0	0.0	0.1	10.0
Lane LOS			A	B
Approach Delay (s)	0.0		0.1	10.0
Approach LOS				B

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization	22.2%		ICU Level of Service A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↓	↑↑	↑
Volume (vph)	98	39	42	851	5	939	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.95	1.00	1.00	1.00	1.00	0.70
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	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1314	1540	3079	1540	3079	971
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1314	1540	3079	1540	3079	971
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	105	42	45	915	5	1010	451
RTOR Reduction (vph)	0	26	0	0	0	0	161
Lane Group Flow (vph)	105	16	45	915	5	1010	290
Confl. Peds. (#/hr)	36	40					133
Confl. Bikes (#/hr)							92
Turn Type	Prot	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	2	1	6	
Permitted Phases		4					6
Actuated Green, G (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Effective Green, g (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Actuated g/C Ratio	0.35	0.35	0.14	0.40	0.09	0.34	0.34
Clearance Time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	455	215	1226	140	1035	326
v/s Ratio Prot	c0.07		0.03	c0.30	0.00	c0.33	
v/s Ratio Perm		0.01					0.30
v/c Ratio	0.20	0.03	0.21	0.75	0.04	0.98	0.89
Uniform Delay, d1	25.2	23.8	41.9	28.3	45.6	36.1	34.6
Progression Factor	1.00	1.00	0.54	0.86	0.89	0.91	1.48
Incremental Delay, d2	0.8	0.1	1.3	2.5	0.1	10.4	10.7
Delay (s)	26.0	23.9	23.9	26.8	40.5	43.1	61.9
Level of Service	C	C	C	C	D	D	E
Approach Delay (s)	25.4			26.7		48.9	
Approach LOS	C			C		D	

Intersection Summary			
HCM 2000 Control Delay	39.3		HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0		Sum of lost time (s) 19.5
Intersection Capacity Utilization	80.6%		ICU Level of Service D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔			↔			↔	↔		↔	↔
Volume (vph)	105	6	20	4	5	6	10	35	782	5	2	809
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600	1600
Total Lost time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Lane Util. Factor		1.00			1.00			1.00	0.95		1.00	0.95
Frbp, ped/bikes		0.95			0.87			1.00	1.00		1.00	0.94
Flpb, ped/bikes		0.76			0.94			1.00	1.00		1.00	1.00
Frt		0.98			0.95			1.00	1.00		1.00	0.97
Fit Protected		0.96			0.99			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1096			1230			1296	2583		1296	2386
Fit Permitted		0.76			0.94			0.95	1.00		0.95	1.00
Satd. Flow (perm)		865			1176			1296	2583		1296	2386
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)	113	6	22	4	5	6	11	38	841	5	2	870
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	1	0	0	15
Lane Group Flow (vph)	0	135	0	0	11	0	0	49	845	0	2	1035
Confl. Peds. (#/hr)	400		400	400		400				400		
Confl. Bikes (#/hr)			30			30				30		
Turn Type	Perm	NA		Perm	NA		Prot	Prot	NA		Prot	NA
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8								
Actuated Green, G (s)		33.6			33.6			15.0	43.0		13.6	42.0
Effective Green, g (s)		33.6			33.6			15.0	43.0		13.6	42.0
Actuated g/C Ratio		0.31			0.31			0.14	0.39		0.12	0.38
Clearance Time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		264			359			176	1009		160	911
v/s Ratio Prot								0.04	c0.33		0.00	c0.43
v/s Ratio Perm		c0.16			0.01							
v/c Ratio		0.51			0.03			0.28	0.84		0.01	1.14
Uniform Delay, d1		31.4			26.8			42.6	30.3		42.3	34.0
Progression Factor		1.00			1.00			0.82	0.67		1.97	0.65
Incremental Delay, d2		1.7			0.0			2.7	5.9		0.0	66.5
Delay (s)		33.1			26.8			37.8	26.3		83.6	88.5
Level of Service		C			C			D	C		F	F
Approach Delay (s)		33.1			26.8				27.0			88.5
Approach LOS		C			C				C			F

Intersection Summary			
HCM 2000 Control Delay	58.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015

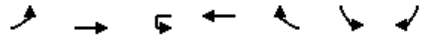


Movement	SBR	SBT
Lane Configurations	↔	↔
Volume (vph)	167	809
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)		
Lane Util. Factor		
Frbp, ped/bikes		
Flpb, ped/bikes		
Frt		
Fit Protected		
Satd. Flow (prot)		
Fit Permitted		
Satd. Flow (perm)		
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	180	870
RTOR Reduction (vph)	0	15
Lane Group Flow (vph)	0	1035
Confl. Peds. (#/hr)	400	
Confl. Bikes (#/hr)	30	
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		

Intersection Summary	
HCM 2000 Control Delay	58.2
HCM 2000 Volume to Capacity ratio	0.88
Actuated Cycle Length (s)	110.0
Intersection Capacity Utilization	92.7%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↔	↕	↔	↔	↕
Volume (vph)	196	791	5	813	25	19	285
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	*0.90		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99		1.00	0.68
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1296	2593	1296	2422		1296	784
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1296	2593	1296	2422		1296	784
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	202	815	5	838	26	20	294
RTOR Reduction (vph)	0	0	0	2	0	0	192
Lane Group Flow (vph)	202	815	5	862	0	20	102
Confl. Peds. (#/hr)					400	400	400
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA	Prot	Perm	
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	181	1056	98	801		450	272
v/s Ratio Prot	c0.16	0.31	0.00	c0.36		0.02	
v/s Ratio Perm							c0.13
v/c Ratio	1.12	0.77	0.05	1.08		0.04	0.38
Uniform Delay, d1	47.3	28.2	47.1	36.8		23.8	26.9
Progression Factor	0.84	1.46	0.65	0.54		1.00	1.00
Incremental Delay, d2	94.2	4.4	0.1	36.9		0.2	3.9
Delay (s)	133.7	45.6	30.8	56.7		24.0	30.9
Level of Service	F	D	C	E		C	C
Approach Delay (s)		63.1		56.6		30.4	
Approach LOS		E		E		C	

Intersection Summary			
HCM 2000 Control Delay	55.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

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HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↕	↔	↔	↕
Volume (vph)	872	732	12	135	927	36	53	948	255	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	3057		2515	2547			5469	941			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	3057		2515	2547			5469	941			
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)	899	755	12	139	956	37	55	977	263	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	183	0	0	0
Lane Group Flow (vph)	899	766	0	139	992	0	0	1032	80	0	0	0
Confl. Peds. (#/hr)				400		400	400		400			
Confl. Bikes (#/hr)				10		10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	18.2	42.9		13.2	39.4			33.5	33.5			
Effective Green, g (s)	18.2	42.9		13.2	39.4			33.5	33.5			
Actuated g/C Ratio	0.17	0.39		0.12	0.36			0.30	0.30			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	718	1192		301	912			1665	286			
v/s Ratio Prot	c0.21	0.25		0.06	c0.39							
v/s Ratio Perm								0.19	0.09			
v/c Ratio	1.25	0.64		0.46	1.09			0.62	0.28			
Uniform Delay, d1	45.9	27.3		45.1	35.3			32.8	29.1			
Progression Factor	1.38	1.65		1.50	1.01			1.00	1.00			
Incremental Delay, d2	121.0	1.7		0.3	46.0			0.7	0.5			
Delay (s)	184.3	46.8		68.1	81.7			33.5	29.6			
Level of Service	F	D		E	F			C	C			
Approach Delay (s)		121.0			80.1			32.7				0.0
Approach LOS		F			F			C				A

Intersection Summary			
HCM 2000 Control Delay	81.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↔	↔↔		↔	↔↔			↔	↔	↔	↔↔	↔		
Volume (vph)	151	1521	25	24	907	19	5	60	61	34	250	301		
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8		
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91		
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.64	1.00	0.82	0.47		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.67	1.00	1.00		
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85		
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	1540	4385		1296	2553			1579	858	1038	2295	581		
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00		
Satd. Flow (perm)	1540	4385		1296	2553			1533	858	780	2295	581		
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98		
Adj. Flow (vph)	154	1552	26	24	926	19	5	61	62	35	255	307		
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	40	0	53	113		
Lane Group Flow (vph)	154	1577		0	24	944		0	0	66	22	35	334	62
Confl. Peds. (#/hr)			761				695	1648		678	678	1648		
Confl. Bikes (#/hr)			10				10		10			10		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5		
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm		
Protected Phases	5	2		1	6			4			7			
Permitted Phases							4		4	7		7		
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2		
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2		
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36		
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8		
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)	201	1829		70	833			532	297	277	817	207		
v/s Ratio Prot	0.10	c0.36		0.02	c0.37						c0.15			
v/s Ratio Perm							0.04	0.03	0.04			0.11		
v/c Ratio	0.77	0.86		0.34	1.13			0.12	0.07	0.13	0.41	0.30		
Uniform Delay, d1	46.2	29.2		50.1	37.0			24.5	24.0	23.9	26.7	25.5		
Progression Factor	0.58	1.18		0.90	0.93			1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.6	0.5		0.3	61.4			0.1	0.1	0.2	0.3	0.8		
Delay (s)	28.4	34.9		45.4	95.7			24.6	24.1	24.1	27.0	26.3		
Level of Service	C	C		D	F			C	C	C	C	C		
Approach Delay (s)		34.3			94.5			24.4			26.6			
Approach LOS		C			F			C			C			

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	115.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

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HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Volume (vph)	1689	138	0	1243	86	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3037			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3037			3079	1540	1357
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1759	144	0	1295	90	8
RTOR Reduction (vph)	6	0	0	0	0	5
Lane Group Flow (vph)	1897	0	0	1295	90	3
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1714			1738	512	451
v/s Ratio Prot	c0.62			0.42	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.11			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.0	26.0	24.5
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	57.3			1.1	0.7	0.0
Delay (s)	81.2			10.8	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	81.2			10.8	26.6	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	51.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015

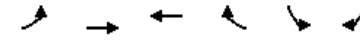


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕↕↕	↕↕↕		↕	↕			↕	↕
Volume (vph)	24	125	74	5	561	54	118	236	14	2	91	253
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.0		4.5	4.5			4.5	4.5
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.95			0.98		1.00	1.00			1.00	0.92
Flpb, ped/bikes		1.00			1.00		0.94	1.00			1.00	1.00
Frt		0.96			0.99		1.00	0.99			1.00	0.85
Fit Protected		0.99			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1633			1212		1608	1778			1797	1197
Fit Permitted		0.74			0.94		0.69	1.00			1.00	1.00
Satd. Flow (perm)		1210			1137		1170	1778			1791	1197
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	137	81	5	616	59	130	259	15	2	100	278
RTOR Reduction (vph)	0	30	0	0	7	0	0	3	0	0	0	48
Lane Group Flow (vph)	0	214	0	0	673	0	130	271	0	0	102	230
Confl. Peds. (#/hr)			100	100		100	100		100	100		100
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		25.0			25.5		26.0	26.0			26.0	26.0
Effective Green, g (s)		25.0			25.5		26.0	26.0			26.0	26.0
Actuated g/C Ratio		0.42			0.42		0.43	0.43			0.43	0.43
Clearance Time (s)		4.5			4.0		4.5	4.5			4.5	4.5
Lane Grp Cap (vph)		504			483		507	770			776	518
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.18			c0.59		0.11				0.06	c0.19
v/c Ratio		0.43			1.39		0.26	0.35			0.13	0.44
Uniform Delay, d1		12.4			17.2		10.8	11.4			10.2	11.9
Progression Factor		0.79			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		2.5			189.4		1.2	1.3			0.4	2.7
Delay (s)		12.3			206.7		12.1	12.6			10.6	14.7
Level of Service		B			F		B	B			B	B
Approach Delay (s)		12.3			206.7		12.4				13.6	
Approach LOS		B			F		B				B	

Intersection Summary			
HCM 2000 Control Delay	90.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Volume (vph)	174	169	97	178	96	79
Ideal Flow (vphpl)	1500	1500	1500	1500	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	*0.40	*0.40	*0.40	*0.40	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.96	1.00	0.89
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	486	435	512	418	1540	1043
Fit Permitted	0.59	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	304	435	512	418	1540	1043
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	193	188	108	198	107	88
RTOR Reduction (vph)	0	0	0	45	0	76
Lane Group Flow (vph)	193	188	108	153	107	12
Confl. Peds. (#/hr)				52		31
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	77.3	77.3	77.3	77.3	13.7	13.7
Effective Green, g (s)	77.3	77.3	77.3	77.3	13.7	13.7
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	234	336	395	323	210	142
v/s Ratio Prot		0.43	0.21		c0.07	
v/s Ratio Perm	c0.64			0.37		0.01
v/c Ratio	0.82	0.56	0.27	0.47	0.51	0.08
Uniform Delay, d1	7.1	4.5	3.3	4.1	40.0	37.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.0	6.6	1.7	4.9	1.9	0.3
Delay (s)	34.1	11.1	5.0	9.0	42.0	37.9
Level of Service	C	B	A	A	D	D
Approach Delay (s)		22.8	7.6		40.2	
Approach LOS		C	A		D	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑					↑	↑↑↑	
Volume (vph)	0	417	165	77	297	0	0	0	0	62	806	92
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frt		0.96		1.00	1.00					1.00	0.98	
Flt Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2948		1296	1365					972	2751	
Flt Permitted		1.00		0.37	1.00					0.95	1.00	
Satd. Flow (perm)		2948		500	1365					972	2751	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	474	188	88	338	0	0	0	0	70	916	105
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	645	0	88	338	0	0	0	0	70	998	0
Parking (#/hr)				10								10
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		29.0		29.0	29.0					21.0	21.0	
Effective Green, g (s)		29.0		29.0	29.0					21.0	21.0	
Actuated g/C Ratio		0.48		0.48	0.48					0.35	0.35	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1424		241	659					340	962	
v/s Ratio Prot		0.22			c0.25						c0.36	
v/s Ratio Perm				0.18						0.07		
v/c Ratio		0.45		0.37	0.51					0.21	1.04	
Uniform Delay, d1		10.3		9.7	10.6					13.7	19.5	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.0		4.2	2.8					1.4	39.0	
Delay (s)		11.3		14.0	13.5					15.0	58.5	
Level of Service		B		B	B					B	E	
Approach Delay (s)		11.3			13.6		0.0				55.7	
Approach LOS		B		B	B		A				E	

Intersection Summary

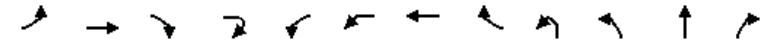
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↑					↑				↑	
Volume (vph)	30	94	13	8	9	61	62	48	8	2	9	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.93					0.97				0.96	
Flpb, ped/bikes		0.99					0.86				0.93	
Frt		0.98					0.96				0.92	
Flt Protected		0.99					0.98				0.99	
Satd. Flow (prot)		1367					1036				1065	
Flt Permitted		0.91					0.84				0.92	
Satd. Flow (perm)		1256					882				992	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	102	14	9	10	66	67	52	9	2	10	28
RTOR Reduction (vph)	0	0	0	0	0	0	15	0	0	0	16	0
Lane Group Flow (vph)	0	158	0	0	0	0	180	0	0	0	33	0
Confl. Peds. (#/hr)	51		86	200	86	200		51	200	200		66
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		2					6				8	
Permitted Phases	2				6	6			8	8		
Actuated Green, G (s)		27.0					27.0				38.0	
Effective Green, g (s)		27.0					27.0				38.0	
Actuated g/C Ratio		0.30					0.30				0.42	
Clearance Time (s)		5.0					5.0				5.0	
Vehicle Extension (s)		3.0					3.0				3.0	
Lane Grp Cap (vph)		376					264				418	
v/s Ratio Prot							c0.20				0.03	
v/s Ratio Perm		0.13										
v/c Ratio		0.42					0.68				0.08	
Uniform Delay, d1		25.2					27.7				15.5	
Progression Factor		1.00					1.00				1.00	
Incremental Delay, d2		3.4					7.1				0.1	
Delay (s)		28.7					34.8				15.6	
Level of Service		C					C				B	
Approach Delay (s)		28.7					34.8				15.6	
Approach LOS		C					C				B	

Intersection Summary

HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations		↕		↕		↕	↕	
Volume (vph)	81	16	174	207	5	59	97	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1900	1800	1800
Total Lost time (s)		5.0		5.0		3.5	3.5	
Lane Util. Factor		0.95		0.95		1.00	1.00	
Frbp, ped/bikes		0.64		0.69		1.00	0.60	
Flpb, ped/bikes		1.00		1.00		0.77	1.00	
Frt		0.90		0.85		1.00	0.85	
Fit Protected		0.99		1.00		0.95	1.00	
Satd. Flow (prot)		830		853		1186	784	
Fit Permitted		0.90		1.00		0.95	1.00	
Satd. Flow (perm)		759		853		1186	784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	17	189	225	5	64	105	9
RTOR Reduction (vph)	0	3	0	83	0	0	74	0
Lane Group Flow (vph)	0	314	0	119	0	69	40	0
Confl. Peds. (#/hr)			200	200		51		86
Confl. Bikes (#/hr)			12	12				
Parking (#/hr)								
Turn Type	Perm	NA		Perm	Perm	Prot	Perm	
Protected Phases		4				5		
Permitted Phases	4			4	5		5	
Actuated Green, G (s)		38.0		38.0		11.5	11.5	
Effective Green, g (s)		38.0		38.0		11.5	11.5	
Actuated g/C Ratio		0.42		0.42		0.13	0.13	
Clearance Time (s)		5.0		5.0		3.5	3.5	
Vehicle Extension (s)		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		320		360		151	100	
v/s Ratio Prot								
v/s Ratio Perm		c0.41		0.14		0.06	0.05	
v/c Ratio		0.98		0.33		0.46	0.40	
Uniform Delay, d1		25.7		17.5		36.4	36.1	
Progression Factor		1.00		1.00		1.00	1.00	
Incremental Delay, d2		45.1		0.5		9.6	11.4	
Delay (s)		70.7		18.0		46.0	47.5	
Level of Service		E		B		D	D	
Approach Delay (s)		50.2				46.9		
Approach LOS		D				D		
Intersection Summary								

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕	↕	↕	↕↕			↕	
Volume (vph)	51	98	0	0	887	45	63	153	121	4	0	214
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frbp, ped/bikes		1.00			1.00	0.96	1.00	0.99			1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	0.93			0.87	
Fit Protected		0.98			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1281			2047	698	1459	2687			1330	
Fit Permitted		0.60			1.00	1.00	0.62	1.00			0.99	
Satd. Flow (perm)		781			2047	698	957	2687			1324	
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)	54	103	0	0	934	47	66	161	127	4	0	225
RTOR Reduction (vph)	0	0	0	0	0	0	0	76	0	0	0	0
Lane Group Flow (vph)	0	157	0	0	934	47	66	212	0	0	229	0
Confl. Peds. (#/hr)		32					32		8	8		
Confl. Bikes (#/hr)							10					
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		338			887	302	382	1074			529	
v/s Ratio Prot					c0.46			0.08				
v/s Ratio Perm		0.20				0.07	0.07				c0.17	
v/c Ratio		0.46			1.05	0.16	0.17	0.20			0.43	
Uniform Delay, d1		12.1			17.0	10.3	11.6	11.7			13.1	
Progression Factor		0.58			1.27	1.17	1.00	1.00			1.00	
Incremental Delay, d2		4.3			27.0	0.1	1.0	0.4			2.6	
Delay (s)		11.3			48.7	12.2	12.6	12.1			15.6	
Level of Service		B			D	B	B	B			B	
Approach Delay (s)		11.3			47.0			12.2			15.6	
Approach LOS		B			D			B			B	
Intersection Summary												
HCM 2000 Control Delay		32.4									C	
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		60.0							10.0			
Intersection Capacity Utilization		96.3%									F	
Analysis Period (min)		15										
c Critical Lane Group												

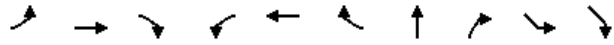
Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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TR-795

HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBT	NBR	SEL	SER	
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↔	↕	↕	
Volume (vph)	177	238	154	12	105	108	171	78	190	52	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	4.0	3.0			2.0		2.0		6.0		
Lane Util. Factor	1.00	0.95			1.00		1.00		0.97		
Frbp, ped/bikes	1.00	0.94			0.91		0.99		1.00		
Flpb, ped/bikes	1.00	1.00			1.00		1.00		1.00		
Frt	1.00	0.94			0.94		0.96		0.97		
Fit Protected	0.95	1.00			1.00		1.00		0.96		
Satd. Flow (prot)	1459	2399			1309		1451		2774		
Fit Permitted	0.95	1.00			0.97		1.00		0.96		
Satd. Flow (perm)	1459	2399			1275		1451		2774		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	184	248	160	12	109	112	178	81	198	54	
RTOR Reduction (vph)	0	105	0	0	137	0	18	0	0	0	
Lane Group Flow (vph)	184	303			96		241		252	0	
Confl. Peds. (#/hr)			152			154		25			
Confl. Bikes (#/hr)			30								
Parking (#/hr)		10	10								
Turn Type	Prot	NA		Perm	NA		NA		Prot		
Protected Phases	5	2			6		8		4		
Permitted Phases				6							
Actuated Green, G (s)	6.0	25.0			15.0		20.0		19.0		
Effective Green, g (s)	8.0	28.0			17.0		23.0		19.0		
Actuated g/C Ratio	0.10	0.35			0.21		0.28		0.23		
Clearance Time (s)	6.0	6.0			4.0		5.0		6.0		
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0		
Lane Grp Cap (vph)	144	829			267		412		650		
v/s Ratio Prot	c0.13	c0.13					c0.17		c0.09		
v/s Ratio Perm					0.07						
v/c Ratio	1.28	0.37			0.36		0.59		0.39		
Uniform Delay, d1	36.5	19.9			27.3		24.9		26.1		
Progression Factor	1.00	1.00			1.00		1.00		1.00		
Incremental Delay, d2	167.8	0.3			0.8		2.1		0.4		
Delay (s)	204.3	20.1			28.2		27.0		26.5		
Level of Service	F	C			C		C		C		
Approach Delay (s)		77.4			28.2		27.0		26.5		
Approach LOS		E			C		C		C		
Intersection Summary											
HCM 2000 Control Delay			49.4							HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.55								
Actuated Cycle Length (s)			81.0						14.0	Sum of lost time (s)	
Intersection Capacity Utilization			92.7%						F	ICU Level of Service	
Analysis Period (min)			15								
c Critical Lane Group											

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBR	SBL	SBT	SBR	SBR2		
Lane Configurations	↔	↔	↔	↕	↔	↔	↕	↕	↕		
Volume (vph)	84	65	696	468	23	42	0	1171	253		
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1600	1600	1600	1600		
Total Lost time (s)	3.0		5.0	3.0	3.0		3.0	5.0	3.0		
Lane Util. Factor	1.00		0.91	0.91	1.00		1.00	0.88	1.00		
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00	1.00	0.98		
Flpb, ped/bikes	1.00		1.00	1.00	1.00		0.92	1.00	1.00		
Frt	0.94		1.00	1.00	0.86		1.00	0.85	0.85		
Fit Protected	1.00		0.95	0.98	1.00		0.95	1.00	1.00		
Satd. Flow (prot)	1445		1327	2533	1328		1192	2042	1132		
Fit Permitted	1.00		0.58	0.74	1.00		0.95	1.00	1.00		
Satd. Flow (perm)	1445		811	1916	1328		1192	2042	1132		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Adj. Flow (vph)	85	66	703	473	23	42	0	1183	256		
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	145		
Lane Group Flow (vph)	151	0	380	796	5	0	42	1183	111		
Confl. Peds. (#/hr)						70	70		17		
Parking (#/hr)				10		10					
Turn Type	NA		pm+pt	NA	Over	Perm	NA	Perm	custom		
Protected Phases	2		1	6	1		4				
Permitted Phases			6			4		4	6		
Actuated Green, G (s)	8.0		24.0	24.0	11.0		26.0	26.0	24.0		
Effective Green, g (s)	10.0		24.0	26.0	13.0		28.0	26.0	26.0		
Actuated g/C Ratio	0.17		0.40	0.43	0.22		0.47	0.43	0.43		
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0	5.0	5.0		
Lane Grp Cap (vph)	240		419	963	287		556	884	490		
v/s Ratio Prot	0.10		0.17	c0.18	0.00						
v/s Ratio Perm			c0.20	0.18			0.04	c0.58	0.10		
v/c Ratio	0.63		0.91	0.83	0.02		0.08	1.34	0.23		
Uniform Delay, d1	23.3		16.9	15.0	18.5		8.8	17.0	10.7		
Progression Factor	1.00		1.36	1.31	1.00		1.00	1.00	1.00		
Incremental Delay, d2	11.9		13.6	3.7	0.1		0.3	159.9	1.1		
Delay (s)	35.2		36.6	23.2	18.6		9.1	176.9	11.8		
Level of Service	D		D	C	B		A	F	B		
Approach Delay (s)	35.2			27.6			143.6				
Approach LOS	D			C			F				
Intersection Summary											
HCM 2000 Control Delay			88.6							HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.15								
Actuated Cycle Length (s)			60.0						11.0	Sum of lost time (s)	
Intersection Capacity Utilization			100.7%						G	ICU Level of Service	
Analysis Period (min)			15								
c Critical Lane Group											

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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TR-796

HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔						↔	↔
Volume (vph)	0	0	0	697	1429	0	0	0	0	0	1133	460
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1900	1900	1900
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.95	0.66
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.98	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4933						4885	732
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4933						4885	732
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	711	1458	0	0	0	0	0	1156	469
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	419	1750	0	0	0	0	0	1334	291
Confl. Peds. (#/hr)				195		399	495		657	657		495
Confl. Bikes (#/hr)			30			30			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				32.0	32.0						26.0	26.0
Effective Green, g (s)				33.5	33.5						28.0	28.0
Actuated g/C Ratio				0.37	0.37						0.31	0.31
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				439	1836						1519	227
v/s Ratio Prot				c0.35	0.35						0.27	
v/s Ratio Perm												c0.40
v/c Ratio				0.95	0.95						0.88	1.28
Uniform Delay, d1				27.5	27.5						29.4	31.0
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				32.9	12.5						7.5	156.2
Delay (s)				60.5	40.0						36.9	187.2
Level of Service				E	D						D	F
Approach Delay (s)	0.0				44.0			0.0			63.8	
Approach LOS	A				D			A			E	

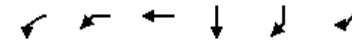
Intersection Summary			
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	172	738	1141	544	951	288
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)	2.4		2.4	5.7	2.7	2.7
Lane Util. Factor	0.81		0.81	0.91	0.91	1.00
Frbp, ped/bikes	1.00		1.00	0.99	0.98	0.97
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	0.93	0.85	0.85
Fit Protected	0.95		0.98	1.00	1.00	1.00
Satd. Flow (prot)	1050		4885	2120	1038	1126
Fit Permitted	0.95		0.98	1.00	1.00	1.00
Satd. Flow (perm)	1050		4885	2120	1038	1126
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	176	753	1164	555	970	294
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	158	0	1935	1040	485	280
Confl. Peds. (#/hr)						21
Confl. Bikes (#/hr)						10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)				10		
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)	35.6		35.6	43.3	43.3	43.3
Effective Green, g (s)	38.6		38.6	43.3	46.3	46.3
Actuated g/C Ratio	0.43		0.43	0.48	0.51	0.51
Clearance Time (s)	5.4		5.4	5.7	5.7	5.7
Lane Grp Cap (vph)	450		2081	1019	533	579
v/s Ratio Prot				c0.49		
v/s Ratio Perm	0.15		0.40		0.47	0.25
v/c Ratio	0.35		1.32dl	1.09dr	0.91	0.48
Uniform Delay, d1	17.3		24.4	23.4	19.9	14.1
Progression Factor	1.00		1.00	1.66	1.86	2.05
Incremental Delay, d2	2.1		8.9	23.3	10.9	1.2
Delay (s)	19.4		33.3	62.0	48.1	30.1
Level of Service	B		C	E	D	C
Approach Delay (s)			32.3	53.1		
Approach LOS			C	D		

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations	↑↑↑↑		↑	↑	↑↑↑↑	↑
Volume (vph)	724	113	132	584	136	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.98		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5767		1459	1305	4118	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5767		1459	1305	4118	1122
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	770	120	140	621	145	15
RTOR Reduction (vph)	31	0	95	0	0	0
Lane Group Flow (vph)	859	0	45	621	147	13
Confl. Peds. (#/hr)		143	776			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1633		466	417	1075	292
v/s Ratio Prot	c0.15		0.03	c0.48	c0.04	
v/s Ratio Perm						0.01
v/c Ratio	0.53		0.10	1.49	0.14	0.04
Uniform Delay, d1	27.2		21.5	30.6	25.5	24.9
Progression Factor	1.00		0.94	0.78	1.00	1.00
Incremental Delay, d2	1.2		0.2	226.7	0.3	0.3
Delay (s)	28.4		20.5	250.7	25.7	25.1
Level of Service	C		C	F	C	C
Approach Delay (s)	28.4			208.4	25.7	
Approach LOS	C			F	C	

Intersection Summary

HCM 2000 Control Delay	103.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	272	1171	161	52	302	537	219	192	722	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.87
Flpb, ped/bikes		0.99			1.00	1.00			0.84	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5749			2857	2464			3416	978
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5749			1899	2464			3416	978
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	209	776	285
RTOR Reduction (vph)	0	22	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	808	0	0	1014	256
Confl. Peds. (#/hr)		50		100	100		100	50	100	100
Confl. Bikes (#/hr)				10			10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases		6			4	4			7	
Permitted Phases	6			4				7		7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1852			590	766			1024	293
v/s Ratio Prot						c0.33				
v/s Ratio Perm		0.30			0.20				0.30	0.26
v/c Ratio		0.92			0.65	1.05			0.99	0.87
Uniform Delay, d1		29.4			26.7	31.0			31.4	29.9
Progression Factor		1.48			1.00	1.00			1.00	1.00
Incremental Delay, d2		6.6			5.4	47.9			25.9	28.4
Delay (s)		50.1			32.1	78.9			57.2	58.2
Level of Service		D			C	E			E	E
Approach Delay (s)		50.1			32.1	78.9			57.4	
Approach LOS		D			C	E			E	

Intersection Summary

HCM 2000 Control Delay	56.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	108.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekday PM Peak (No Giants)

Synchro 8 Report
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HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	112	87	29	15	307	19	23	3	3	4	4	195
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	129	100	33	17	353	22	26	3	3	5	5	224
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	262	392	33	233								
Volume Left (vph)	129	17	26	5								
Volume Right (vph)	33	22	3	224								
Hadj (s)	0.06	0.01	0.13	-0.54								
Departure Headway (s)	5.2	5.0	6.2	5.1								
Degree Utilization, x	0.38	0.55	0.06	0.33								
Capacity (veh/h)	644	686	484	640								
Control Delay (s)	11.4	13.9	9.5	10.6								
Approach Delay (s)	11.4	13.9	9.5	10.6								
Approach LOS	B	B	A	B								
Intersection Summary												
Delay				12.2								
Level of Service				B								
Intersection Capacity Utilization				60.0%	ICU Level of Service	B						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (vph)	50	525	93	168	204	81	44	338	73	38	308	215
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	2.0		2.0		2.0		3.0					
Lane Util. Factor	0.95		0.95		0.95		0.95					
Frbp, ped/bikes	0.93		0.95		0.95		0.89					
Flpb, ped/bikes	0.99		0.94		0.99		0.99					
Frt	0.98		0.97		0.98		0.94					
Fit Protected	1.00		0.98		1.00		1.00					
Satd. Flow (prot)	2154		2044		2348		1956					
Fit Permitted	0.89		0.61		0.87		0.90					
Satd. Flow (perm)	1931		1262		2056		1771					
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)	53	553	98	177	215	85	46	356	77	40	324	226
RTOR Reduction (vph)	0	17	0	0	15	0	0	9	0	0	24	0
Lane Group Flow (vph)	0	687	0	0	462	0	0	470	0	0	566	0
Confl. Peds. (#/hr)	400		400		400		400		400			
Confl. Bikes (#/hr)			20		6		3		23			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0
Parking (#/hr)	10		10		10		10		10			
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		6		8		4					
Permitted Phases	2		6		8		4					
Actuated Green, G (s)	25.0		25.0		25.0		25.0					
Effective Green, g (s)	28.0		28.0		28.0		27.0					
Actuated g/C Ratio	0.47		0.47		0.47		0.45					
Clearance Time (s)	5.0		5.0		5.0		5.0					
Lane Grp Cap (vph)	901		588		959		796					
v/s Ratio Prot			c0.37		0.23		c0.32					
v/c Ratio	0.76		1.11dl		0.49		0.71					
Uniform Delay, d1	13.3		13.5		11.1		13.3					
Progression Factor	1.00		1.00		1.00		1.53					
Incremental Delay, d2	6.1		10.1		1.8		4.3					
Delay (s)	19.3		23.6		12.9		24.7					
Level of Service	B		C		B		C					
Approach Delay (s)	19.3		23.6		12.9		24.7					
Approach LOS	B		C		B		C					
Intersection Summary												
HCM 2000 Control Delay	20.3		HCM 2000 Level of Service		C							
HCM 2000 Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	60.0		Sum of lost time (s)		5.0							
Intersection Capacity Utilization	106.6%		ICU Level of Service		G							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

28: Second St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔↔	↑↑↔						↑↑	↔		↑↑		
Volume (vph)	354	561	48	0	0	0	0	512	177	12	521	0	
Ideal Flow (vphpl)	1050	1050	1050	1800	1800	1800	1050	1050	1050	1600	1600	1600	
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0		
Lane Util. Factor	*0.50	*0.50						*0.50	0.91		0.95		
Frbp, ped/bikes	1.00	0.98						0.99	0.71		1.00		
Flpb, ped/bikes	1.00	1.00						1.00	1.00		1.00		
Frt	1.00	0.99						0.99	0.85		1.00		
Flt Protected	0.95	1.00						1.00	1.00		1.00		
Satd. Flow (prot)	787	1234						883	493		2391		
Flt Permitted	0.95	1.00						1.00	1.00		0.93		
Satd. Flow (perm)	787	1234						883	493		2225		
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)	381	603	52	0	0	0	0	551	190	13	560	0	
RTOR Reduction (vph)	0	8	0	0	0	0	0	2	9	0	0	0	
Lane Group Flow (vph)	381	647	0	0	0	0	0	568	162	0	573	0	
Confl. Peds. (#/hr)			400						400	400			
Confl. Bikes (#/hr)			1						17				
Parking (#/hr)	10	10	10								10		
Turn Type	Split	NA						NA	Perm	Perm	NA		
Protected Phases	2	2						4			4		
Permitted Phases									4	4			
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0		
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5		
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46		
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5		
Lane Grp Cap (vph)	373	586						404	225		1019		
v/s Ratio Prot	0.48	c0.52						c0.64					
v/s Ratio Perm									0.33		0.26		
v/c Ratio	1.02	1.10						1.41	0.72		0.56		
Uniform Delay, d1	15.8	15.8						16.2	13.1		11.9		
Progression Factor	1.00	1.00						0.73	0.70		1.00		
Incremental Delay, d2	52.2	69.0						196.0	17.0		2.2		
Delay (s)	67.9	84.8						207.9	26.2		14.1		
Level of Service	E	F						F	C		B		
Approach Delay (s)		78.6			0.0			165.9			14.1		
Approach LOS		E			A			F			B		
Intersection Summary													
HCM 2000 Control Delay			90.4									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.23										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	4.0
Intersection Capacity Utilization			78.1%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING – SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	52	206	162	507	0	644	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95		0.95	
Frbp, ped/bikes	1.00	0.82	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	1.00	1.00		0.99	
Fit Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1540	1128	2987	3079		3046	
Fit Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1540	1128	2987	3079		3046	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	226	178	557	0	708	31
RTOR Reduction (vph)	0	146	0	0	0	3	0
Lane Group Flow (vph)	57	80	178	557	0	736	0
Confl. Peds. (#/hr)		191					110
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.4		37.6	
Effective Green, g (s)	39.0	39.0	20.0	51.3		39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.47		0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9		5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	546	399	543	1435		1079	
v/s Ratio Prot			0.06			c0.24	
v/s Ratio Perm	0.04	c0.07		c0.18			
v/c Ratio	0.10	0.20	0.33	0.39		0.68	
Uniform Delay, d1	23.8	24.7	39.2	19.1		30.2	
Progression Factor	1.00	1.00	0.88	0.70		1.00	
Incremental Delay, d2	0.1	0.2	0.3	0.8		3.5	
Delay (s)	23.9	24.9	35.0	14.1		33.7	
Level of Service	C	C	C	B		C	
Approach Delay (s)	24.7			19.1		33.7	
Approach LOS	C			B		C	
Intersection Summary							
HCM 2000 Control Delay			26.2		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.46				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	16.7	
Intersection Capacity Utilization			76.8%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	138	99	142	519	12	775	63
Ideal Flow (vphpl)	1900	1900	1400	1400	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.1	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.84	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	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	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1540	1158	2201	3260	1540	4324	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1540	1158	2201	3260	1540	4324	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	142	102	146	535	12	799	65
RTOR Reduction (vph)	0	60	0	0	0	9	0
Lane Group Flow (vph)	142	42	146	535	12	855	0
Confl. Peds. (#/hr)		188	131				131
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.5	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	630	473	420	1256	147	1257	
v/s Ratio Prot			0.07	c0.16	0.01	c0.20	
v/s Ratio Perm	c0.09	0.04					
v/c Ratio	0.23	0.09	0.35	0.43	0.08	0.68	
Uniform Delay, d1	21.2	19.9	38.6	24.9	45.4	34.5	
Progression Factor	1.00	1.00	1.18	1.20	0.54	0.87	
Incremental Delay, d2	0.2	0.1	0.5	1.0	0.9	2.4	
Delay (s)	21.3	20.0	46.0	30.9	25.5	32.3	
Level of Service	C	C	D	C	C	C	
Approach Delay (s)	20.8			34.1		32.3	
Approach LOS	C			C		C	
Intersection Summary							
HCM 2000 Control Delay			31.4		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.44				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	15.8	
Intersection Capacity Utilization			75.5%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

TR-802

HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	130	99	0	572	794	64
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	*0.80	
Frbp, ped/bikes	1.00	0.89		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1223		3726	3208	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1223		3726	3208	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	149	114	0	657	913	74
RTOR Reduction (vph)	0	55	0	0	7	0
Lane Group Flow (vph)	149	59	0	657	980	0
Confl. Peds. (#/hr)	307	110				80
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	35.6	35.6		62.8	62.8	
Effective Green, g (s)	38.0	35.6		64.0	64.0	
Actuated g/C Ratio	0.35	0.32		0.58	0.58	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	532	395		2167	1866	
v/s Ratio Prot	c0.10			0.18	c0.31	
v/s Ratio Perm		0.05				
v/c Ratio	0.28	0.15		0.30	0.53	
Uniform Delay, d1	26.1	26.4		11.7	13.8	
Progression Factor	1.00	1.00		1.48	0.37	
Incremental Delay, d2	0.3	0.2		0.3	0.9	
Delay (s)	26.4	26.6		17.7	6.0	
Level of Service	C	C		B	A	
Approach Delay (s)	26.5			17.7	6.0	
Approach LOS	C			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	67	49	181	501	4	718	171
Ideal Flow (vphpl)	1900	1900	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	7.1	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.93	1.00	1.00	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1286	1459	4191	1459	2917	1235
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1286	1459	4191	1459	2917	1235
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	76	56	206	569	5	816	194
RTOR Reduction (vph)	0	34	0	0	0	0	125
Lane Group Flow (vph)	76	22	206	569	5	816	69
Confl. Peds. (#/hr)	120	72	46				46
Turn Type	Prot	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	2	1	6	
Permitted Phases		4					6
Actuated Green, G (s)	42.9	42.9	10.1	39.8	7.0	37.6	37.6
Effective Green, g (s)	46.0	42.9	13.0	42.7	9.3	39.0	39.0
Actuated g/C Ratio	0.42	0.39	0.12	0.39	0.08	0.35	0.35
Clearance Time (s)	7.1	7.1	6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	644	501	172	1626	123	1034	437
v/s Ratio Prot	c0.05		c0.14	0.14	0.00	c0.28	
v/s Ratio Perm		0.02					0.06
v/c Ratio	0.12	0.04	1.20	0.35	0.04	0.79	0.16
Uniform Delay, d1	19.6	20.8	48.5	23.8	46.3	31.8	24.3
Progression Factor	1.00	1.00	0.70	0.71	1.62	0.64	1.13
Incremental Delay, d2	0.1	0.0	131.0	0.6	0.5	5.4	0.7
Delay (s)	19.7	20.9	165.1	17.6	75.4	25.9	28.2
Level of Service	B	C	F	B	E	C	C
Approach Delay (s)	20.2			56.8		26.6	
Approach LOS	C			E		C	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	172	56	23	176	510	751	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1600	1600
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.78		1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	950		1593	2946	2650	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3090	950		1593	2946	2650	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	181	59	24	185	537	791	17
RTOR Reduction (vph)	0	35	0	0	0	1	0
Lane Group Flow (vph)	181	24	0	209	537	807	0
Confl. Peds. (#/hr)	84	266					223
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	Prot	Prot	NA	NA	
Protected Phases	4		5	5	2	6	
Permitted Phases		4					
Actuated Green, G (s)	42.3	42.3		12.6	55.7	36.7	
Effective Green, g (s)	45.3	45.3		15.6	58.7	39.7	
Actuated g/C Ratio	0.41	0.41		0.14	0.53	0.36	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	391		225	1572	956	
v/s Ratio Prot	c0.06			c0.13	0.18	c0.30	
v/s Ratio Perm		0.03					
v/c Ratio	0.14	0.06		0.93	0.34	0.84	
Uniform Delay, d1	20.2	19.5		46.7	14.6	32.3	
Progression Factor	1.00	1.00		1.60	0.21	0.08	
Incremental Delay, d2	0.2	0.3		42.6	0.6	6.1	
Delay (s)	20.4	19.8		117.2	3.7	8.8	
Level of Service	C	B		F	A	A	
Approach Delay (s)	20.3				35.5	8.8	
Approach LOS	C				D	A	
Intersection Summary							
HCM 2000 Control Delay			21.4		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.54				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	10.4	12.2
Intersection Capacity Utilization			85.7%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (vph)	99	107	0	610	627	203	
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600	
Total Lost time (s)	6.8	6.8		5.4	5.4		
Lane Util. Factor	1.00	1.00		0.95	0.95		
Frbp, ped/bikes	1.00	0.96		1.00	0.97		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		
Frt	1.00	0.85		1.00	0.96		
Flt Protected	0.95	1.00		1.00	1.00		
Satd. Flow (prot)	1540	1318		3079	2415		
Flt Permitted	0.95	1.00		1.00	1.00		
Satd. Flow (perm)	1540	1318		3079	2415		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	102	110	0	629	646	209	
RTOR Reduction (vph)	0	63	0	0	28	0	
Lane Group Flow (vph)	102	47	0	629	827	0	
Confl. Peds. (#/hr)	73	40				140	
Confl. Bikes (#/hr)						117	
Turn Type	Prot	Perm		NA	NA		
Protected Phases	4			2	6		
Permitted Phases		4					
Actuated Green, G (s)	41.2	41.2		56.6	56.6		
Effective Green, g (s)	41.2	41.2		56.6	56.6		
Actuated g/C Ratio	0.37	0.37		0.51	0.51		
Clearance Time (s)	6.8	6.8		5.4	5.4		
Lane Grp Cap (vph)	576	493		1584	1242		
v/s Ratio Prot	c0.07			0.20	c0.34		
v/s Ratio Perm		0.04					
v/c Ratio	0.18	0.10		0.40	0.67		
Uniform Delay, d1	23.0	22.3		16.3	19.7		
Progression Factor	1.00	1.00		1.56	0.77		
Incremental Delay, d2	0.7	0.4		0.7	1.6		
Delay (s)	23.7	22.7		26.1	16.8		
Level of Service	C	C		C	B		
Approach Delay (s)	23.2			26.1	16.8		
Approach LOS	C			C	B		
Intersection Summary							
HCM 2000 Control Delay			21.0		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.46				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	12.2	
Intersection Capacity Utilization			91.7%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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DRAFT - SUBJECT TO REVIEW

TR-804

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Volume (vph)	49	3	100	1	1	6	78	555	4	21	645	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600	1600	1600
Total Lost time (s)	6.9	6.9		6.9	6.9		6.5	6.5		5.9	5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		0.96	1.00		1.00	1.00		1.00	1.00	0.87
Flpb, ped/bikes	0.96	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		0.90	1.00		1.00	1.00		1.00	1.00	0.85
Fit Protected	0.95	1.00		0.99	0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1480	1339		1390	1540		3070	3070		1296	2593	1004
Fit Permitted	0.75	1.00		0.98	0.95		1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1172	1339		1374	1540		3070	3070		1296	2593	1004
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	52	3	106	1	1	6	83	590	4	22	686	72
RTOR Reduction (vph)	0	69	0	0	4	0	0	1	0	0	0	48
Lane Group Flow (vph)	52	40	0	0	4	0	83	593	0	22	686	24
Confl. Peds. (#/hr)	45		24	24		45			173			77
Confl. Bikes (#/hr)			2						52			80
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	38.1	38.1		38.1			16.5	41.5		11.1	36.8	36.8
Effective Green, g (s)	38.1	38.1		38.1			16.5	41.5		11.1	36.8	36.8
Actuated g/C Ratio	0.35	0.35		0.35			0.15	0.38		0.10	0.33	0.33
Clearance Time (s)	6.9	6.9		6.9			6.5	6.5		5.9	5.2	5.2
Lane Grp Cap (vph)	405	463		475			231	1158		130	867	335
v/s Ratio Prot		0.03					0.05	c0.19		0.02	c0.26	
v/s Ratio Perm	c0.04			0.00								0.02
v/c Ratio	0.13	0.09		0.01			0.36	0.51		0.17	0.79	0.07
Uniform Delay, d1	24.6	24.2		23.6			42.0	26.4		45.2	33.1	25.0
Progression Factor	1.00	1.00		1.00			0.42	0.36		1.19	0.80	1.06
Incremental Delay, d2	0.7	0.4		0.0			3.8	1.4		2.3	6.0	0.3
Delay (s)	25.2	24.6		23.6			21.6	10.9		56.2	32.4	26.9
Level of Service	C	C		C			C	B		E	C	C
Approach Delay (s)		24.8		23.6			12.3				32.6	
Approach LOS		C		C			B				C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Volume (veh/h)	276	0	31	131	5	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	358	0	40	170	6	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked					0.99	
vC, conflicting volume			358		609	179
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			358		603	179
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	98
cM capacity (veh/h)			1197		413	833

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	239	119	210	26
Volume Left	0	0	40	6
Volume Right	0	0	0	19
cSH	1700	1700	1197	664
Volume to Capacity	0.14	0.07	0.03	0.04
Queue Length 95th (ft)	0	0	3	3
Control Delay (s)	0.0	0.0	1.8	10.6
Lane LOS			A	B
Approach Delay (s)	0.0		1.8	10.6
Approach LOS				B

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	42	30	5	143	594	1	656	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.95		1.00	1.00	1.00	1.00	0.71
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	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1314		1540	3079	1540	3079	982
Fit Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1314		1540	3079	1540	3079	982
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	46	33	5	157	653	1	721	98
RTOR Reduction (vph)	0	22	0	0	0	0	0	49
Lane Group Flow (vph)	46	11	0	162	653	1	721	49
Confl. Peds. (#/hr)	36	40						133
Confl. Bikes (#/hr)								92
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Effective Green, g (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Actuated g/C Ratio	0.35	0.35		0.10	0.40	0.09	0.37	0.37
Clearance Time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	455		159	1226	140	1147	366
v/s Ratio Prot	c0.03			c0.11	0.21	0.00	c0.23	
v/s Ratio Perm		0.01						0.05
v/c Ratio	0.09	0.03		1.02	0.53	0.01	0.63	0.13
Uniform Delay, d1	24.2	23.7		49.3	25.3	45.5	28.3	22.8
Progression Factor	1.00	1.00		0.44	0.67	0.90	0.52	0.45
Incremental Delay, d2	0.3	0.1		67.6	1.3	0.1	1.9	0.5
Delay (s)	24.5	23.8		89.4	18.2	40.8	16.6	10.8
Level of Service	C	C		F	B	D	B	B
Approach Delay (s)	24.2				32.4		15.9	
Approach LOS	C				C		B	
Intersection Summary								
HCM 2000 Control Delay			24.1		HCM 2000 Level of Service			C
HCM 2000 Volume to Capacity ratio			0.45					
Actuated Cycle Length (s)			110.0		Sum of lost time (s)			19.5
Intersection Capacity Utilization			91.7%		ICU Level of Service			F
Analysis Period (min)			15					
c Critical Lane Group								

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	26	2	45	1	6	2	16	54	714	10	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600
Total Lost time (s)		7.0			7.0			7.0	7.0			5.8
Lane Util. Factor		1.00			1.00			1.00	0.95			1.00
Frbp, ped/bikes		0.80			0.94			1.00	0.99			1.00
Flpb, ped/bikes		0.89			0.97			1.00	1.00			1.00
Frt		0.92			0.97			1.00	1.00			1.00
Fit Protected		0.98			1.00			0.95	1.00			0.95
Satd. Flow (prot)		1039			1426			1540	3050			1296
Fit Permitted		0.91			0.99			0.95	1.00			0.43
Satd. Flow (perm)		964			1415			1540	3050			593
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	2	49	1	7	2	17	59	776	11	3	1
RTOR Reduction (vph)	0	32	0	0	1	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	47	0	0	9	0	0	76	786	0	0	4
Confl. Peds. (#/hr)	400		400	400		400				400		
Confl. Bikes (#/hr)			30			30				30		
Turn Type		Perm	NA		Perm	NA		Prot	Prot	NA	custom	Prot
Protected Phases			4			8		5	5	2		1
Permitted Phases		4			8						1	
Actuated Green, G (s)			38.0			38.0		15.0	43.0			9.2
Effective Green, g (s)			38.0			38.0		15.0	43.0			9.2
Actuated g/C Ratio			0.35			0.35		0.14	0.39			0.08
Clearance Time (s)			7.0			7.0		7.0	7.0			5.8
Lane Grp Cap (vph)			333			488		210	1192			49
v/s Ratio Prot								0.05	c0.26			
v/s Ratio Perm			c0.05			0.01						0.01
v/c Ratio			0.14			0.02		0.36	0.66			0.08
Uniform Delay, d1			24.8			23.7		43.2	27.5			46.5
Progression Factor			1.00			1.00		0.75	0.70			1.56
Incremental Delay, d2			0.9			0.1		3.6	2.2			2.6
Delay (s)			25.7			23.8		36.0	21.3			74.9
Level of Service			C			C		D	C			E
Approach Delay (s)			25.7			23.8			22.6			
Approach LOS			C			C			C			
Intersection Summary												
HCM 2000 Control Delay			19.2					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			110.0					Sum of lost time (s)			19.8	
Intersection Capacity Utilization			91.7%					ICU Level of Service			F	
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



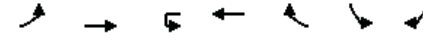
Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (vph)	628	59
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)	5.4	
Lane Util. Factor	0.95	
Frbp, ped/bikes	0.97	
Flpb, ped/bikes	1.00	
Frt	0.99	
Fit Protected	1.00	
Satd. Flow (prot)	2488	
Fit Permitted	1.00	
Satd. Flow (perm)	2488	
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	683	64
RTOR Reduction (vph)	7	0
Lane Group Flow (vph)	740	0
Confl. Peds. (#/hr)		400
Confl. Bikes (#/hr)		30
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	37.6	
Effective Green, g (s)	37.6	
Actuated g/C Ratio	0.34	
Clearance Time (s)	5.4	
Lane Grp Cap (vph)	850	
v/s Ratio Prot	c0.30	
v/s Ratio Perm		
v/c Ratio	0.87	
Uniform Delay, d1	33.9	
Progression Factor	0.13	
Incremental Delay, d2	9.8	
Delay (s)	14.1	
Level of Service	B	
Approach Delay (s)	14.4	
Approach LOS	B	

Intersection Summary

HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑↑	↔	↑↑		↔	↔
Volume (vph)	123	778	4	630	56	24	209
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1900	1900
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	0.95		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97		1.00	0.68
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1540	3079	1540	2494		1540	931
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1540	3079	1540	2494		1540	931
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	132	837	4	677	60	26	225
RTOR Reduction (vph)	0	0	0	6	0	0	147
Lane Group Flow (vph)	132	837	4	731	0	26	78
Confl. Peds. (#/hr)					400	400	400
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA		Prot	Perm
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	215	1253	117	825		534	323
v/s Ratio Prot	0.09	c0.27	0.00	c0.29		0.02	
v/s Ratio Perm							c0.08
v/c Ratio	0.61	0.67	0.03	0.89		0.05	0.24
Uniform Delay, d1	44.5	26.5	47.0	34.8		23.8	25.6
Progression Factor	0.71	1.36	0.74	0.62		1.00	1.00
Incremental Delay, d2	10.6	2.4	0.3	8.1		0.2	1.8
Delay (s)	42.3	38.6	34.9	29.5		24.0	27.4
Level of Service	D	D	C	C		C	C
Approach Delay (s)		39.1		29.5		27.0	
Approach LOS		D		C		C	

Intersection Summary

HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↔↔↔	↕			
Volume (vph)	634	750	58	140	619	80	43	451	151	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.98		1.00	0.96			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	2977		2515	2453			5401	937			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	2977		2515	2453			5401	937			
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)	704	833	64	156	688	89	48	501	168	0	0	0
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	139	0	0	0
Lane Group Flow (vph)	704	893	0	156	774	0	0	549	29	0	0	0
Confl. Peds. (#/hr)			400			400	400		400			
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.3	56.6		13.9	53.7			19.1	19.1			
Effective Green, g (s)	18.3	56.6		13.9	53.7			19.1	19.1			
Actuated g/C Ratio	0.17	0.51		0.13	0.49			0.17	0.17			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	722	1531		317	1197			937	162			
v/s Ratio Prot	c0.16	0.30		0.06	c0.32							
v/s Ratio Perm								0.10	0.03			
v/c Ratio	0.98	0.58		0.49	0.65			0.59	0.18			
Uniform Delay, d1	45.6	18.5		44.8	21.1			41.8	38.8			
Progression Factor	0.75	0.91		1.40	0.68			1.00	1.00			
Incremental Delay, d2	17.5	0.8		0.8	0.8			0.9	0.5			
Delay (s)	51.6	17.6		63.4	15.2			42.8	39.3			
Level of Service	D	B		E	B			D	D			
Approach Delay (s)		32.6			23.2			41.9			0.0	
Approach LOS		C			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	152	1357	79	56	557	49	7	47	25	60	204	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.64	1.00	0.98	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.95	1.00	0.67	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4295		1296	2432			1535	858	1032	2862	581
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4295		1296	2432			1482	858	782	2862	581
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1444	84	60	593	52	7	50	27	64	217	103
RTOR Reduction (vph)	0	6	0	0	6	0	0	0	18	0	3	60
Lane Group Flow (vph)	162	1522	0	60	639	0	0	57	9	64	224	33
Confl. Peds. (#/hr)			761			695	1648		678	678		1648
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4		4	7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.36		0.11	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1561		140	793			514	297	278	1019	207
v/s Ratio Prot	0.11	c0.35		0.05	c0.26						0.08	
v/s Ratio Perm								0.04	0.01	c0.08		0.06
v/c Ratio	0.81	0.98		0.43	0.81			0.11	0.03	0.23	0.22	0.16
Uniform Delay, d1	46.4	34.5		45.9	33.9			24.4	23.7	24.8	24.7	24.2
Progression Factor	0.65	0.75		0.75	0.62			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	6.6		1.6	4.7			0.1	0.0	0.4	0.1	0.4
Delay (s)	35.8	32.4		36.1	25.9			24.5	23.7	25.2	24.8	24.5
Level of Service	D	C		D	C			C	C	C	C	C
Approach Delay (s)		32.7			26.7			24.2			24.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1533	80	0	661	30	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, 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	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3051			3079	1540	1357
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3051			3079	1540	1357
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1685	88	0	726	33	60
RTOR Reduction (vph)	3	0	0	0	0	10
Lane Group Flow (vph)	1770	0	0	726	33	50
Confl. Peds. (#/hr)		37	37		1	3
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1722			1738	512	451
v/s Ratio Prot	c0.58			0.24	0.02	
v/s Ratio Perm						c0.04
v/c Ratio	1.03			0.42	0.06	0.11
Uniform Delay, d1	23.9			13.6	25.0	25.4
Progression Factor	1.00			0.56	1.00	1.00
Incremental Delay, d2	29.1			0.5	0.2	0.5
Delay (s)	53.0			8.2	25.3	25.9
Level of Service	D			A	C	C
Approach Delay (s)	53.0			8.2	25.7	
Approach LOS	D			A	C	
Intersection Summary						
HCM 2000 Control Delay			39.5		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	11.3
Intersection Capacity Utilization			90.8%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑		↑	↑			↑	↑
Volume (vph)	28	156	50	10	315	69	72	275	20	3	22	71
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.96			0.96		1.00	0.99			1.00	0.88
Flpb, ped/bikes		1.00			1.00		0.89	1.00			0.99	1.00
Frt		0.97			0.97		1.00	0.99			1.00	0.85
Fit Protected		0.99			1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		1662			1170		1525	1768			1778	1142
Fit Permitted		0.84			0.93		0.74	1.00			0.97	1.00
Satd. Flow (perm)		1408			1092		1188	1768			1741	1142
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)	31	173	56	11	350	77	80	306	22	3	24	79
RTOR Reduction (vph)	0	16	0	0	16	0	0	5	0	0	0	45
Lane Group Flow (vph)	0	244	0	0	422	0	80	323	0	0	27	34
Confl. Peds. (#/hr)			100	100		100	100		100	100		100
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		6			6
Actuated Green, G (s)		26.0			26.0		26.0	26.0			26.0	26.0
Effective Green, g (s)		26.0			26.0		26.0	26.0			26.0	26.0
Actuated g/C Ratio		0.43			0.43		0.43	0.43			0.43	0.43
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)		610			473		514	766			754	494
v/s Ratio Prot								c0.18				
v/s Ratio Perm		0.17			c0.39		0.07				0.02	0.03
v/c Ratio		0.40			0.89		0.16	0.42			0.04	0.07
Uniform Delay, d1		11.6			15.7		10.3	11.8			9.8	9.9
Progression Factor		1.12			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		1.8			21.8		0.6	1.7			0.1	0.3
Delay (s)		14.9			37.5		11.0	13.5			9.9	10.2
Level of Service		B			D		B	B			A	B
Approach Delay (s)		14.9			37.5		13.0				10.1	
Approach LOS		B			D		B				B	
Intersection Summary												
HCM 2000 Control Delay					22.0		HCM 2000 Level of Service	C				
HCM 2000 Volume to Capacity ratio					0.66							
Actuated Cycle Length (s)					60.0		Sum of lost time (s)	8.0				
Intersection Capacity Utilization					54.7%		ICU Level of Service	A				
Analysis Period (min)					15							
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

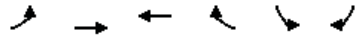
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DRAFT - SUBJECT TO REVIEW

TR-809

HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Volume (vph)	179	112	100	47	40	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.94	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1540	1378	1621	1289	1540	1083
Flt Permitted	0.68	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1107	1378	1621	1289	1540	1083
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	206	129	115	54	46	71
RTOR Reduction (vph)	0	0	0	15	0	61
Lane Group Flow (vph)	206	129	115	39	46	10
Confl. Peds. (#/hr)				52		31
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	46.4	46.4	46.4	46.4	9.6	9.6
Effective Green, g (s)	46.4	46.4	46.4	46.4	9.6	9.6
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	790	983	1157	920	227	159
v/s Ratio Prot		0.09	0.07		c0.03	
v/s Ratio Perm	c0.19			0.03		0.01
v/c Ratio	0.26	0.13	0.10	0.04	0.20	0.07
Uniform Delay, d1	3.3	2.9	2.9	2.7	24.3	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	0.2	0.1	0.4	0.2
Delay (s)	4.1	3.2	3.0	2.8	24.8	24.0
Level of Service	A	A	A	A	C	C
Approach Delay (s)		3.7	3.0		24.3	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕		↕	↕					↕	↕↕↕	↕
Volume (vph)	0	350	94	19	153	0	0	0	0	10	147	34
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frt		0.97		1.00	1.00					1.00	0.97	
Flt Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2982		1296	1365					972	2716	
Flt Permitted		1.00		0.46	1.00					0.95	1.00	
Satd. Flow (perm)		2982		631	1365					972	2716	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	385	103	21	168	0	0	0	0	11	162	37
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	448	0	21	168	0	0	0	0	11	177	0
Parking (#/hr)				10								10
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		26.0		26.0	26.0					24.0	24.0	
Effective Green, g (s)		26.0		26.0	26.0					24.0	24.0	
Actuated g/C Ratio		0.43		0.43	0.43					0.40	0.40	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1292		273	591					388	1086	
v/s Ratio Prot		c0.15			0.12						c0.07	
v/s Ratio Perm				0.03						0.01		
v/c Ratio		0.35		0.08	0.28					0.03	0.16	
Uniform Delay, d1		11.3		10.0	11.0					10.9	11.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.7		0.5	1.2					0.1	0.3	
Delay (s)		12.1		10.5	12.2					11.1	11.9	
Level of Service		B		B	B					B	B	
Approach Delay (s)		12.1			12.0			0.0			11.8	
Approach LOS		B			B			A			B	

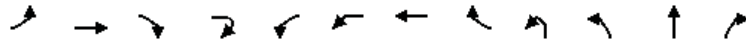
Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 Existing Weekend PM Late Evening, No Giants

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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↔					↔				↔	
Volume (vph)	51	181	2	14	15	14	27	80	4	10	16	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.97					0.94				0.99	
Flpb, ped/bikes		0.99					0.94				0.83	
Frt		0.99					0.92				0.98	
Fit Protected		0.99					0.99				0.98	
Satd. Flow (prot)		1438					1047				1031	
Fit Permitted		0.91					0.89				0.89	
Satd. Flow (perm)		1318					946				932	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	213	2	16	18	16	32	94	5	12	19	5
RTOR Reduction (vph)	0	0	0	0	0	0	60	0	0	0	3	0
Lane Group Flow (vph)	0	291	0	0	0	0	100	0	0	0	38	0
Confl. Peds. (#/hr)	51		86	200	86	200		51	200	200		66
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		2					6				8	
Permitted Phases	2				6	6			8	8		
Actuated Green, G (s)		27.3					27.3				23.2	
Effective Green, g (s)		27.3					27.3				23.2	
Actuated g/C Ratio		0.36					0.36				0.31	
Clearance Time (s)		5.0					5.0				5.0	
Vehicle Extension (s)		3.0					3.0				3.0	
Lane Grp Cap (vph)		479					344				288	
v/s Ratio Prot												
v/s Ratio Perm		c0.22					0.11				0.04	
v/c Ratio		0.61					0.29				0.13	
Uniform Delay, d1		19.5					17.0				18.6	
Progression Factor		1.00					1.00				1.00	
Incremental Delay, d2		5.6					0.5				0.2	
Delay (s)		25.1					17.4				18.8	
Level of Service		C					B				B	
Approach Delay (s)		25.1					17.4				18.8	
Approach LOS		C					B				B	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER
Lane Configurations		↔		↔		↔	↔
Volume (vph)	78	15	11	103	35	91	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1900	1900
Total Lost time (s)		5.0		5.0		3.5	3.5
Lane Util. Factor		0.95		0.95		1.00	1.00
Frbp, ped/bikes		0.90		0.72		1.00	1.00
Flpb, ped/bikes		1.00		1.00		0.81	1.00
Frt		0.97		0.85		1.00	0.85
Fit Protected		0.97		1.00		0.95	1.00
Satd. Flow (prot)		1237		888		1245	1378
Fit Permitted		0.78		1.00		0.95	1.00
Satd. Flow (perm)		1003		888		1245	1378
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	92	18	13	121	41	107	15
RTOR Reduction (vph)	0	6	0	75	0	0	0
Lane Group Flow (vph)	0	129	0	34	0	148	15
Confl. Peds. (#/hr)			200	200		51	
Confl. Bikes (#/hr)			12	12			
Parking (#/hr)							
Turn Type	Perm	NA		Perm	Perm	Prot	Perm
Protected Phases		4				5	
Permitted Phases	4			4	5		5
Actuated Green, G (s)		23.2		23.2		11.0	11.0
Effective Green, g (s)		23.2		23.2		11.0	11.0
Actuated g/C Ratio		0.31		0.31		0.15	0.15
Clearance Time (s)		5.0		5.0		3.5	3.5
Vehicle Extension (s)		3.0		3.0		3.0	3.0
Lane Grp Cap (vph)		310		274		182	202
v/s Ratio Prot							
v/s Ratio Perm		c0.13		0.04		0.12	0.01
v/c Ratio		0.42		0.12		0.81	0.07
Uniform Delay, d1		20.5		18.6		31.0	27.6
Progression Factor		1.00		1.00		1.00	1.00
Incremental Delay, d2		0.9		0.2		23.4	0.2
Delay (s)		21.5		18.8		54.4	27.8
Level of Service		C		B		D	C
Approach Delay (s)		20.3				52.0	
Approach LOS		C				D	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔↔↔	↔↔↔	↔	↔	↔↔		↔	↔	↔
Volume (vph)	133	91	0	0	423	35	128	138	139	4	0	63
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frbp, ped/bikes		1.00			1.00	0.96	1.00	0.98			1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	0.92			0.87	
Fit Protected		0.97			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1259			2047	697	1459	2656			1335	
Fit Permitted		0.56			1.00	1.00	0.71	1.00			0.98	
Satd. Flow (perm)		720			2047	697	1091	2656			1316	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	141	97	0	0	450	37	136	147	148	4	0	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	89	0	0	0	0
Lane Group Flow (vph)	0	238	0	0	450	37	136	206	0	0	71	0
Confl. Peds. (#/hr)		32						32	8	8		
Confl. Bikes (#/hr)								10				
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		312			887	302	436	1062			526	
v/s Ratio Prot					0.22			0.08				
v/s Ratio Perm	c0.33					0.05	c0.12				0.05	
v/c Ratio	0.76				0.51	0.12	0.31	0.19			0.13	
Uniform Delay, d1	14.4				12.3	10.2	12.3	11.7			11.4	
Progression Factor	1.54				1.02	0.88	1.00	1.00			1.00	
Incremental Delay, d2	15.7				1.5	0.6	1.9	0.4			0.5	
Delay (s)	37.9				14.1	9.5	14.2	12.1			11.9	
Level of Service	D				B	A	B	B			B	
Approach Delay (s)	37.9				13.7			12.8			11.9	
Approach LOS	D				B			B			B	
Intersection Summary												
HCM 2000 Control Delay		18.0			HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		60.0			Sum of lost time (s)						10.0	
Intersection Capacity Utilization		66.8%			ICU Level of Service						C	
Analysis Period (min)		15										
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015

Movement	EBL	EBT	EBR	WBT	WBR2	NBT	NBR	SEL	SER	SER2	
Lane Configurations	↔	↔↔		↔		↔		↔↔	↔	↔	
Volume (vph)	100	257	13	15	112	213	93	179	52	3	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	4.0	3.0		2.0		2.0		6.0			
Lane Util. Factor	1.00	0.95		1.00		1.00		0.97			
Frbp, ped/bikes	1.00	0.99		0.84		0.99		0.99			
Flpb, ped/bikes	1.00	1.00		1.00		1.00		1.00			
Frt	1.00	0.99		0.88		0.96		0.97			
Fit Protected	0.95	1.00		1.00		1.00		0.96			
Satd. Flow (prot)	1459	2660		1142		1454		2735			
Fit Permitted	0.95	1.00		1.00		1.00		0.96			
Satd. Flow (perm)	1459	2660		1142		1454		2735			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	112	289	15	17	126	239	104	201	58	3	
RTOR Reduction (vph)	0	5	0	114	0	17	0	114	0	0	
Lane Group Flow (vph)	112	299	0	29	0	326	0	148	0	0	
Confl. Peds. (#/hr)				152		154		25		15	
Confl. Bikes (#/hr)				30							
Parking (#/hr)		10	10								
Turn Type	Prot	NA			NA		NA	Prot			
Protected Phases	5	2			6		8	4			
Permitted Phases											
Actuated Green, G (s)	6.0	24.0			14.0		20.0	19.0			
Effective Green, g (s)	8.0	27.0			16.0		23.0	19.0			
Actuated g/C Ratio	0.10	0.34			0.20		0.29	0.24			
Clearance Time (s)	6.0	6.0			4.0		5.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			
Lane Grp Cap (vph)	145	897			228		418	649			
v/s Ratio Prot	c0.08	c0.11			0.03		c0.22	c0.05			
v/s Ratio Perm											
v/c Ratio	0.77	0.33			0.13		0.78	0.23			
Uniform Delay, d1	35.1	19.8			26.3		26.2	24.6			
Progression Factor	1.00	1.00			1.00		1.00	1.00			
Incremental Delay, d2	22.1	0.2			0.2		8.9	0.2			
Delay (s)	57.2	20.0			26.5		35.1	24.8			
Level of Service	E	C			C		D	C			
Approach Delay (s)		30.0			26.5		35.1	24.8			
Approach LOS		C			C		D	C			
Intersection Summary											
HCM 2000 Control Delay		29.9			HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio		0.50									
Actuated Cycle Length (s)		80.0			Sum of lost time (s)						14.0
Intersection Capacity Utilization		76.1%			ICU Level of Service						D
Analysis Period (min)		15									
c Critical Lane Group											

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HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015

Movement	EBT	EBR	WBL2	WBL	WBT	NBR	SBL	SBT	SBR	SBR2	
Lane Configurations	[Diagrammatic Lane Configurations]										
Volume (vph)	106	14	12	263	339	45	44	29	941	229	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0			5.0	3.0	3.0		3.0	5.0	3.0	
Lane Util. Factor	1.00			0.91	0.91	1.00		1.00	0.88	1.00	
Frbp, ped/bikes	1.00			1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00			1.00	1.00	1.00		0.95	1.00	1.00	
Frt	0.98			1.00	1.00	0.86		1.00	0.85	0.85	
Fit Protected	1.00			0.95	0.99	1.00		0.97	1.00	1.00	
Satd. Flow (prot)	1595			1401	2701	1402		1498	2424	1344	
Fit Permitted	1.00			0.62	0.89	1.00		0.97	1.00	1.00	
Satd. Flow (perm)	1595			909	2432	1402		1498	2424	1344	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	119	16	13	296	381	51	49	33	1057	257	
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	0	146	
Lane Group Flow (vph)	135	0	0	214	476	11	0	82	1057	111	
Confl. Peds. (#/hr)						70	70			17	
Parking (#/hr)					10		10				
Turn Type	NA	pm+pt	pm+pt	NA	Over	Perm	NA	Perm	custom		
Protected Phases	2	1	1	6	1		4				
Permitted Phases		6	6			4		4	6		
Actuated Green, G (s)	8.0			24.0	24.0	11.0		26.0	26.0	24.0	
Effective Green, g (s)	10.0			24.0	26.0	13.0		28.0	26.0	26.0	
Actuated g/C Ratio	0.17			0.40	0.43	0.22		0.47	0.43	0.43	
Clearance Time (s)	5.0			5.0	5.0	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	265			453	1112	303		699	1050	582	
v/s Ratio Prot	c0.08			0.09	c0.09	0.01					
v/s Ratio Perm				0.10	0.09			0.05	c0.44	0.08	
v/c Ratio	0.51			0.47	0.43	0.04		0.12	1.01	0.19	
Uniform Delay, d1	22.8			14.6	11.8	18.6		9.0	17.0	10.5	
Progression Factor	1.00			0.62	0.63	1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.8			3.3	1.1	0.2		0.3	29.4	0.7	
Delay (s)	29.6			12.3	8.6	18.8		9.4	46.4	11.2	
Level of Service	C			B	A	B		A	D	B	
Approach Delay (s)	29.6				9.7			37.8			
Approach LOS	C				A			D			
Intersection Summary											
HCM 2000 Control Delay		28.3		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio		0.77									
Actuated Cycle Length (s)		60.0		Sum of lost time (s)					11.0		
Intersection Capacity Utilization		64.1%		ICU Level of Service					C		
Analysis Period (min)		15									
c Critical Lane Group											

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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic Lane Configurations]											
Volume (vph)	0	0	0	400	671	1800	1800	1800	1800	0	504	392
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.91	0.66
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.96	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4920						4294	700
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4920						4294	700
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)	0	0	0	412	692	0	0	0	0	0	520	404
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	214	890	0	0	0	0	0	722	202
Confl. Peds. (#/hr)				195		399	495		657	657		495
Confl. Bikes (#/hr)				30		30			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				30.0	30.0						28.0	28.0
Effective Green, g (s)				31.5	31.5						30.0	30.0
Actuated g/C Ratio				0.35	0.35						0.33	0.33
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				413	1722						1431	233
v/s Ratio Prot				c0.18	0.18						0.17	
v/s Ratio Perm												c0.29
v/c Ratio				0.52	0.52						0.50	0.87
Uniform Delay, d1				23.2	23.2						24.0	28.1
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				4.6	1.1						1.3	32.6
Delay (s)				27.8	24.3						25.3	60.7
Level of Service				C	C						C	E
Approach Delay (s)		0.0			25.0			0.0			33.1	
Approach LOS		A			C			A			C	
Intersection Summary												
HCM 2000 Control Delay		28.7		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		90.0		Sum of lost time (s)					6.5			
Intersection Capacity Utilization		60.5%		ICU Level of Service					B			
Analysis Period (min)		15										
c Critical Lane Group												

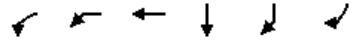
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HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations						
Volume (vph)	71	497	361	217	551	104
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)		5.4	2.4	5.7	2.7	2.7
Lane Util. Factor		0.81	0.81	0.91	0.91	1.00
Frbp, ped/bikes		1.00	1.00	0.99	0.98	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.92	0.85	0.85
Fit Protected		0.95	0.98	1.00	1.00	1.00
Satd. Flow (prot)		1050	4843	2085	1039	1127
Fit Permitted		0.95	0.98	1.00	1.00	1.00
Satd. Flow (perm)		1050	4843	2085	1039	1127
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	74	518	376	226	574	108
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	297	671	513	287	59
Confl. Peds. (#/hr)					21	
Confl. Bikes (#/hr)					10	10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)				10		
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)		32.6	32.6	46.3	46.3	46.3
Effective Green, g (s)		32.6	35.6	46.3	49.3	49.3
Actuated g/C Ratio		0.36	0.40	0.51	0.55	0.55
Clearance Time (s)		5.4	5.4	5.7	5.7	5.7
Lane Grp Cap (vph)		380	1915	1072	569	617
v/s Ratio Prot				0.25		
v/s Ratio Perm		c0.28	0.14		c0.28	0.05
v/c Ratio		0.78	0.35	0.48	0.50	0.10
Uniform Delay, d1		25.5	19.1	14.1	12.7	9.7
Progression Factor		1.00	1.00	1.07	1.11	2.36
Incremental Delay, d2		14.7	0.5	1.3	2.8	0.3
Delay (s)		40.3	19.6	16.4	16.9	23.2
Level of Service		D	B	B	B	C
Approach Delay (s)			25.9	17.4		
Approach LOS			C	B		

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Volume (vph)	351	92	68	220	343	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.96		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5625		1459	1305	4117	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5625		1459	1305	4117	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	399	105	77	250	390	59
RTOR Reduction (vph)	53	0	52	0	0	0
Lane Group Flow (vph)	451	0	25	250	396	53
Confl. Peds. (#/hr)		143	776			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1593		466	417	1074	292
v/s Ratio Prot	c0.08		0.02	c0.19	c0.10	
v/s Ratio Perm						0.05
v/c Ratio	0.28		0.05	0.60	0.37	0.18
Uniform Delay, d1	25.1		21.2	25.7	27.2	25.8
Progression Factor	1.00		1.59	0.96	1.00	1.00
Incremental Delay, d2	0.4		0.2	5.5	1.0	1.4
Delay (s)	25.6		33.8	30.1	28.2	27.2
Level of Service	C		C	C	C	C
Approach Delay (s)	25.6			31.0	28.0	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	27.8	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)	12.2
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑				↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	79	381	44	34	166	356	188	134	443	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.5				2.0	2.0			2.5	2.5
Lane Util. Factor	0.81				0.95	0.95			0.94	0.86
Frbp, ped/bikes	0.99				1.00	0.96			0.98	0.86
Flpb, ped/bikes	0.99				0.99	1.00			0.84	1.00
Frt	0.99				1.00	0.95			0.98	0.85
Fit Protected	0.99				0.99	1.00			0.96	1.00
Satd. Flow (prot)	6090				3003	2565			3515	1021
Fit Permitted	0.99				0.83	1.00			0.96	1.00
Satd. Flow (perm)	6090				2521	2565			3515	1021
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	81	393	45	35	171	367	194	138	457	270
RTOR Reduction (vph)	0	23	0	0	0	35	0	0	0	0
Lane Group Flow (vph)	0	496	0	0	206	526	0	0	665	200
Confl. Peds. (#/hr)	50		100	100			100	50	100	100
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases	6				4	4			7	
Permitted Phases	6		4				7		7	
Actuated Green, G (s)	20.5				22.0	22.0			14.5	14.5
Effective Green, g (s)	23.5				26.0	26.0			18.5	18.5
Actuated g/C Ratio	0.31				0.35	0.35			0.25	0.25
Clearance Time (s)	5.5				6.0	6.0			6.5	6.5
Lane Grp Cap (vph)	1908				873	889			867	251
v/s Ratio Prot					c0.20					
v/s Ratio Perm	0.08				0.08				0.19	c0.20
v/c Ratio	0.26				0.24	0.59			0.77	0.80
Uniform Delay, d1	19.3				17.4	20.1			26.2	26.5
Progression Factor	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3				0.6	2.9			6.4	22.6
Delay (s)	19.6				18.1	23.0			32.7	49.0
Level of Service	B				B	C			C	D
Approach Delay (s)	19.6				18.1	23.0			36.5	
Approach LOS	B				B	C			D	
Intersection Summary										
HCM 2000 Control Delay	27.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio	0.53									
Actuated Cycle Length (s)	75.0				Sum of lost time (s)				7.0	
Intersection Capacity Utilization	73.7%				ICU Level of Service				D	
Analysis Period (min)	15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	122	95	50	9	166	80	19	4	6	12	8	86
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	134	104	55	10	182	88	21	4	7	13	9	95
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	293	280	32	116								
Volume Left (vph)	134	10	21	13								
Volume Right (vph)	55	88	7	95								
Hadj (s)	0.01	-0.15	0.04	-0.43								
Departure Headway (s)	4.6	4.5	5.4	4.8								
Degree Utilization, x	0.38	0.35	0.05	0.16								
Capacity (veh/h)	742	767	570	662								
Control Delay (s)	10.4	9.9	8.7	8.7								
Approach Delay (s)	10.4	9.9	8.7	8.7								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay	9.8											
Level of Service	A											
Intersection Capacity Utilization	55.2%			ICU Level of Service			B					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←→		←→	←→			←→		←→	←→	
Volume (vph)	198	128	57	24	148	141	22	275	36	68	284	94
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0			2.0			3.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.92			0.86			0.97			0.94	
Flpb, ped/bikes		0.90			0.98			0.99			0.97	
Frt		0.98			0.93			0.98			0.97	
Fit Protected		0.97			1.00			1.00			0.99	
Satd. Flow (prot)		2144			2110			2713			2342	
Fit Permitted		0.68			0.91			0.92			0.86	
Satd. Flow (perm)		1491			1937			2497			2018	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	206	133	59	25	154	147	23	286	38	71	296	98
RTOR Reduction (vph)	0	24	0	0	26	0	0	16	0	0	21	0
Lane Group Flow (vph)	0	374	0	0	300	0	0	332	0	0	444	0
Confl. Peds. (#/hr)	400		400	400		400	400		400	400		400
Confl. Bikes (#/hr)			20			6			3			23
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0
Parking (#/hr)		10	10	10	10	10					10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		23.0			23.0			27.0			27.0	
Effective Green, g (s)		26.0			26.0			30.0			29.0	
Actuated g/C Ratio		0.43			0.43			0.50			0.48	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		646			839			1248			975	
v/s Ratio Prot												
v/s Ratio Perm		c0.25			0.15			0.13			c0.22	
v/c Ratio		0.58			0.36			0.27			0.46	
Uniform Delay, d1		12.9			11.4			8.6			10.3	
Progression Factor		1.00			1.00			1.00			0.39	
Incremental Delay, d2		3.8			1.2			0.5			1.4	
Delay (s)		16.6			12.6			9.2			5.4	
Level of Service		B			B			A			A	
Approach Delay (s)		16.6			12.6			9.2			5.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Second St. & Bryant St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←→	←→		←→	←→			←→	←→	←→	←→	
Volume (vph)	157	469	56	0	0	0	0	224	234	22	379	0
Ideal Flow (vphpl)	1000	1000	1000	1800	1800	1800	1000	1000	1000	1800	1800	1800
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0	
Lane Util. Factor	*0.60	*0.60						*0.60	0.91		0.95	
Frbp, ped/bikes	1.00	0.97						0.92	0.71		1.00	
Flpb, ped/bikes	1.00	1.00						1.00	1.00		0.99	
Frt	1.00	0.98						0.96	0.85		1.00	
Fit Protected	0.95	1.00						1.00	1.00		1.00	
Satd. Flow (prot)	899	1393						898	470		2669	
Fit Permitted	0.95	1.00						1.00	1.00		0.92	
Satd. Flow (perm)	899	1393						898	470		2451	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	185	552	66	0	0	0	0	264	275	26	446	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	11	11	0	0	0
Lane Group Flow (vph)	185	604	0	0	0	0	0	360	157	0	472	0
Confl. Peds. (#/hr)			400						400	400		
Confl. Bikes (#/hr)			1						17			
Parking (#/hr)	10	10	10								10	
Turn Type	Split	NA						NA	Perm	Perm	NA	
Protected Phases	2	2						4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0	
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5	
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5	
Lane Grp Cap (vph)	427	661						411	215		1123	
v/s Ratio Prot	0.21	c0.43						c0.40				
v/s Ratio Perm									0.33		0.19	
v/c Ratio	0.43	0.91						0.88	0.73		0.42	
Uniform Delay, d1	10.4	14.6						14.7	13.2		10.9	
Progression Factor	1.00	1.00						0.92	0.90		1.00	
Incremental Delay, d2	3.2	19.2						21.0	18.4		1.2	
Delay (s)	13.6	33.9						34.5	30.4		12.1	
Level of Service	B	C						C	C		B	
Approach Delay (s)		29.2			0.0			33.2			12.1	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING PLUS NO EVENT – WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	50	297	201	629	4	707	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.3	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.80	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	1.00	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1512	1103	2987	3079	1540	3074	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1512	1103	2987	3079	1540	3074	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	316	214	669	4	752	5
RTOR Reduction (vph)	0	204	0	0	0	1	0
Lane Group Flow (vph)	53	112	214	669	4	756	0
Confl. Peds. (#/hr)	20	211	20				130
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.0	5.9	37.6	
Effective Green, g (s)	39.0	39.0	20.0	50.9	8.8	39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.46	0.08	0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9	6.2	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	536	391	543	1424	123	1089	
v/s Ratio Prot			0.07		0.00	c0.25	
v/s Ratio Perm	0.04	c0.10		c0.22			
v/c Ratio	0.10	0.29	0.39	0.47	0.03	0.69	
Uniform Delay, d1	23.7	25.5	39.7	20.3	46.7	30.4	
Progression Factor	1.00	1.00	1.51	1.86	1.00	1.00	
Incremental Delay, d2	0.1	0.4	0.4	0.9	0.5	3.7	
Delay (s)	23.8	25.9	60.4	38.7	47.2	34.1	
Level of Service	C	C	E	D	D	C	
Approach Delay (s)	25.6			44.0		34.1	
Approach LOS	C			D		C	
Intersection Summary							
HCM 2000 Control Delay			36.9				HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.52				
Actuated Cycle Length (s)			110.0				Sum of lost time (s) 16.7
Intersection Capacity Utilization			78.1%				ICU Level of Service D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	115	156	115	730	11	955	38
Ideal Flow (vphpl)	1900	1900	1400	1400	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.83	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.99	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1515	1137	2201	3260	1377	3910	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1515	1137	2201	3260	1377	3910	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	170	125	793	12	1038	41
RTOR Reduction (vph)	0	100	0	0	0	4	0
Lane Group Flow (vph)	125	70	125	793	12	1075	0
Confl. Peds. (#/hr)	20	208	151				151
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.6	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	619	465	420	1256	132	1137	
v/s Ratio Prot			0.06	c0.24	0.01	c0.28	
v/s Ratio Perm	c0.08	0.06					
v/c Ratio	0.20	0.15	0.30	0.63	0.09	0.95	
Uniform Delay, d1	20.9	20.5	38.2	27.5	45.3	38.2	
Progression Factor	1.00	1.00	1.13	1.18	1.23	0.46	
Incremental Delay, d2	0.2	0.1	0.2	1.4	1.1	13.7	
Delay (s)	21.1	20.6	43.5	33.8	56.8	31.2	
Level of Service	C	C	D	C	E	C	
Approach Delay (s)	20.8			35.1		31.4	
Approach LOS	C			D		C	
Intersection Summary							
HCM 2000 Control Delay			31.6				HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.57				
Actuated Cycle Length (s)			110.0				Sum of lost time (s) 15.7
Intersection Capacity Utilization			74.3%				ICU Level of Service D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

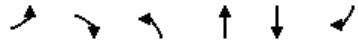
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DRAFT - SUBJECT TO REVIEW

TR-818

HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	167	72	0	1147	1133	140
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		*0.50	*0.40	
Frpb, ped/bikes	1.00	0.77		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1064		2047	1555	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1064		2047	1555	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	178	77	0	1220	1205	149
RTOR Reduction (vph)	0	21	0	0	4	0
Lane Group Flow (vph)	178	56	0	1220	1350	0
Confl. Peds. (#/hr)	327	160	110			190
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	24.2	24.2		74.2	74.2	
Effective Green, g (s)	26.6	24.2		75.4	75.4	
Actuated g/C Ratio	0.24	0.22		0.69	0.69	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	372	234		1403	1065	
v/s Ratio Prot	c0.12			0.60	c0.87	
v/s Ratio Perm		0.05				
v/c Ratio	0.48	0.24		0.87	1.27	
Uniform Delay, d1	35.8	35.3		13.5	17.3	
Progression Factor	1.00	1.00		2.49	1.03	
Incremental Delay, d2	1.0	0.5		5.4	125.3	
Delay (s)	36.7	35.9		38.9	143.1	
Level of Service	D	D		D	F	
Approach Delay (s)	36.5			38.9	143.1	
Approach LOS	D			D	F	

Intersection Summary			
HCM 2000 Control Delay	88.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	164	120	1	158	981	2	917	286
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	7.1		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.80	1.00	*0.76	1.00
Frpb, ped/bikes	1.00	0.92		1.00	1.00	1.00	1.00	0.90
Flpb, ped/bikes	0.89	1.00		0.98	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1374	1265		1266	3275	1296	2074	1045
Fit Permitted	0.95	1.00		0.27	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1374	1265		355	3275	1296	2074	1045
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	171	125	1	165	1022	2	955	298
RTOR Reduction (vph)	0	23	0	0	0	0	0	171
Lane Group Flow (vph)	171	102	0	166	1022	2	955	127
Confl. Peds. (#/hr)	140	92		96				96
Turn Type	Perm	Perm	custom	Prot	NA	Prot	NA	custom
Protected Phases				5		1		
Permitted Phases	4	4	5		2		6	6
Actuated Green, G (s)	42.9	42.9		12.1	39.8	7.0	35.6	35.6
Effective Green, g (s)	46.0	42.9		15.0	42.7	9.3	37.0	37.0
Actuated g/C Ratio	0.42	0.39		0.14	0.39	0.08	0.34	0.34
Clearance Time (s)	7.1	7.1		6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	574	493		48	1271	109	697	351
v/s Ratio Prot						0.00		
v/s Ratio Perm	c0.12	0.08		c0.47	0.31		c0.46	0.12
v/c Ratio	0.30	0.21		3.46	0.80	0.02	1.37	0.36
Uniform Delay, d1	21.3	22.3		47.5	29.9	46.2	36.5	27.6
Progression Factor	1.00	1.00		0.73	0.55	1.23	0.90	0.88
Incremental Delay, d2	0.3	0.2		1149.7	4.7	0.0	167.4	0.3
Delay (s)	21.6	22.5		1184.3	21.2	56.7	200.3	24.4
Level of Service	C	C		F	C	E	F	C
Approach Delay (s)	21.9				183.8		158.3	
Approach LOS	C				F		F	














Intersection Summary			
HCM 2000 Control Delay	154.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015












							
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	218	195	31	63	922	1013	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1700	1700
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.76		1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	923		1571	2946	2805	
Flt Permitted	0.95	1.00		0.22	1.00	1.00	
Satd. Flow (perm)	3090	923		356	2946	2805	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	229	205	33	66	971	1066	26
RTOR Reduction (vph)	0	64	0	0	0	1	0
Lane Group Flow (vph)	229	141	0	99	971	1091	0
Confl. Peds. (#/hr)	114	296		50			273
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases		4	5				
Actuated Green, G (s)	42.3	42.3		15.6	55.7	33.7	
Effective Green, g (s)	45.3	45.3		18.6	58.7	36.7	
Actuated g/C Ratio	0.41	0.41		0.17	0.53	0.33	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	380		60	1572	935	
v/s Ratio Prot	0.07				0.33	c0.39	
v/s Ratio Perm		c0.15		c0.28			
v/c Ratio	0.18	0.37		1.65	0.62	1.17	
Uniform Delay, d1	20.6	22.5		45.7	17.8	36.6	
Progression Factor	1.00	1.00		0.83	1.95	0.20	
Incremental Delay, d2	0.3	2.8		346.1	1.5	76.1	
Delay (s)	20.9	25.3		383.8	36.3	83.3	
Level of Service	C	C		F	D	F	
Approach Delay (s)	22.9				68.4	83.3	
Approach LOS	C				E	F	
Intersection Summary							
HCM 2000 Control Delay			67.1		HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			0.89				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		9.4
Intersection Capacity Utilization			95.9%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	170	224	0	846	1030	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600
Total Lost time (s)	6.8	6.8		5.4	5.4	
Lane Util. Factor	1.00	1.00		*0.90	*0.80	
Frbp, ped/bikes	1.00	0.92		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1264		2917	2072	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1264		2917	2072	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	243	0	920	1120	227
RTOR Reduction (vph)	0	14	0	0	12	0
Lane Group Flow (vph)	185	229	0	920	1335	0
Confl. Peds. (#/hr)	123	90	40			180
Confl. Bikes (#/hr)						117
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	41.2	41.2		56.6	56.6	
Effective Green, g (s)	41.2	41.2		56.6	56.6	
Actuated g/C Ratio	0.37	0.37		0.51	0.51	
Clearance Time (s)	6.8	6.8		5.4	5.4	
Lane Grp Cap (vph)	576	473		1500	1066	
v/s Ratio Prot	0.12			0.32	c0.64	
v/s Ratio Perm		c0.18				
v/c Ratio	0.32	0.48		0.61	1.25	
Uniform Delay, d1	24.5	26.3		18.9	26.7	
Progression Factor	1.00	1.00		1.82	0.58	
Incremental Delay, d2	1.5	3.5		1.0	114.2	
Delay (s)	25.9	29.8		35.4	129.9	
Level of Service	C	C		D	F	
Approach Delay (s)	28.1				35.4	129.9
Approach LOS	C				D	F
Intersection Summary						
HCM 2000 Control Delay			81.5		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	12.2
Intersection Capacity Utilization			92.1%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Volume (vph)	38	0	229	0	0	0	45	263	788	0	0	1170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600
Total Lost time (s)	6.9	6.9						6.5	6.5			5.2
Lane Util. Factor	1.00	1.00						1.00	0.95			*0.90
Frbp, ped/bikes	1.00	0.93						1.00	1.00			1.00
Flpb, ped/bikes	0.86	1.00						0.99	1.00			1.00
Frt	1.00	0.85						1.00	1.00			1.00
Fit Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1320	1283						1288	2593			2456
Fit Permitted	0.76	1.00						0.20	1.00			1.00
Satd. Flow (perm)	1052	1283						276	2593			2456
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	0	249	0	0	0	49	286	857	0	0	1272
RTOR Reduction (vph)	0	157	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	41	92	0	0	0	0	0	335	857	0	0	1272
Confl. Peds. (#/hr)	165		64	64			165	40		1113	940	
Confl. Bikes (#/hr)			2							52		
Turn Type	Perm	NA					custom	Prot	NA		Prot	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8			5					
Actuated Green, G (s)	20.4	20.4						20.5	41.5			50.5
Effective Green, g (s)	20.4	20.4						20.5	41.5			50.5
Actuated g/C Ratio	0.19	0.19						0.19	0.38			0.46
Clearance Time (s)	6.9	6.9						6.5	6.5			5.2
Vehicle Extension (s)	3.0	3.0						3.0	3.0			3.0
Lane Grp Cap (vph)	195	237						51	978			1127
v/s Ratio Prot		c0.07							0.33			c0.52
v/s Ratio Perm	0.04							c1.22				
v/c Ratio	0.21	0.39						6.57	0.88			1.13
Uniform Delay, d1	38.0	39.3						44.8	31.9			29.8
Progression Factor	1.00	1.00						0.86	0.89			1.25
Incremental Delay, d2	0.5	1.1						2536.8	8.5			59.1
Delay (s)	38.5	40.4						2575.1	36.9			96.4
Level of Service	D	D						F	D			F
Approach Delay (s)		40.1			0.0				750.2			92.6
Approach LOS		D			A				F			F

Intersection Summary			
HCM 2000 Control Delay	362.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015

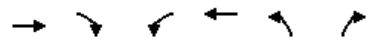


Movement	SBR
Lane Configurations	↖
Volume (vph)	84
Ideal Flow (vphpl)	1600
Total Lost time (s)	5.2
Lane Util. Factor	*0.90
Frbp, ped/bikes	0.84
Flpb, ped/bikes	1.00
Frt	0.85
Fit Protected	1.00
Satd. Flow (prot)	879
Fit Permitted	1.00
Satd. Flow (perm)	879
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	91
RTOR Reduction (vph)	49
Lane Group Flow (vph)	42
Confl. Peds. (#/hr)	117
Confl. Bikes (#/hr)	80
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	50.5
Effective Green, g (s)	50.5
Actuated g/C Ratio	0.46
Clearance Time (s)	5.2
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	403
v/s Ratio Prot	
v/s Ratio Perm	0.05
v/c Ratio	0.10
Uniform Delay, d1	16.9
Progression Factor	2.31
Incremental Delay, d2	0.0
Delay (s)	39.2
Level of Service	D
Approach Delay (s)	
Approach LOS	

Intersection Summary	
HCM 2000 Control Delay	362.8
HCM 2000 Volume to Capacity ratio	2.19
Actuated Cycle Length (s)	110.0
Intersection Capacity Utilization	112.4%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑	↑	
Volume (veh/h)	358	0	0	252	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	402	0	0	283	0	0
Pedestrians	20			20	20	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked						
vC, conflicting volume			422		725	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			422		725	241
iC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1116		349	737

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	268	134	283	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1116	1700
Volume to Capacity	0.16	0.08	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				A
Approach Delay (s)	0.0		0.0	0.0
Approach LOS				A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		29.6%	ICU Level of Service A
Analysis Period (min)		15	

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↓	↑↑	↑
Volume (vph)	101	39	42	880	56	954	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.84	1.00	1.00	1.00	1.00	0.68
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	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1162	1540	3079	1540	3079	935
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1162	1540	3079	1540	3079	935
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	109	42	45	946	60	1026	467
RTOR Reduction (vph)	0	25	0	0	0	0	164
Lane Group Flow (vph)	109	17	45	946	60	1026	303
Confl. Peds. (#/hr)	56	170	20				153
Confl. Bikes (#/hr)							92

Turn Type	Prot	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	2	1	6	
Permitted Phases		4					6
Actuated Green, G (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Effective Green, g (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Actuated g/C Ratio	0.35	0.35	0.14	0.40	0.09	0.34	0.34
Clearance Time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	402	215	1226	140	1035	314
v/s Ratio Prot	c0.07		0.03	c0.31	0.04	c0.33	
v/s Ratio Perm		0.01					0.32
v/c Ratio	0.20	0.04	0.21	0.77	0.43	0.99	0.97
Uniform Delay, d1	25.3	23.8	41.9	28.8	47.3	36.3	35.9
Progression Factor	1.00	1.00	0.53	0.87	0.90	0.89	1.42
Incremental Delay, d2	0.9	0.2	1.2	2.6	0.9	6.6	9.1
Delay (s)	26.2	24.0	23.6	27.8	43.3	39.1	60.0
Level of Service	C	C	C	C	D	D	E
Approach Delay (s)	25.6			27.6		45.6	
Approach LOS	C			C		D	

Intersection Summary			
HCM 2000 Control Delay		37.8	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio		0.66	
Actuated Cycle Length (s)		110.0	Sum of lost time (s) 19.5
Intersection Capacity Utilization		91.7%	ICU Level of Service F
Analysis Period (min)		15	

c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↕			↕			↕	↕		↕	↕
Volume (vph)	105	6	20	4	5	6	10	35	811	5	2	824
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600	1600
Total Lost time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Lane Util. Factor		1.00			1.00			1.00	0.95		1.00	0.95
Frbp, ped/bikes		0.95			0.87			1.00	1.00		1.00	0.94
Flpb, ped/bikes		0.75			0.93			1.00	1.00		1.00	1.00
Frt		0.98			0.95			1.00	1.00		1.00	0.97
Fit Protected		0.96			0.99			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1087			1225			1296	2583		1296	2387
Fit Permitted		0.76			0.94			0.95	1.00		0.95	1.00
Satd. Flow (perm)		857			1170			1296	2583		1296	2387
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)	113	6	22	4	5	6	11	38	872	5	2	886
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	1	0	0	14
Lane Group Flow (vph)	0	135	0	0	11	0	0	49	876	0	2	1052
Confl. Peds. (#/hr)	440		440	440		440		30		520	120	
Confl. Bikes (#/hr)			30			30				30		
Turn Type	Perm	NA		Perm	NA		Prot	Prot	NA		Prot	NA
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8								
Actuated Green, G (s)		33.6			33.6			15.0	43.0		13.6	42.0
Effective Green, g (s)		33.6			33.6			15.0	43.0		13.6	42.0
Actuated g/C Ratio		0.31			0.31			0.14	0.39		0.12	0.38
Clearance Time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		261			357			176	1009		160	911
v/s Ratio Prot								0.04	c0.34		0.00	c0.44
v/s Ratio Perm		c0.16			0.01							
v/c Ratio		0.52			0.03			0.28	0.87		0.01	1.15
Uniform Delay, d1		31.5			26.8			42.6	30.9		42.3	34.0
Progression Factor		1.00			1.00			0.85	0.71		1.87	0.65
Incremental Delay, d2		1.7			0.0			2.6	7.1		0.0	73.9
Delay (s)		33.2			26.8			39.0	28.9		79.1	95.9
Level of Service		C			C			D	C		E	F
Approach Delay (s)		33.2			26.8				29.5			95.9
Approach LOS		C			C				C			F

Intersection Summary			
HCM 2000 Control Delay	62.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015

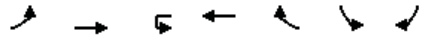


Movement	SBR
Lane Configurations	↕
Volume (vph)	167
Ideal Flow (vphpl)	1600
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	180
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	430
Confl. Bikes (#/hr)	30
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary	

HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	196	817	5	828	25	11	285
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	*0.90		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99		1.00	0.67
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1296	2593	1296	2422		1296	774
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1296	2593	1296	2422		1296	774
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	202	842	5	854	26	11	294
RTOR Reduction (vph)	0	0	0	2	0	0	192
Lane Group Flow (vph)	202	842	5	878	0	11	102
Confl. Peds. (#/hr)	30				430	430	450
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA		Prot	Perm
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	181	1056	98	801		450	268
v/s Ratio Prot	c0.16	0.32	0.00	c0.36		0.01	
v/s Ratio Perm							c0.13
v/c Ratio	1.12	0.80	0.05	1.10		0.02	0.38
Uniform Delay, d1	47.3	28.6	47.1	36.8		23.6	27.0
Progression Factor	0.83	1.46	0.65	0.54		1.00	1.00
Incremental Delay, d2	93.5	4.9	0.1	45.4		0.1	4.1
Delay (s)	132.8	46.6	30.7	65.4		23.7	31.1
Level of Service	F	D	C	E		C	C
Approach Delay (s)		63.3		65.2		30.8	
Approach LOS		E		E		C	

Intersection Summary			
HCM 2000 Control Delay	59.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	872	759	12	140	937	36	53	951	257	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.68			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	3057		2515	2547			5468	934			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	3057		2515	2547			5468	934			
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)	899	782	12	144	966	37	55	980	265	0	0	0
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	184	0	0	0
Lane Group Flow (vph)	899	793	0	144	1002	0	0	1035	81	0	0	0
Confl. Peds. (#/hr)	30		430	30		430	430		430	30		30
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	18.2	42.8		13.2	39.3			33.6	33.6			
Effective Green, g (s)	18.2	42.8		13.2	39.3			33.6	33.6			
Actuated g/C Ratio	0.17	0.39		0.12	0.36			0.31	0.31			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	718	1189		301	909			1670	285			
v/s Ratio Prot	c0.21	0.26		0.06	c0.39							
v/s Ratio Perm								0.19	0.09			
v/c Ratio	1.25	0.67		0.48	1.10			0.62	0.28			
Uniform Delay, d1	45.9	27.7		45.2	35.4			32.7	29.1			
Progression Factor	1.38	1.64		1.50	1.02			1.00	1.00			
Incremental Delay, d2	120.8	1.9		0.3	51.4			0.7	0.6			
Delay (s)	184.2	47.4		68.2	87.3			33.4	29.6			
Level of Service	F	D		E	F			C	C			
Approach Delay (s)		120.0			84.9			32.6			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	82.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔	↔↔			↔	↔	↔	↔↔	↔
Volume (vph)	151	1548	25	24	947	19	5	60	61	34	254	301
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.63	1.00	0.82	0.47
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.67	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4386		1296	2554			1579	851	1031	2297	575
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1540	4386		1296	2554			1533	851	775	2297	575
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1580	26	24	966	19	5	61	62	35	259	307
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	40	0	52	113
Lane Group Flow (vph)	154	1605	0	24	984	0	0	66	22	35	339	62
Confl. Peds. (#/hr)	30		791	30		725	1678		708	708		1678
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases							4		4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1830		70	833			532	295	276	818	204
v/s Ratio Prot	0.10	c0.37		0.02	c0.39						c0.15	
v/s Ratio Perm								0.04	0.03	0.05		0.11
v/c Ratio	0.77	0.88		0.34	1.18			0.12	0.07	0.13	0.41	0.31
Uniform Delay, d1	46.2	29.5		50.1	37.0			24.5	24.0	23.9	26.7	25.6
Progression Factor	0.58	1.18		0.89	0.93			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.6		0.3	82.6			0.1	0.1	0.2	0.3	0.9
Delay (s)	28.3	35.5		45.0	117.0			24.6	24.1	24.1	27.1	26.4
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		34.8			115.2			24.4			26.7	
Approach LOS		C			F			C			C	

Intersection Summary	
HCM 2000 Control Delay	56.2 HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.86
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 21.5
Intersection Capacity Utilization	116.5% ICU Level of Service H
Analysis Period (min)	15
c Critical Lane Group	

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Volume (vph)	1716	138	0	1253	86	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.97
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3035			3079	1540	1333
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3035			3079	1540	1333
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1788	144	0	1305	90	8
RTOR Reduction (vph)	5	0	0	0	0	5
Lane Group Flow (vph)	1927	0	0	1305	90	3
Confl. Peds. (#/hr)		57	57		21	23
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1713			1738	512	443
v/s Ratio Prot	c0.63			0.42	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.12			0.75	0.18	0.01
Uniform Delay, d1	23.9			18.1	26.0	24.5
Progression Factor	1.00			0.53	1.00	1.00
Incremental Delay, d2	64.4			0.7	0.7	0.0
Delay (s)	88.4			10.3	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	88.4			10.3	26.6	
Approach LOS	F			B	C	

Intersection Summary	
HCM 2000 Control Delay	56.0 HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.77
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 11.3
Intersection Capacity Utilization	97.8% ICU Level of Service F
Analysis Period (min)	15
c Critical Lane Group	

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕↕	↕↕		↕	↕			↕	↕
Volume (vph)	24	135	91	5	561	54	127	262	14	2	96	253
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.0		4.5	4.5			4.5	4.5
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.94			0.98		1.00	1.00			1.00	0.87
Flpb, ped/bikes		1.00			1.00		0.90	1.00			1.00	1.00
Frt		0.95			0.99		1.00	0.99			1.00	0.85
Fit Protected		1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1602			1208		1537	1778			1797	1135
Fit Permitted		0.75			0.94		0.69	1.00			1.00	1.00
Satd. Flow (perm)		1210			1134		1113	1778			1791	1135
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	148	100	5	616	59	140	288	15	2	105	278
RTOR Reduction (vph)	0	34	0	0	7	0	0	3	0	0	0	42
Lane Group Flow (vph)	0	240	0	0	673	0	140	300	0	0	107	236
Confl. Peds. (#/hr)	20		120	120		120	170		130	130		170
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		25.0			25.5		26.0	26.0			26.0	26.0
Effective Green, g (s)		25.0			25.5		26.0	26.0			26.0	26.0
Actuated g/C Ratio		0.42			0.42		0.43	0.43			0.43	0.43
Clearance Time (s)		4.5			4.0		4.5	4.5			4.5	4.5
Lane Grp Cap (vph)		504			481		482	770			776	491
v/s Ratio Prot								0.17				
v/s Ratio Perm	0.20				c0.59		0.13				0.06	c0.21
v/c Ratio	0.48				1.40		0.29	0.39			0.14	0.48
Uniform Delay, d1	12.7				17.2		11.0	11.6			10.2	12.2
Progression Factor	0.89				1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.1				192.0		1.5	1.5			0.4	3.3
Delay (s)	14.3				209.2		12.5	13.1			10.6	15.5
Level of Service	B				F		B	B			B	B
Approach Delay (s)	14.3				209.2		12.9				14.2	
Approach LOS	B				F		B				B	

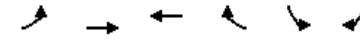
Intersection Summary			
HCM 2000 Control Delay	88.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Volume (vph)	187	169	149	196	96	96
Ideal Flow (vphpl)	1500	1500	1500	1500	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	*0.40	*0.40	*0.40	*0.40	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.95	1.00	0.80
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	482	435	512	414	1540	942
Fit Permitted	0.51	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	257	435	512	414	1540	942
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	208	188	166	218	107	107
RTOR Reduction (vph)	0	0	0	49	0	92
Lane Group Flow (vph)	208	188	166	169	107	15
Confl. Peds. (#/hr)	20			72	70	61
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	77.3	77.3	77.3	77.3	13.7	13.7
Effective Green, g (s)	77.3	77.3	77.3	77.3	13.7	13.7
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.14	0.14
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	198	336	395	320	210	129
v/s Ratio Prot		0.43	0.32		c0.07	
v/s Ratio Perm	c0.81			0.41		0.02
v/c Ratio	1.05	0.56	0.42	0.53	0.51	0.11
Uniform Delay, d1	11.4	4.5	3.8	4.3	40.0	37.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	77.9	6.6	3.3	6.1	1.9	0.4
Delay (s)	89.2	11.1	7.1	10.4	42.0	38.2
Level of Service	F	B	A	B	D	D
Approach Delay (s)		52.2	9.0		40.1	
Approach LOS		D	A		D	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑					↑	↑↑	
Volume (vph)	0	418	167	77	301	0	0	0	0	62	818	92
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frbp, ped/bikes		0.99		1.00	1.00					1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00					0.97	1.00	
Frt		0.96		1.00	1.00					1.00	0.98	
Fit Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2927		1290	1365					945	2738	
Fit Permitted		1.00		0.36	1.00					0.95	1.00	
Satd. Flow (perm)		2927		495	1365					945	2738	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	475	190	88	342	0	0	0	0	70	930	105
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	652	0	88	342	0	0	0	0	70	1012	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)			10									10
Turn Type	NA		Perm	NA						Perm	NA	
Protected Phases	2			6							4	
Permitted Phases				6						4		
Actuated Green, G (s)		29.0		29.0	29.0					21.0	21.0	
Effective Green, g (s)		29.0		29.0	29.0					21.0	21.0	
Actuated g/C Ratio		0.48		0.48	0.48					0.35	0.35	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1414		239	659					330	958	
v/s Ratio Prot		0.22			c0.25						c0.37	
v/s Ratio Perm				0.18						0.07		
v/c Ratio		0.46		0.37	0.52					0.21	1.06	
Uniform Delay, d1		10.3		9.7	10.7					13.7	19.5	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.1		4.3	2.9					1.5	45.2	
Delay (s)		11.4		14.1	13.6					15.2	64.7	
Level of Service		B		B	B					B	E	
Approach Delay (s)		11.4			13.7			0.0			61.6	
Approach LOS		B			B			A			E	

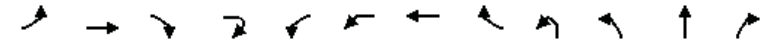
Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↑					↑				↑	
Volume (vph)	30	98	24	8	52	61	90	48	23	19	9	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.90					0.97				0.95	
Flpb, ped/bikes		0.99					0.84				0.91	
Frt		0.97					0.97				0.92	
Fit Protected		0.99					0.98				0.98	
Satd. Flow (prot)		1309					1015				1011	
Fit Permitted		0.91					0.74				0.82	
Satd. Flow (perm)		1206					772				838	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	107	26	9	57	66	98	52	25	21	10	83
RTOR Reduction (vph)	0	0	0	0	0	0	9	0	0	0	48	0
Lane Group Flow (vph)	0	175	0	0	0	0	264	0	0	0	91	0
Confl. Peds. (#/hr)	71		106	220	106	220		71	220	220		86
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		2					6				8	
Permitted Phases	2				6	6			8	8		
Actuated Green, G (s)		27.0					27.0				38.0	
Effective Green, g (s)		27.0					27.0				38.0	
Actuated g/C Ratio		0.30					0.30				0.42	
Clearance Time (s)		5.0					5.0				5.0	
Vehicle Extension (s)		3.0					3.0				3.0	
Lane Grp Cap (vph)		361					231				353	
v/s Ratio Prot												
v/s Ratio Perm		0.15					c0.34				0.11	
v/c Ratio		0.48					1.14				0.26	
Uniform Delay, d1		25.8					31.5				16.9	
Progression Factor		1.00					1.00				1.00	
Incremental Delay, d2		4.6					103.0				0.4	
Delay (s)		30.4					134.5				17.2	
Level of Service		C					F				B	
Approach Delay (s)		30.4					134.5				17.2	
Approach LOS		C					F				B	

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015

Movement	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations		↕		↕	↕	↕	↕
Volume (vph)	86	35	174	207	59	97	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1800	1800
Total Lost time (s)		5.0		5.0	3.5	3.5	
Lane Util. Factor		0.95		0.95	1.00	1.00	
Frpb, ped/bikes		0.66		0.66	1.00	0.51	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	
Frt		0.91		0.85	1.00	0.85	
Fit Protected		0.99		1.00	0.95	1.00	
Satd. Flow (prot)		861		818	1540	669	
Fit Permitted		0.88		1.00	0.95	1.00	
Satd. Flow (perm)		764		818	1540	669	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	38	189	225	64	105	18
RTOR Reduction (vph)	0	3	0	76	0	74	0
Lane Group Flow (vph)	0	340	0	126	64	49	0
Confl. Peds. (#/hr)	20		220	220	71		106
Confl. Bikes (#/hr)			12	12			
Parking (#/hr)							
Turn Type	Perm	NA		Perm	Prot	Perm	
Protected Phases		4			5		
Permitted Phases	4			4		5	
Actuated Green, G (s)		38.0		38.0	11.5	11.5	
Effective Green, g (s)		38.0		38.0	11.5	11.5	
Actuated g/C Ratio		0.42		0.42	0.13	0.13	
Clearance Time (s)		5.0		5.0	3.5	3.5	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		322		345	196	85	
v/s Ratio Prot					0.04		
v/s Ratio Perm		c0.45		0.15		c0.07	
v/c Ratio		1.06		0.37	0.33	0.57	
Uniform Delay, d1		26.0		17.8	35.7	36.9	
Progression Factor		1.00		1.00	1.00	1.00	
Incremental Delay, d2		65.7		0.7	4.4	25.3	
Delay (s)		91.7		18.4	40.1	62.2	
Level of Service		F		B	D	E	
Approach Delay (s)		64.6			54.7		
Approach LOS		E			D		
Intersection Summary							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕	↕	↕	↕↕			↕	
Volume (vph)	51	98	0	0	896	45	63	153	149	4	0	214
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frpb, ped/bikes		1.00			1.00	0.95	1.00	0.97			0.97	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	0.93			0.87	
Fit Protected		0.98			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1279			2047	689	1442	2624			1293	
Fit Permitted		0.60			1.00	1.00	0.62	1.00			0.99	
Satd. Flow (perm)		777			2047	689	946	2624			1287	
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)	54	103	0	0	943	47	66	161	157	4	0	225
RTOR Reduction (vph)	0	0	0	0	0	0	0	94	0	0	0	0
Lane Group Flow (vph)	0	157	0	0	943	47	66	224	0	0	229	0
Confl. Peds. (#/hr)	52		20	20		52	20		28	28		20
Confl. Bikes (#/hr)						10						
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		336			887	298	378	1049			514	
v/s Ratio Prot					c0.46			0.09				
v/s Ratio Perm		0.20				0.07	0.07				c0.18	
v/c Ratio		0.47			1.06	0.16	0.17	0.21			0.45	
Uniform Delay, d1		12.1			17.0	10.3	11.6	11.8			13.1	
Progression Factor		1.00			1.25	1.15	1.00	1.00			1.00	
Incremental Delay, d2		4.5			31.2	0.1	1.0	0.5			2.8	
Delay (s)		16.6			52.5	12.0	12.6	12.3			15.9	
Level of Service		B			D	B	B	B			B	
Approach Delay (s)		16.6			50.6			12.3			15.9	
Approach LOS		B			D			B			B	
Intersection Summary												
HCM 2000 Control Delay		34.7									C	
HCM 2000 Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		60.0						Sum of lost time (s)		10.0		
Intersection Capacity Utilization		108.2%						ICU Level of Service		G		
Analysis Period (min)		15										
c Critical Lane Group												

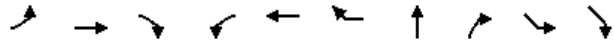
Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SEL	SER		
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↔	↕	↕		
Volume (vph)	177	260	154	12	105	108	171	78	200	52		
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800		
Total Lost time (s)	4.0	3.0			2.0		2.0		6.0			
Lane Util. Factor	1.00	0.95			1.00		1.00		0.97			
Frbp, ped/bikes	1.00	0.94			1.00		0.98		1.00			
Flpb, ped/bikes	1.00	1.00			1.00		1.00		1.00			
Frt	1.00	0.94			0.94		0.96		0.97			
Fit Protected	0.95	1.00			1.00		1.00		0.96			
Satd. Flow (prot)	1459	2397			1427		1439		2776			
Fit Permitted	0.95	1.00			0.97		1.00		0.96			
Satd. Flow (perm)	1459	2397			1390		1439		2776			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		
Adj. Flow (vph)	184	271	160	12	109	112	178	81	208	54		
RTOR Reduction (vph)	0	100	0	0	0	0	18	0	0	0		
Lane Group Flow (vph)	184	331	0	0	233	0	241	0	262	0		
Confl. Peds. (#/hr)	174		172	172				45				
Confl. Bikes (#/hr)			30									
Parking (#/hr)		10	10									
Turn Type	Prot	NA		Perm	NA		NA		Prot			
Protected Phases	5	2			6		8		4			
Permitted Phases				6								
Actuated Green, G (s)	6.0	28.5			18.5		20.0		19.0			
Effective Green, g (s)	8.0	31.5			20.5		23.0		19.0			
Actuated g/C Ratio	0.09	0.37			0.24		0.27		0.22			
Clearance Time (s)	6.0	6.0			4.0		5.0		6.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	138	893			337		391		624			
v/s Ratio Prot	c0.13	0.14					c0.17		c0.09			
v/s Ratio Perm					c0.17							
v/c Ratio	1.33	0.37			0.69		0.62		0.42			
Uniform Delay, d1	38.2	19.3			29.1		26.9		28.0			
Progression Factor	1.00	1.00			1.00		1.00		1.00			
Incremental Delay, d2	191.0	0.3			6.0		2.9		0.5			
Delay (s)	229.2	19.5			35.1		29.8		28.5			
Level of Service	F	B			D		C		C			
Approach Delay (s)		82.3			35.1		29.8		28.5			
Approach LOS		F			D		C		C			
Intersection Summary												
HCM 2000 Control Delay			54.0							HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			84.5						14.0		Sum of lost time (s)	
Intersection Capacity Utilization			93.3%								ICU Level of Service	F
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015



Movement	EBT	EBR2	WBL	WBT	NBR	SBL	SBT	SBR	SBR2			
Lane Configurations	↔	↔	↔	↕	↔	↔	↕	↔	↕			
Volume (vph)	84	65	696	477	23	42	42	1171	253			
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1600	1600	1600	1600			
Total Lost time (s)	3.0		5.0	3.0	3.0		3.0	5.0	3.0			
Lane Util. Factor	1.00		0.91	0.91	1.00		1.00	0.88	1.00			
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00	0.96	0.96			
Flpb, ped/bikes	1.00		1.00	1.00	1.00		0.95	1.00	1.00			
Frt	0.94		1.00	1.00	0.86		1.00	0.85	0.85			
Fit Protected	1.00		0.95	0.98	1.00		0.98	1.00	1.00			
Satd. Flow (prot)	1445		1327	2534	1328		1262	1955	1115			
Fit Permitted	1.00		0.58	0.74	1.00		0.98	1.00	1.00			
Satd. Flow (perm)	1445		811	1918	1328		1262	1955	1115			
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Adj. Flow (vph)	85	66	703	482	23	42	42	1183	256			
RTOR Reduction (vph)	106	0	0	0	18	0	0	0	145			
Lane Group Flow (vph)	45	0	380	805	5	0	84	1183	111			
Confl. Peds. (#/hr)						90	90	20	37			
Parking (#/hr)				10			10					
Turn Type	NA		pm+pt	NA	Over	Perm	NA	Perm	custom			
Protected Phases	2		1	6	1		4					
Permitted Phases			6			4		4	6			
Actuated Green, G (s)	8.0		24.0	24.0	11.0		26.0	26.0	24.0			
Effective Green, g (s)	10.0		24.0	26.0	13.0		28.0	26.0	26.0			
Actuated g/C Ratio	0.17		0.40	0.43	0.22		0.47	0.43	0.43			
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0	5.0	5.0			
Lane Grp Cap (vph)	240		419	964	287		588	847	483			
v/s Ratio Prot	0.03		0.17	c0.18	0.00							
v/s Ratio Perm			c0.20	0.18			0.07	c0.61	0.10			
v/c Ratio	0.19		0.91	0.84	0.02		0.14	1.40	0.23			
Uniform Delay, d1	21.5		16.9	15.1	18.5		9.1	17.0	10.7			
Progression Factor	1.00		1.36	1.30	1.00		1.00	1.00	1.00			
Incremental Delay, d2	1.7		13.1	3.7	0.1		0.5	185.7	1.1			
Delay (s)	23.2		36.1	23.4	18.6		9.7	202.7	11.8			
Level of Service	C		D	C	B		A	F	B			
Approach Delay (s)	23.2			27.5			160.0					
Approach LOS	C			C			F					
Intersection Summary												
HCM 2000 Control Delay			97.2							HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			60.0						11.0		Sum of lost time (s)	
Intersection Capacity Utilization			103.6%								ICU Level of Service	G
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔						↔	↔
Volume (vph)	0	0	0	697	1444	0	0	0	0	0	1133	460
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1900	1900
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.95	0.65
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.98	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4934						4882	728
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4934						4882	728
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	711	1473	0	0	0	0	0	1156	469
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	419	1765	0	0	0	0	0	1334	291
Confl. Peds. (#/hr)	20		20	215		419	515		677	677		515
Confl. Bikes (#/hr)			30			30			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				32.0	32.0						26.0	26.0
Effective Green, g (s)				33.5	33.5						28.0	28.0
Actuated g/C Ratio				0.37	0.37						0.31	0.31
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				439	1836						1518	226
v/s Ratio Prot				0.35	0.36						0.27	
v/s Ratio Perm												0.40
v/c Ratio				0.95	0.96						0.88	1.29
Uniform Delay, d1				27.5	27.6						29.4	31.0
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				32.9	13.7						7.6	158.5
Delay (s)				60.5	41.3						36.9	189.5
Level of Service				E	D						D	F
Approach Delay (s)	0.0				45.0		0.0				64.3	
Approach LOS	A				D		A				E	

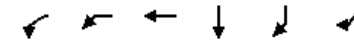
Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	172	747	1141	544	951	288
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)	2.4		2.4	5.7	2.7	2.7
Lane Util. Factor	0.81		0.81	0.91	0.91	1.00
Frbp, ped/bikes	1.00		1.00	0.99	0.98	0.96
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	0.93	0.85	0.85
Fit Protected	0.95		0.98	1.00	1.00	1.00
Satd. Flow (prot)	1050		4852	2120	1038	1112
Fit Permitted	0.95		0.98	1.00	1.00	1.00
Satd. Flow (perm)	1050		4852	2120	1038	1112
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	176	762	1164	555	970	294
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	158	0	1944	1040	485	280
Confl. Peds. (#/hr)						41
Confl. Bikes (#/hr)					10	10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)				10		
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)	35.6		35.6	43.3	43.3	43.3
Effective Green, g (s)	38.6		38.6	43.3	46.3	46.3
Actuated g/C Ratio	0.43		0.43	0.48	0.51	0.51
Clearance Time (s)	5.4		5.4	5.7	5.7	5.7
Lane Grp Cap (vph)	450		2080	1019	533	572
v/s Ratio Prot				0.49		
v/s Ratio Perm	0.15		0.40		0.47	0.25
v/c Ratio	0.35		1.34dl	1.09dr	0.91	0.49
Uniform Delay, d1	17.3		24.5	23.4	19.9	14.2
Progression Factor	1.00		1.00	1.65	1.86	2.04
Incremental Delay, d2	2.1		9.4	23.3	10.8	1.2
Delay (s)	19.4		33.9	61.9	47.9	30.2
Level of Service	B		C	E	D	C
Approach Delay (s)			32.8	53.0		
Approach LOS			C	D		

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	113.1%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations	↑↑↑↑		↑	↑	↑↑↑↑	↑
Volume (vph)	729	113	132	584	143	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.97		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5751		1459	1305	4118	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5751		1459	1305	4118	1122
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	776	120	140	621	152	15
RTOR Reduction (vph)	31	0	95	0	0	0
Lane Group Flow (vph)	865	0	45	621	154	13
Confl. Peds. (#/hr)		163	796			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1629		466	417	1075	292
v/s Ratio Prot	c0.15		0.03	c0.48	c0.04	
v/s Ratio Perm						0.01
v/c Ratio	0.53		0.10	1.49	0.14	0.04
Uniform Delay, d1	27.2		21.5	30.6	25.5	24.9
Progression Factor	1.00		0.94	0.78	1.00	1.00
Incremental Delay, d2	1.2		0.2	226.7	0.3	0.3
Delay (s)	28.5		20.4	250.7	25.8	25.1
Level of Service	C		C	F	C	C
Approach Delay (s)	28.5			208.3	25.8	
Approach LOS	C			F	C	
Intersection Summary						
HCM 2000 Control Delay			103.3		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	12.2
Intersection Capacity Utilization			77.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations		↑↑↑↑			↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	272	1171	161	52	302	537	219	192	722	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0	2.0			2.0	2.0
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.96			0.99	0.85
Flpb, ped/bikes		0.99			1.00	1.00			0.79	1.00
Frt		0.98			1.00	0.96			1.00	0.85
Fit Protected		0.99			0.99	1.00			0.95	1.00
Satd. Flow (prot)		5718			2855	2448			3234	954
Fit Permitted		0.99			0.66	1.00			0.95	1.00
Satd. Flow (perm)		5718			1898	2448			3234	954
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1259	173	56	325	577	235	209	776	285
RTOR Reduction (vph)	0	22	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1706	0	0	381	809	0	0	1014	256
Confl. Peds. (#/hr)	70		120	120			120	70	120	120
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases		6			4	4			7	
Permitted Phases	6			4				7		7
Actuated Green, G (s)		27.0			25.0	25.0			24.0	24.0
Effective Green, g (s)		29.0			28.0	28.0			27.0	27.0
Actuated g/C Ratio		0.32			0.31	0.31			0.30	0.30
Clearance Time (s)		4.0			5.0	5.0			5.0	5.0
Lane Grp Cap (vph)		1842			590	761			970	286
v/s Ratio Prot						c0.33				
v/s Ratio Perm		0.30			0.20				0.31	0.27
v/c Ratio		0.93			0.65	1.06			1.05	0.90
Uniform Delay, d1		29.5			26.7	31.0			31.5	30.1
Progression Factor		1.48			1.00	1.00			1.00	1.00
Incremental Delay, d2		6.9			5.4	50.5			41.5	32.0
Delay (s)		50.5			32.1	81.5			73.0	62.2
Level of Service		D			C	F			E	E
Approach Delay (s)		50.5			32.1	81.5			70.8	
Approach LOS		D			C	F			E	
Intersection Summary										
HCM 2000 Control Delay					61.0				HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio					0.99					
Actuated Cycle Length (s)					90.0				Sum of lost time (s)	6.0
Intersection Capacity Utilization					109.1%				ICU Level of Service	H
Analysis Period (min)					15					
c Critical Lane Group										


Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, No Event (No Giants)

Synchro 8 Report
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TR-831

HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St


5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	121	90	29	15	322	19	23	3	3	4	4	210
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	139	103	33	17	370	22	26	3	3	5	5	241
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	276	409	33	251								
Volume Left (vph)	139	17	26	5								
Volume Right (vph)	33	22	3	241								
Hadj (s)	0.06	0.01	0.13	-0.54								
Departure Headway (s)	5.4	5.1	6.3	5.2								
Degree Utilization, x	0.41	0.58	0.06	0.36								
Capacity (veh/h)	631	674	465	626								
Control Delay (s)	12.0	15.0	9.7	11.1								
Approach Delay (s)	12.0	15.0	9.7	11.1								
Approach LOS	B	C	A	B								
Intersection Summary												
Delay				13.0								
Level of Service				B								
Intersection Capacity Utilization				62.8%	ICU Level of Service	B						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕			↕			↕			↕			
Volume (vph)	50	538	93	168	235	81	44	338	73	38	308	215		
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600		
Total Lost time (s)					2.0					2.0				
Lane Util. Factor					0.95					0.95				
Frbp, ped/bikes					0.93					0.95				
Flpb, ped/bikes					0.99					0.94				
Frt					0.98					0.97				
Fit Protected					1.00					0.98				
Satd. Flow (prot)					2153					2058				
Fit Permitted					0.89					0.61				
Satd. Flow (perm)					1924					1274				
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)	53	566	98	177	247	85	46	356	77	40	324	226		
RTOR Reduction (vph)	0	14	0	0	13	0	0	7	0	0	19	0		
Lane Group Flow (vph)	0	703	0	0	496	0	0	472	0	0	571	0		
Confl. Peds. (#/hr)	420			420			420			420				
Confl. Bikes (#/hr)	20			6			3			23				
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0		
Parking (#/hr)	10			10			10			10				
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA		
Protected Phases	2		6		8		4							
Permitted Phases	2		6		8		4							
Actuated Green, G (s)	25.0				25.0				25.0					
Effective Green, g (s)	28.0				28.0				28.0					
Actuated g/C Ratio	0.47				0.47				0.47					
Clearance Time (s)	5.0				5.0				5.0					
Lane Grp Cap (vph)	897				594				956					
v/s Ratio Prot														
v/s Ratio Perm	0.37				c0.39				0.23					
v/c Ratio	0.78				1.15dl				0.49					
Uniform Delay, d1	13.4				14.0				11.1					
Progression Factor	1.00				1.00				1.00					
Incremental Delay, d2	6.8				13.0				1.8					
Delay (s)	20.2				27.0				12.9					
Level of Service	C				C				B					
Approach Delay (s)	20.2				27.0				12.9					
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	0.77													
Actuated Cycle Length (s)	60.0				Sum of lost time (s)				5.0					
Intersection Capacity Utilization	107.1%				ICU Level of Service				G					
Analysis Period (min)	15													
dl Defacto Left Lane. Recode with 1 though lane as a left lane.														
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

28: Second St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔						↑↑	↔		↑↑	
Volume (vph)	354	576	48	0	0	0	0	512	177	12	521	0
Ideal Flow (vphpl)	1050	1050	1050	1800	1800	1800	1050	1050	1050	1600	1600	1600
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0	
Lane Util. Factor	*0.50	*0.50						*0.50	0.91		0.95	
Frbp, ped/bikes	1.00	0.98						0.99	0.70		1.00	
Flpb, ped/bikes	1.00	1.00						1.00	1.00		1.00	
Frt	1.00	0.99						0.99	0.85		1.00	
Fit Protected	0.95	1.00						1.00	1.00		1.00	
Satd. Flow (prot)	787	1233						882	484		2390	
Fit Permitted	0.95	1.00						1.00	1.00		0.93	
Satd. Flow (perm)	787	1233						882	484		2225	
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)	381	619	52	0	0	0	0	551	190	13	560	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	2	8	0	0	0
Lane Group Flow (vph)	381	663	0	0	0	0	0	568	163	0	573	0
Confl. Peds. (#/hr)	20		420	20			20	20		420		20
Confl. Bikes (#/hr)			1						17			
Parking (#/hr)	10	10	10									10
Turn Type	Split	NA						NA	Perm	Perm	NA	
Protected Phases	2	2						4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0	
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5	
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5	
Lane Grp Cap (vph)	373	585						404	221		1019	
v/s Ratio Prot	0.48	c0.54						c0.64				
v/s Ratio Perm									0.34		0.26	
v/c Ratio	1.02	1.13						1.41	0.74		0.56	
Uniform Delay, d1	15.8	15.8						16.2	13.3		11.9	
Progression Factor	1.00	1.00						0.73	0.70		1.00	
Incremental Delay, d2	52.2	79.8						196.0	18.7		2.2	
Delay (s)	67.9	95.5						207.7	28.1		14.1	
Level of Service	E	F						F	C		B	
Approach Delay (s)		85.5			0.0			166.3			14.1	
Approach LOS		F			A			F			B	
Intersection Summary												
HCM 2000 Control Delay		93.5							HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio		1.24										
Actuated Cycle Length (s)		60.0							Sum of lost time (s)		4.0	
Intersection Capacity Utilization		81.0%							ICU Level of Service		D	
Analysis Period (min)		15										
c Critical Lane Group												

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING PLUS NO EVENT – SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	52	214	172	527	0	661	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95		0.95	
Frbp, ped/bikes	1.00	0.79	1.00	1.00		0.99	
Flpb, ped/bikes	0.97	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	1.00	1.00		0.99	
Fit Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1498	1091	2987	3079		3044	
Fit Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1498	1091	2987	3079		3044	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	235	189	579	0	726	31
RTOR Reduction (vph)	0	152	0	0	0	3	0
Lane Group Flow (vph)	57	83	189	579	0	754	0
Confl. Peds. (#/hr)	30	221	30				140
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.4		37.6	
Effective Green, g (s)	39.0	39.0	20.0	51.3		39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.47		0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9		5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	531	386	543	1435		1079	
v/s Ratio Prot			0.06			c0.25	
v/s Ratio Perm	0.04	c0.08		c0.19			
v/c Ratio	0.11	0.22	0.35	0.40		0.70	
Uniform Delay, d1	23.8	24.8	39.3	19.3		30.5	
Progression Factor	1.00	1.00	0.88	0.69		1.00	
Incremental Delay, d2	0.1	0.3	0.4	0.8		3.8	
Delay (s)	23.9	25.1	35.0	14.1		34.2	
Level of Service	C	C	D	B		C	
Approach Delay (s)	24.9			19.3		34.2	
Approach LOS	C			B		C	
Intersection Summary							
HCM 2000 Control Delay			26.4		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.48				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		16.7
Intersection Capacity Utilization			77.2%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	138	99	141	549	12	799	63
Ideal Flow (vphpl)	1900	1900	1400	1400	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.1	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.82	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.99	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1503	1126	2201	3260	1540	4316	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1503	1126	2201	3260	1540	4316	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	142	102	145	566	12	824	65
RTOR Reduction (vph)	0	60	0	0	0	8	0
Lane Group Flow (vph)	142	42	145	566	12	881	0
Confl. Peds. (#/hr)	30	218	161				161
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.5	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	614	460	420	1256	147	1255	
v/s Ratio Prot			0.07	c0.17	0.01	c0.20	
v/s Ratio Perm	c0.09	0.04					
v/c Ratio	0.23	0.09	0.35	0.45	0.08	0.70	
Uniform Delay, d1	21.2	19.9	38.5	25.1	45.4	34.8	
Progression Factor	1.00	1.00	1.19	1.23	0.54	0.87	
Incremental Delay, d2	0.2	0.1	0.5	1.1	0.8	2.6	
Delay (s)	21.4	20.0	46.5	31.9	25.3	32.7	
Level of Service	C	C	D	C	C	C	
Approach Delay (s)	20.8			34.9		32.6	
Approach LOS	C			C		C	
Intersection Summary							
HCM 2000 Control Delay			31.9		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.46				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		15.8
Intersection Capacity Utilization			75.5%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	130	101	0	601	818	64
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	*0.80	
Frbp, ped/bikes	1.00	0.80		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1098		3726	3163	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1098		3726	3163	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	149	116	0	691	940	74
RTOR Reduction (vph)	0	23	0	0	7	0
Lane Group Flow (vph)	149	93	0	691	1007	0
Confl. Peds. (#/hr)	347	210	190			270
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	35.6	35.6		62.8	62.8	
Effective Green, g (s)	38.0	35.6		64.0	64.0	
Actuated g/C Ratio	0.35	0.32		0.58	0.58	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	532	355		2167	1840	
v/s Ratio Prot	c0.10			0.19	c0.32	
v/s Ratio Perm		0.08				
v/c Ratio	0.28	0.26		0.32	0.55	
Uniform Delay, d1	26.1	27.5		11.8	14.1	
Progression Factor	1.00	1.00		1.46	0.38	
Incremental Delay, d2	0.3	0.4		0.4	1.0	
Delay (s)	26.4	27.9		17.6	6.3	
Level of Service	C	C		B	A	
Approach Delay (s)	27.0			17.6	6.3	
Approach LOS	C			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	67	49	199	530	4	745	171
Ideal Flow (vphpl)	1900	1900	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	7.1	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.90	1.00	1.00	1.00	1.00	0.86
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	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1245	1459	4191	1459	2917	1116
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1245	1459	4191	1459	2917	1116
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	76	56	226	602	5	847	194
RTOR Reduction (vph)	0	34	0	0	0	0	125
Lane Group Flow (vph)	76	22	226	602	5	847	69
Confl. Peds. (#/hr)	160	112	146				146
Turn Type	Prot	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	2	1	6	
Permitted Phases		4					6
Actuated Green, G (s)	42.9	42.9	10.1	39.8	7.0	37.6	37.6
Effective Green, g (s)	46.0	42.9	13.0	42.7	9.3	39.0	39.0
Actuated g/C Ratio	0.42	0.39	0.12	0.39	0.08	0.35	0.35
Clearance Time (s)	7.1	7.1	6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	644	485	172	1626	123	1034	395
v/s Ratio Prot	c0.05		c0.15	0.14	0.00	c0.29	
v/s Ratio Perm		0.02					0.06
v/c Ratio	0.12	0.05	1.31	0.37	0.04	0.82	0.17
Uniform Delay, d1	19.6	20.8	48.5	24.0	46.3	32.3	24.4
Progression Factor	1.00	1.00	0.72	0.76	1.59	0.69	1.24
Incremental Delay, d2	0.1	0.0	175.5	0.6	0.5	6.3	0.8
Delay (s)	19.7	20.9	210.6	18.9	74.2	28.7	31.2
Level of Service	B	C	F	B	E	C	C
Approach Delay (s)	20.2			71.2		29.4	
Approach LOS	C			E		C	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	172	97	23	176	556	778	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1600	1600
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.75		1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	904		1593	2946	2644	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3090	904		1593	2946	2644	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	181	102	24	185	585	819	17
RTOR Reduction (vph)	0	14	0	0	0	1	0
Lane Group Flow (vph)	181	88	0	209	585	835	0
Confl. Peds. (#/hr)	134	316		100			323
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	Prot	Prot	NA	NA	
Protected Phases	4		5	5	2	6	
Permitted Phases		4					
Actuated Green, G (s)	42.3	42.3		12.6	55.7	36.7	
Effective Green, g (s)	45.3	45.3		15.6	58.7	39.7	
Actuated g/C Ratio	0.41	0.41		0.14	0.53	0.36	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	372		225	1572	954	
v/s Ratio Prot	0.06			c0.13	0.20	c0.32	
v/s Ratio Perm		c0.10					
v/c Ratio	0.14	0.24		0.93	0.37	0.87	
Uniform Delay, d1	20.2	21.1		46.7	14.9	32.8	
Progression Factor	1.00	1.00		1.60	0.20	0.09	
Incremental Delay, d2	0.2	1.5		42.3	0.6	7.1	
Delay (s)	20.4	22.6		116.8	3.6	9.9	
Level of Service	C	C		F	A	A	
Approach Delay (s)	21.2				33.4	9.9	
Approach LOS	C				C	A	
Intersection Summary							
HCM 2000 Control Delay			21.3				HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.60				
Actuated Cycle Length (s)			110.0			10.4	Sum of lost time (s) 12.2
Intersection Capacity Utilization			86.7%				ICU Level of Service F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	99	126	0	656	674	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600
Total Lost time (s)	6.8	6.8		5.4	5.4	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frbp, ped/bikes	1.00	0.88		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1210		3079	2385	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1210		3079	2385	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	102	130	0	676	695	231
RTOR Reduction (vph)	0	36	0	0	30	0
Lane Group Flow (vph)	102	94	0	676	896	0
Confl. Peds. (#/hr)	173	140	80			220
Confl. Bikes (#/hr)						117
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	41.2	41.2		56.6	56.6	
Effective Green, g (s)	41.2	41.2		56.6	56.6	
Actuated g/C Ratio	0.37	0.37		0.51	0.51	
Clearance Time (s)	6.8	6.8		5.4	5.4	
Lane Grp Cap (vph)	576	453		1584	1227	
v/s Ratio Prot	0.07			0.22	c0.38	
v/s Ratio Perm		c0.08				
v/c Ratio	0.18	0.21		0.43	0.73	
Uniform Delay, d1	23.0	23.3		16.6	20.8	
Progression Factor	1.00	1.00		1.75	0.84	
Incremental Delay, d2	0.7	1.0		0.7	2.2	
Delay (s)	23.7	24.4		29.8	19.6	
Level of Service	C	C		C	B	
Approach Delay (s)	24.1			29.8	19.6	
Approach LOS	C			C	B	
Intersection Summary						
HCM 2000 Control Delay			23.9			HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			110.0			Sum of lost time (s) 12.2
Intersection Capacity Utilization			91.7%			ICU Level of Service F
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

TR-837

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔			↕		↔	↔	↔		↔	↔
Volume (vph)	59	0	129	0	0	0	73	187	598	0	0	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600	1600
Total Lost time (s)	6.9	6.9						6.5	6.5			5.2
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frbp, ped/bikes	1.00	0.90						1.00	1.00			1.00
Flpb, ped/bikes	0.78	1.00						0.97	1.00			1.00
Frt	1.00	0.85						1.00	1.00			1.00
Fit Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1200	1238						1497	3079			2593
Fit Permitted	0.76	1.00						0.36	1.00			1.00
Satd. Flow (perm)	956	1238						567	3079			2593
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	63	0	137	0	0	0	78	199	636	0	0	771
RTOR Reduction (vph)	0	90	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	63	47	0	0	0	0	0	277	636	0	0	771
Confl. Peds. (#/hr)	255		104	104		255		80		1863	1690	
Confl. Bikes (#/hr)			2							52		
Turn Type	Perm	NA					custom	Prot	NA		Prot	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8			5					
Actuated Green, G (s)	38.1	38.1						16.5	41.5			36.8
Effective Green, g (s)	38.1	38.1						16.5	41.5			36.8
Actuated g/C Ratio	0.35	0.35						0.15	0.38			0.33
Clearance Time (s)	6.9	6.9						6.5	6.5			5.2
Lane Grp Cap (vph)	331	428						85	1161			867
v/s Ratio Prot		0.04							0.21			c0.30
v/s Ratio Perm	c0.07							c0.49				
v/c Ratio	0.19	0.11						3.26	0.55			0.89
Uniform Delay, d1	25.2	24.4						46.8	26.9			34.7
Progression Factor	1.00	1.00						0.57	0.59			0.81
Incremental Delay, d2	1.3	0.5						1042.3	1.6			10.5
Delay (s)	26.4	25.0						1068.7	17.5			38.7
Level of Service	C	C						F	B			D
Approach Delay (s)		25.4			0.0				336.4			37.0
Approach LOS		C			A				F			D

Intersection Summary				
HCM 2000 Control Delay		175.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio		1.03		
Actuated Cycle Length (s)		110.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization		93.9%	ICU Level of Service	F
Analysis Period (min)		15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015

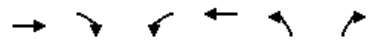


Movement	SBR	SBT
Lane Configurations	↔	↔
Volume (vph)	75	725
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)	5.2	5.2
Lane Util. Factor	1.00	0.95
Frbp, ped/bikes	0.79	1.00
Flpb, ped/bikes	1.00	1.00
Frt	0.85	1.00
Fit Protected	1.00	1.00
Satd. Flow (prot)	921	2593
Fit Permitted	1.00	1.00
Satd. Flow (perm)	921	2593
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	80	771
RTOR Reduction (vph)	53	0
Lane Group Flow (vph)	27	771
Confl. Peds. (#/hr)	157	
Confl. Bikes (#/hr)	80	
Turn Type	Perm	
Protected Phases		
Permitted Phases	6	
Actuated Green, G (s)	36.8	
Effective Green, g (s)	36.8	
Actuated g/C Ratio	0.33	
Clearance Time (s)	5.2	
Lane Grp Cap (vph)	308	
v/s Ratio Prot		
v/s Ratio Perm	0.03	
v/c Ratio	0.09	
Uniform Delay, d1	25.1	
Progression Factor	0.80	
Incremental Delay, d2	0.4	
Delay (s)	20.6	
Level of Service	C	
Approach Delay (s)		
Approach LOS		

Intersection Summary	

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑	↑	
Volume (veh/h)	344	0	0	220	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	447	0	0	286	0	0
Pedestrians	30			30	30	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked					0.98	
vC, conflicting volume			477		792	283
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			477		779	283
iC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1057		312	681

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	298	149	286	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1057	1700
Volume to Capacity	0.18	0.09	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				A
Approach Delay (s)	0.0		0.0	0.0
Approach LOS				A

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		29.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015



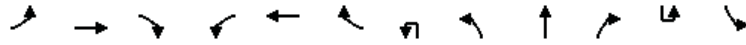
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↑	↑		↑	↑↑	↓	↑↑	↑
Volume (vph)	48	30	5	147	625	98	713	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.76		1.00	1.00	1.00	1.00	0.67
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	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1045		1540	3079	1540	3079	927
Fit Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1045		1540	3079	1540	3079	927
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	53	33	5	162	687	108	784	126
RTOR Reduction (vph)	0	22	0	0	0	0	0	58
Lane Group Flow (vph)	53	11	0	167	687	108	784	68
Confl. Peds. (#/hr)	76	270		30				163
Confl. Bikes (#/hr)								92
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Effective Green, g (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Actuated g/C Ratio	0.35	0.35		0.10	0.40	0.09	0.37	0.37
Clearance Time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	361		159	1226	140	1147	345
v/s Ratio Prot	c0.03			c0.11	0.22	0.07	c0.25	
v/s Ratio Perm		0.01						0.07
v/c Ratio	0.10	0.03		1.05	0.56	0.77	0.68	0.20
Uniform Delay, d1	24.3	23.8		49.3	25.6	48.9	29.0	23.4
Progression Factor	1.00	1.00		0.44	0.70	0.71	0.50	0.38
Incremental Delay, d2	0.4	0.2		75.2	1.4	11.9	1.0	0.4
Delay (s)	24.7	23.9		97.0	19.3	46.7	15.6	9.3
Level of Service	C	C		F	B	D	B	A
Approach Delay (s)	24.4				34.5		18.1	
Approach LOS	C				C		B	

Intersection Summary				
HCM 2000 Control Delay		25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.48		
Actuated Cycle Length (s)		110.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization		91.7%	ICU Level of Service	F
Analysis Period (min)		15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations		↔			↔			↔	↔			↔
Volume (vph)	26	2	45	1	6	2	16	54	749	10	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600
Total Lost time (s)		7.0			7.0			7.0	7.0			5.8
Lane Util. Factor		1.00			1.00			1.00	0.95			1.00
Frbp, ped/bikes		0.79			0.93			1.00	0.99			1.00
Flpb, ped/bikes		0.89			0.97			1.00	1.00			0.90
Frt		0.92			0.97			1.00	1.00			1.00
Fit Protected		0.98			1.00			0.95	1.00			0.95
Satd. Flow (prot)		1023			1421			1540	3049			1162
Fit Permitted		0.91			0.99			0.95	1.00			0.43
Satd. Flow (perm)		949			1409			1540	3049			532
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	2	49	1	7	2	17	59	814	11	3	1
RTOR Reduction (vph)	0	32	0	0	1	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	47	0	0	9	0	0	76	824	0	0	4
Confl. Peds. (#/hr)	480		480	480		480		60		610		210
Confl. Bikes (#/hr)			30			30				30		
Turn Type	Perm	NA		Perm	NA		Prot	Prot	NA		custom	Prot
Protected Phases		4			8		5	5	2			1
Permitted Phases	4			8							1	
Actuated Green, G (s)		38.0			38.0			15.0	43.0			9.2
Effective Green, g (s)		38.0			38.0			15.0	43.0			9.2
Actuated g/C Ratio		0.35			0.35			0.14	0.39			0.08
Clearance Time (s)		7.0			7.0			7.0	7.0			5.8
Lane Grp Cap (vph)		327			486			210	1191			44
v/s Ratio Prot								0.05	c0.27			
v/s Ratio Perm		c0.05			0.01							0.01
v/c Ratio		0.14			0.02			0.36	0.69			0.09
Uniform Delay, d1		24.8			23.7			43.2	28.0			46.5
Progression Factor		1.00			1.00			0.79	0.74			1.56
Incremental Delay, d2		0.9			0.1			3.6	2.5			3.0
Delay (s)		25.7			23.8			37.7	23.1			75.4
Level of Service		C			C			D	C			E
Approach Delay (s)		25.7			23.8				24.4			
Approach LOS		C			C				C			

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015

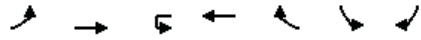


Movement	SBT	SBR
Lane Configurations	↔	↔
Volume (vph)	685	59
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)	5.4	
Lane Util. Factor	0.95	
Frbp, ped/bikes	0.97	
Flpb, ped/bikes	1.00	
Frt	0.99	
Fit Protected	1.00	
Satd. Flow (prot)	2494	
Fit Permitted	1.00	
Satd. Flow (perm)	2494	
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	745	64
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	803	0
Confl. Peds. (#/hr)		460
Confl. Bikes (#/hr)		30
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	37.6	
Effective Green, g (s)	37.6	
Actuated g/C Ratio	0.34	
Clearance Time (s)	5.4	
Lane Grp Cap (vph)	852	
v/s Ratio Prot	c0.32	
v/s Ratio Perm		
v/c Ratio	0.94	
Uniform Delay, d1	35.2	
Progression Factor	0.16	
Incremental Delay, d2	16.1	
Delay (s)	21.5	
Level of Service	C	
Approach Delay (s)	21.8	
Approach LOS	C	

Intersection Summary	
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HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	123	804	4	687	56	15	209
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1900	1900
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	0.95		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.98		1.00	0.66
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1540	3079	1540	2500		1540	908
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1540	3079	1540	2500		1540	908
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	132	865	4	739	60	16	225
RTOR Reduction (vph)	0	0	0	5	0	0	78
Lane Group Flow (vph)	132	865	4	794	0	16	147
Confl. Peds. (#/hr)	60				460	460	500
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA		Prot	Perm
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	215	1253	117	827		534	315
v/s Ratio Prot	0.09	0.28	0.00	0.32		0.01	
v/s Ratio Perm							0.16
v/c Ratio	0.61	0.69	0.03	0.96		0.03	0.47
Uniform Delay, d1	44.5	26.9	47.0	36.1		23.7	28.0
Progression Factor	0.71	1.35	0.75	0.61		1.00	1.00
Incremental Delay, d2	10.4	2.6	0.2	13.2		0.1	4.9
Delay (s)	41.8	38.9	35.4	35.3		23.8	32.9
Level of Service	D	D	D	D		C	C
Approach Delay (s)		39.3		35.3		32.3	
Approach LOS		D		D		C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	634	781	58	149	668	80	43	454	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frbp, ped/bikes	1.00	0.98		1.00	0.96			1.00	0.67			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	2979		2515	2459			5397	924			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	2979		2515	2459			5397	924			
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)	704	868	64	166	742	89	48	504	172	0	0	0
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	142	0	0	0
Lane Group Flow (vph)	704	929	0	166	829	0	0	552	30	0	0	0
Confl. Peds. (#/hr)	60		460	60		460	460		460	60		60
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases							8		8			
Actuated Green, G (s)	18.2	56.2		14.1	53.6			19.3	19.3			
Effective Green, g (s)	18.2	56.2		14.1	53.6			19.3	19.3			
Actuated g/C Ratio	0.17	0.51		0.13	0.49			0.18	0.18			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	718	1521		322	1198			946	162			
v/s Ratio Prot	0.16	0.31		0.07	0.34							
v/s Ratio Perm								0.10	0.03			
v/c Ratio	0.98	0.61		0.52	0.69			0.58	0.19			
Uniform Delay, d1	45.7	19.1		44.8	21.8			41.7	38.7			
Progression Factor	0.75	0.92		1.38	0.77			1.00	1.00			
Incremental Delay, d2	18.0	0.8		0.7	0.9			0.9	0.6			
Delay (s)	52.2	18.5		62.7	17.6			42.6	39.2			
Level of Service	D	B		E	B			D	D			
Approach Delay (s)		33.0			25.1			41.8			0.0	
Approach LOS		C			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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TR-841

HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↔	↕↕	↕
Volume (vph)	152	1388	79	56	606	49	7	47	25	60	208	97
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.63	1.00	0.98	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.95	1.00	0.66	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4296		1296	2442			1534	846	1019	2862	571
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4296		1296	2442			1481	846	772	2862	571
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1477	84	60	645	52	7	50	27	64	221	103
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	18	0	3	60
Lane Group Flow (vph)	162	1556	0	60	692	0	0	57	9	64	228	33
Confl. Peds. (#/hr)	50		811	50		745	1698		728	728		1698
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases							4		4	7		7
Actuated Green, G (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.36		0.11	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1562		140	796			514	293	275	1019	203
v/s Ratio Prot	0.11	c0.36		0.05	c0.28						0.08	
v/s Ratio Perm							0.04	0.01	c0.08			0.06
v/c Ratio	0.81	1.00		0.43	0.87			0.11	0.03	0.23	0.22	0.16
Uniform Delay, d1	46.4	34.9		45.9	34.8			24.4	23.7	24.8	24.8	24.2
Progression Factor	0.65	0.76		0.75	0.65			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	6.0		1.6	7.6			0.1	0.0	0.4	0.1	0.4
Delay (s)	32.5	32.7		36.1	30.1			24.5	23.7	25.3	24.9	24.6
Level of Service	C	C		D	C			C	C	C	C	C
Approach Delay (s)		32.7			30.5			24.2			24.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Volume (vph)	1564	80	0	710	30	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3049			3079	1540	1321
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3049			3079	1540	1321
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1719	88	0	780	33	60
RTOR Reduction (vph)	3	0	0	0	0	8
Lane Group Flow (vph)	1804	0	0	780	33	52
Confl. Peds. (#/hr)		67	67		31	33
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1721			1738	512	439
v/s Ratio Prot	c0.59			0.25	0.02	
v/s Ratio Perm						c0.04
v/c Ratio	1.05			0.45	0.06	0.12
Uniform Delay, d1	23.9			14.0	25.0	25.5
Progression Factor	1.00			0.55	1.00	1.00
Incremental Delay, d2	35.5			0.5	0.2	0.6
Delay (s)	59.4			8.3	25.3	26.0
Level of Service	E			A	C	C
Approach Delay (s)	59.4			8.3	25.8	
Approach LOS	E			A	C	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015

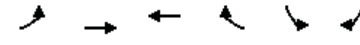


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕		↕	↕			↕	↕
Volume (vph)	28	175	65	10	315	69	83	362	20	3	27	71
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.94			0.95		1.00	0.99			1.00	0.73
Flpb, ped/bikes		1.00			1.00		0.75	1.00			0.99	1.00
Frt		0.97			0.97		1.00	0.99			1.00	0.85
Fit Protected		0.99			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1620			1157		1288	1769			1780	955
Fit Permitted		0.86			0.93		0.74	1.00			0.97	1.00
Satd. Flow (perm)		1395			1080		997	1769			1742	955
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)	31	194	72	11	350	77	92	402	22	3	30	79
RTOR Reduction (vph)	0	19	0	0	16	0	0	3	0	0	0	45
Lane Group Flow (vph)	0	278	0	0	422	0	92	421	0	0	33	34
Confl. Peds. (#/hr)	30		130	130		130	230		160	160		230
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		26.0			26.0		26.0	26.0			26.0	26.0
Effective Green, g (s)		26.0			26.0		26.0	26.0			26.0	26.0
Actuated g/C Ratio		0.43			0.43		0.43	0.43			0.43	0.43
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)		604			468		432	766			754	413
v/s Ratio Prot								c0.24				
v/s Ratio Perm		0.20			c0.39		0.09				0.02	0.04
v/c Ratio		0.46			0.90		0.21	0.55			0.04	0.08
Uniform Delay, d1		12.0			15.8		10.6	12.6			9.8	10.0
Progression Factor		1.17			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		2.3			23.2		1.1	2.8			0.1	0.4
Delay (s)		16.4			39.0		11.7	15.5			9.9	10.4
Level of Service		B			D		B	B			A	B
Approach Delay (s)		16.4			39.0			14.8			10.3	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Volume (vph)	198	144	138	121	40	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.91	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1502	1378	1621	1247	1540	959
Fit Permitted	0.66	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1037	1378	1621	1247	1540	959
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	228	166	159	139	46	89
RTOR Reduction (vph)	0	0	0	40	0	76
Lane Group Flow (vph)	228	166	159	99	46	13
Confl. Peds. (#/hr)	30			82	130	91
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	46.4	46.4	46.4	46.4	9.6	9.6
Effective Green, g (s)	46.4	46.4	46.4	46.4	9.6	9.6
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	740	983	1157	890	227	141
v/s Ratio Prot		0.12	0.10		c0.03	
v/s Ratio Perm	c0.22			0.08		0.01
v/c Ratio	0.31	0.17	0.14	0.11	0.20	0.09
Uniform Delay, d1	3.4	3.0	3.0	2.9	24.3	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.4	0.2	0.3	0.4	0.3
Delay (s)	4.5	3.4	3.2	3.1	24.8	24.2
Level of Service	A	A	A	A	C	C
Approach Delay (s)		4.0	3.2		24.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑					↑	↑↑	
Volume (vph)	0	352	95	19	159	0	0	0	0	10	162	34
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frbp, ped/bikes		0.99		1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00		0.98	1.00					0.95	1.00	
Frt		0.97		1.00	1.00					1.00	0.97	
Fit Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2954		1276	1365					926	2691	
Fit Permitted		1.00		0.46	1.00					0.95	1.00	
Satd. Flow (perm)		2954		618	1365					926	2691	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	387	104	21	175	0	0	0	0	11	178	37
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	450	0	21	175	0	0	0	0	11	193	0
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Parking (#/hr)			10									10
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		26.0		26.0	26.0					24.0	24.0	
Effective Green, g (s)		26.0		26.0	26.0					24.0	24.0	
Actuated g/C Ratio		0.43		0.43	0.43					0.40	0.40	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1280		267	591					370	1076	
v/s Ratio Prot		c0.15			0.13						c0.07	
v/s Ratio Perm				0.03						0.01		
v/c Ratio		0.35		0.08	0.30					0.03	0.18	
Uniform Delay, d1		11.4		10.0	11.1					10.9	11.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.8		0.6	1.3					0.1	0.4	
Delay (s)		12.1		10.5	12.3					11.1	12.0	
Level of Service		B		B	B					B	B	
Approach Delay (s)		12.1			12.1		0.0				12.0	
Approach LOS		B			B		A				B	

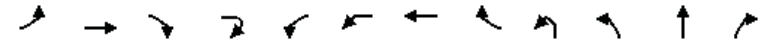
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↑					↑				↑	
Volume (vph)	51	189	10	14	50	14	76	80	19	27	16	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.95					0.94				0.96	
Flpb, ped/bikes		0.98					0.92				0.84	
Frt		0.99					0.95				0.94	
Fit Protected		0.99					0.99				0.98	
Satd. Flow (prot)		1406					1063				962	
Fit Permitted		0.88					0.75				0.84	
Satd. Flow (perm)		1249					813				825	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	222	12	16	59	16	89	94	22	32	19	64
RTOR Reduction (vph)	0	0	0	0	0	0	27	0	0	0	39	0
Lane Group Flow (vph)	0	310	0	0	0	0	231	0	0	0	98	0
Confl. Peds. (#/hr)	81		116	230	116	230		81	230	230		96
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type		Perm	NA		Perm	Perm	NA		Perm	Perm	NA	
Protected Phases			2				6				8	
Permitted Phases		2			6	6			8	8		8
Actuated Green, G (s)			21.0				21.0				29.0	
Effective Green, g (s)			21.0				21.0				29.0	
Actuated g/C Ratio			0.28				0.28				0.39	
Clearance Time (s)			5.0				5.0				5.0	
Vehicle Extension (s)			3.0				3.0				3.0	
Lane Grp Cap (vph)			349				227				319	
v/s Ratio Prot												
v/s Ratio Perm			0.25				c0.28				0.12	
v/c Ratio			0.89				1.02				0.31	
Uniform Delay, d1			25.9				27.0				16.0	
Progression Factor			1.00				1.00				1.00	
Incremental Delay, d2			26.8				63.9				0.5	
Delay (s)			52.6				90.9				16.6	
Level of Service			D				F				B	
Approach Delay (s)			52.6				90.9				16.6	
Approach LOS			D				F				B	

Intersection Summary			
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations		↕		↗		↖	↗	↖
Volume (vph)	88	31	11	103	35	91	13	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0		3.5	3.5	
Lane Util. Factor		0.95		0.95		1.00	1.00	
Frbp, ped/bikes		0.92		0.68		1.00	0.55	
Flpb, ped/bikes		0.99		1.00		0.70	1.00	
Frt		0.98		0.85		1.00	0.85	
Fit Protected		0.97		1.00		0.95	1.00	
Satd. Flow (prot)		1254		844		1072	763	
Fit Permitted		0.75		1.00		0.95	1.00	
Satd. Flow (perm)		969		844		1072	763	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	104	36	13	121	41	107	15	8
RTOR Reduction (vph)	0	4	0	67	0	0	19	0
Lane Group Flow (vph)	0	161	0	42	0	148	4	0
Confl. Peds. (#/hr)	30		230	230		81		116
Confl. Bikes (#/hr)			12	12				
Parking (#/hr)								
Turn Type	Perm	NA		Perm	Perm	Prot	Perm	
Protected Phases		4				5		
Permitted Phases	4			4	5		5	
Actuated Green, G (s)		29.0		29.0		11.5	11.5	
Effective Green, g (s)		29.0		29.0		11.5	11.5	
Actuated g/C Ratio		0.39		0.39		0.15	0.15	
Clearance Time (s)		5.0		5.0		3.5	3.5	
Vehicle Extension (s)		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		374		326		164	116	
v/s Ratio Prot								
v/s Ratio Perm		c0.17		0.05		0.14	0.00	
v/c Ratio		0.43		0.13		0.90	0.03	
Uniform Delay, d1		16.9		14.8		31.2	27.0	
Progression Factor		1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.8		0.2		43.1	0.1	
Delay (s)		17.7		15.0		74.3	27.1	
Level of Service		B		B		E	C	
Approach Delay (s)		16.7				67.9		
Approach LOS		B				E		
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕	↕	↕	↕			↕	↕
Volume (vph)	133	91	0	0	434	35	128	138	173	4	0	63
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frbp, ped/bikes		1.00			1.00	0.94	1.00	0.96			0.97	
Flpb, ped/bikes		0.99			1.00	1.00	0.98	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	0.92			0.87	
Fit Protected		0.97			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1250			2047	682	1426	2569			1288	
Fit Permitted		0.55			1.00	1.00	0.71	1.00			0.98	
Satd. Flow (perm)		708			2047	682	1067	2569			1268	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	141	97	0	0	462	37	136	147	184	4	0	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	110	0	0	0	0
Lane Group Flow (vph)	0	238	0	0	462	37	136	221	0	0	71	0
Confl. Peds. (#/hr)	62		30	30		62	30		38	38		30
Confl. Bikes (#/hr)						10						
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		306			887	295	426	1027			507	
v/s Ratio Prot					0.23			0.09				
v/s Ratio Perm		c0.34				0.05	c0.13				0.06	
v/c Ratio		0.78			0.52	0.13	0.32	0.21			0.14	
Uniform Delay, d1		14.5			12.4	10.2	12.4	11.8			11.4	
Progression Factor		0.97			1.00	0.86	1.00	1.00			1.00	
Incremental Delay, d2		17.3			1.6	0.6	2.0	0.5			0.6	
Delay (s)		31.4			14.0	9.4	14.3	12.3			12.0	
Level of Service		C			B	A	B	B			B	
Approach Delay (s)		31.4			13.7			12.9			12.0	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		16.6							B			
HCM 2000 Volume to Capacity ratio		0.56										
Actuated Cycle Length (s)		60.0						10.0				
Intersection Capacity Utilization		74.2%							D			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL	NBT	NBR	SEL	SER	SER2
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↕	↔	↔
Volume (vph)	100	288	13	2	13	112	3	210	93	198	52	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	3.0			2.0			2.0		6.0		
Lane Util. Factor	1.00	0.95			1.00			1.00		0.97		
Frbp, ped/bikes	1.00	0.99			0.82			0.98		0.98		
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00		
Frt	1.00	0.99			0.88			0.96		0.97		
Fit Protected	0.95	1.00			1.00			1.00		0.96		
Satd. Flow (prot)	1459	2661			1102			1438		2706		
Fit Permitted	0.95	1.00			1.00			1.00		0.96		
Satd. Flow (perm)	1459	2661			1097			1438		2706		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	112	324	15	2	15	126	3	236	104	222	58	3
RTOR Reduction (vph)	0	4	0	0	114	0	0	17	0	114	0	0
Lane Group Flow (vph)	112	335	0	0	29	0	0	326	0	169	0	0
Confl. Peds. (#/hr)	184		182	182		184			55			45
Confl. Bikes (#/hr)			30									
Parking (#/hr)		10	10									
Turn Type	Prot	NA		Perm	NA		Perm	NA		Prot		
Protected Phases	5	2			6			8		4		
Permitted Phases				6			8					
Actuated Green, G (s)	6.0	24.0			14.0			20.0		19.0		
Effective Green, g (s)	8.0	27.0			16.0			23.0		19.0		
Actuated g/C Ratio	0.10	0.34			0.20			0.29		0.24		
Clearance Time (s)	6.0	6.0			4.0			5.0		6.0		
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0		
Lane Grp Cap (vph)	145	898			219			413		642		
v/s Ratio Prot	c0.08	c0.13								c0.06		
v/s Ratio Perm					0.03			0.23				
v/c Ratio	0.77	0.37			0.13			0.79		0.26		
Uniform Delay, d1	35.1	20.1			26.3			26.3		24.8		
Progression Factor	1.00	1.00			1.00			1.00		1.00		
Incremental Delay, d2	22.1	0.3			0.3			9.7		0.2		
Delay (s)	57.2	20.3			26.6			35.9		25.0		
Level of Service	E	C			C			D		C		
Approach Delay (s)		29.5			26.6			35.9		25.0		
Approach LOS		C			C			D		C		

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015



Movement	EBT	EBR2	WBL	WBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations	↔	↔	↔	↕	↔	↔	↕	↕	↕
Volume (vph)	106	14	275	350	45	73	0	941	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0	3.0	3.0		3.0	5.0	3.0
Lane Util. Factor	1.00		0.91	0.91	1.00		1.00	0.88	1.00
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00	0.95	0.95
Flpb, ped/bikes	1.00		1.00	1.00	1.00		0.88	1.00	1.00
Frt	0.98		1.00	1.00	0.86		1.00	0.85	0.85
Fit Protected	1.00		0.95	0.99	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1595		1401	2703	1402		1362	2294	1313
Fit Permitted	1.00		0.62	0.90	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1595		909	2448	1402		1362	2294	1313
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	119	16	309	393	51	82	0	1057	257
RTOR Reduction (vph)	106	0	0	0	40	0	0	0	146
Lane Group Flow (vph)	29	0	219	483	11	0	82	1057	111
Confl. Peds. (#/hr)						100		30	47
Parking (#/hr)				10		10			
Turn Type	NA		pm+pt	NA	Over	Perm	NA	Perm	custom
Protected Phases	2		1	6	1		4		
Permitted Phases			6			4		4	6
Actuated Green, G (s)	8.0		24.0	24.0	11.0		26.0	26.0	24.0
Effective Green, g (s)	10.0		24.0	26.0	13.0		28.0	26.0	26.0
Actuated g/C Ratio	0.17		0.40	0.43	0.22		0.47	0.43	0.43
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	265		453	1116	303		635	994	568
v/s Ratio Prot	0.02		0.09	c0.09	0.01				
v/s Ratio Perm			c0.10	0.09			0.06	c0.46	0.08
v/c Ratio	0.11		0.48	0.43	0.04		0.13	1.06	0.20
Uniform Delay, d1	21.2		14.7	11.9	18.6		9.1	17.0	10.5
Progression Factor	1.00		0.61	0.62	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8		3.4	1.1	0.2		0.4	47.0	0.8
Delay (s)	22.1		12.3	8.4	18.8		9.5	64.0	11.3
Level of Service	C		B	A	B		A	E	B
Approach Delay (s)	22.1			9.6			51.1		
Approach LOS	C			A			D		

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend No Giants + No Event

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015

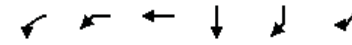


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔						↔	↔
Volume (vph)	0	0	0	400	694	0	0	0	0	0	504	392
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.90	0.66
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.96	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4922						4287	695
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4922						4287	695
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)	0	0	0	412	715	0	0	0	0	0	520	404
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	218	909	0	0	0	0	0	722	202
Confl. Peds. (#/hr)	30		30	225		429	525		687	687		525
Confl. Bikes (#/hr)			30			30			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				30.0	30.0						28.0	28.0
Effective Green, g (s)				31.5	31.5						30.0	30.0
Actuated g/C Ratio				0.35	0.35						0.33	0.33
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				413	1722						1429	231
v/s Ratio Prot				0.18	c0.18						0.17	
v/s Ratio Perm												c0.29
v/c Ratio				0.53	0.53						0.51	0.87
Uniform Delay, d1				23.3	23.3						24.1	28.2
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				4.8	1.2						1.3	33.9
Delay (s)				28.1	24.5						25.3	62.1
Level of Service				C	C						C	E
Approach Delay (s)	0.0				25.2		0.0					33.4
Approach LOS	A				C		A					C

Intersection Summary			
HCM 2000 Control Delay	28.9	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)	6.5
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations		↔	↔	↔	↔	↔
Volume (vph)	71	508	361	217	551	104
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)		5.4	2.4	5.7	2.7	2.7
Lane Util. Factor		0.81	0.81	0.91	0.91	1.00
Frbp, ped/bikes		1.00	1.00	0.99	0.98	0.95
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.92	0.85	0.85
Fit Protected		0.95	0.98	1.00	1.00	1.00
Satd. Flow (prot)		1050	4842	2085	1039	1105
Fit Permitted		0.95	0.98	1.00	1.00	1.00
Satd. Flow (perm)		1050	4842	2085	1039	1105
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	74	529	376	226	574	108
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	301	678	513	287	59
Confl. Peds. (#/hr)						51
Confl. Bikes (#/hr)						10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)				10		
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)			32.6	32.6	46.3	46.3
Effective Green, g (s)			32.6	35.6	46.3	49.3
Actuated g/C Ratio			0.36	0.40	0.51	0.55
Clearance Time (s)			5.4	5.4	5.7	5.7
Lane Grp Cap (vph)			380	1915	1072	569
v/s Ratio Prot					0.25	
v/s Ratio Perm			c0.29	0.14		c0.28
v/c Ratio			0.79	0.35	0.48	0.50
Uniform Delay, d1			25.7	19.1	14.1	12.7
Progression Factor			1.00	1.00	1.07	1.11
Incremental Delay, d2			15.5	0.5	1.3	2.8
Delay (s)			41.2	19.6	16.4	16.8
Level of Service			D	B	B	C
Approach Delay (s)				26.2		17.3
Approach LOS				C		B

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Volume (vph)	358	92	68	220	349	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.96		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5592		1459	1305	4117	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5592		1459	1305	4117	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	407	105	77	250	397	59
RTOR Reduction (vph)	52	0	52	0	0	0
Lane Group Flow (vph)	460	0	25	250	403	53
Confl. Peds. (#/hr)		173	806			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1584		466	417	1074	292
v/s Ratio Prot	c0.08		0.02	c0.19	c0.10	
v/s Ratio Perm						0.05
v/c Ratio	0.29		0.05	0.60	0.38	0.18
Uniform Delay, d1	25.2		21.2	25.7	27.2	25.8
Progression Factor	1.00		1.59	0.96	1.00	1.00
Incremental Delay, d2	0.5		0.2	5.5	1.0	1.4
Delay (s)	25.7		33.9	30.1	28.2	27.2
Level of Service	C		C	C	C	C
Approach Delay (s)	25.7			31.0	28.1	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			27.9		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)	12.2
Intersection Capacity Utilization			54.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations										
Volume (vph)	79	381	44	34	166	356	188	134	443	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.5			2.0	2.0			2.5	2.5
Lane Util. Factor		0.81			0.95	0.95			0.94	0.86
Frbp, ped/bikes		0.99			1.00	0.95			0.97	0.83
Flpb, ped/bikes		0.99			0.99	1.00			0.77	1.00
Frt		0.99			1.00	0.95			0.98	0.85
Fit Protected		0.99			0.99	1.00			0.96	1.00
Satd. Flow (prot)		6041			2997	2537			3220	979
Fit Permitted		0.99			0.83	1.00			0.96	1.00
Satd. Flow (perm)		6041			2516	2537			3220	979
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	81	393	45	35	171	367	194	138	457	270
RTOR Reduction (vph)	0	23	0	0	0	25	0	0	0	0
Lane Group Flow (vph)	0	496	0	0	206	536	0	0	665	200
Confl. Peds. (#/hr)	80		130	130			130	80	130	130
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases		6			4	4			7	
Permitted Phases	6			4				7		7
Actuated Green, G (s)		20.5			22.0	22.0			14.5	14.5
Effective Green, g (s)		23.5			26.0	26.0			18.5	18.5
Actuated g/C Ratio		0.31			0.35	0.35			0.25	0.25
Clearance Time (s)		5.5			6.0	6.0			6.5	6.5
Lane Grp Cap (vph)		1892			872	879			794	241
v/s Ratio Prot						c0.21				
v/s Ratio Perm		0.08			0.08				0.21	0.20
v/c Ratio		0.26			0.24	0.61			0.84	0.83
Uniform Delay, d1		19.3			17.4	20.3			26.8	26.8
Progression Factor		1.00			1.00	1.00			1.00	1.00
Incremental Delay, d2		0.3			0.6	3.1			10.2	26.9
Delay (s)		19.6			18.1	23.4			37.1	53.7
Level of Service		B			B	C			D	D
Approach Delay (s)		19.6			18.1	23.4			40.9	
Approach LOS		B			B	C			D	
Intersection Summary										
HCM 2000 Control Delay					29.0				HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio					0.55					
Actuated Cycle Length (s)					75.0				Sum of lost time (s)	7.0
Intersection Capacity Utilization					73.8%				ICU Level of Service	D
Analysis Period (min)					15					
c Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	129	101	50	9	192	80	19	4	6	12	8	101
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	142	111	55	10	211	88	21	4	7	13	9	111
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	308	309	32	133								
Volume Left (vph)	142	10	21	13								
Volume Right (vph)	55	88	7	111								
Hadj (s)	0.02	-0.13	0.04	-0.45								
Departure Headway (s)	4.7	4.6	5.6	4.9								
Degree Utilization, x	0.40	0.39	0.05	0.18								
Capacity (veh/h)	725	751	546	647								
Control Delay (s)	10.9	10.5	8.9	9.0								
Approach Delay (s)	10.9	10.5	8.9	9.0								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay				10.3								
Level of Service				B								
Intersection Capacity Utilization				57.4%	ICU Level of Service							B
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (vph)	198	141	57	24	188	141	22	275	36	68	284	94	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	2.0				2.0		2.0				3.0		
Lane Util. Factor	0.95				0.95		0.95				0.95		
Frpb, ped/bikes	0.92				0.87		0.97				0.93		
Flpb, ped/bikes	0.91				0.98		0.99				0.97		
Frt	0.98				0.94		0.98				0.97		
Fit Protected	0.98				1.00		1.00				0.99		
Satd. Flow (prot)	2169				2168		2707				2330		
Fit Permitted	0.66				0.92		0.92				0.86		
Satd. Flow (perm)	1476				1995		2492				2009		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	206	147	59	25	196	147	23	286	38	71	296	98	
RTOR Reduction (vph)	0	19	0	0	20	0	0	16	0	0	13	0	
Lane Group Flow (vph)	0	393	0	0	348	0	0	332	0	0	452	0	
Confl. Peds. (#/hr)	440		440		440		440		440		440		
Confl. Bikes (#/hr)	20				6		3				23		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0	
Parking (#/hr)	10		10		10		10				10		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases	2				6		8				4		
Permitted Phases	2				6		8				4		
Actuated Green, G (s)	23.0				23.0		27.0				27.0		
Effective Green, g (s)	26.0				26.0		30.0				29.0		
Actuated g/C Ratio	0.43				0.43		0.50				0.48		
Clearance Time (s)	5.0				5.0		5.0				5.0		
Lane Grp Cap (vph)	639				864		1246				971		
v/s Ratio Prot													
v/s Ratio Perm	c0.27				0.17		0.13				c0.22		
v/c Ratio	0.61				0.40		0.27				0.47		
Uniform Delay, d1	13.1				11.7		8.7				10.3		
Progression Factor	1.00				1.00		1.00				0.42		
Incremental Delay, d2	4.4				1.4		0.5				1.4		
Delay (s)	17.5				13.1		9.2				5.8		
Level of Service	B				B		A				A		
Approach Delay (s)	17.5				13.1		9.2				5.8		
Approach LOS	B				B		A				A		
Intersection Summary													
HCM 2000 Control Delay				11.2	HCM 2000 Level of Service								B
HCM 2000 Volume to Capacity ratio				0.53									
Actuated Cycle Length (s)				60.0	Sum of lost time (s)								5.0
Intersection Capacity Utilization				93.3%	ICU Level of Service								F
Analysis Period (min)				15									
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

28: Second St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔						↑↑	↔		↑↑	
Volume (vph)	157	485	56	0	0	0	0	224	234	22	379	0
Ideal Flow (vphpl)	1000	1000	1000	1800	1800	1800	1000	1000	1000	1800	1800	1800
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0	
Lane Util. Factor	*0.60	*0.60						*0.60	0.91		0.95	
Frbp, ped/bikes	1.00	0.97						0.91	0.69		1.00	
Flpb, ped/bikes	1.00	1.00						1.00	1.00		0.99	
Frt	1.00	0.98						0.96	0.85		1.00	
Fit Protected	0.95	1.00						1.00	1.00		1.00	
Satd. Flow (prot)	899	1392						892	457		2667	
Fit Permitted	0.95	1.00						1.00	1.00		0.92	
Satd. Flow (perm)	899	1392						892	457		2450	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	185	571	66	0	0	0	0	264	275	26	446	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	8	8	0	0	0
Lane Group Flow (vph)	185	623	0	0	0	0	0	363	160	0	472	0
Confl. Peds. (#/hr)	30		430	30		30	30		430	430		30
Confl. Bikes (#/hr)			1						17			
Parking (#/hr)	10	10	10									10
Turn Type	Split	NA						NA	Perm	Perm	NA	
Protected Phases	2	2						4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0	
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5	
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5	
Lane Grp Cap (vph)	427	661						408	209		1122	
v/s Ratio Prot	0.21	c0.45						c0.41				
v/s Ratio Perm									0.35		0.19	
v/c Ratio	0.43	0.94						0.89	0.76		0.42	
Uniform Delay, d1	10.4	15.0						14.9	13.6		10.9	
Progression Factor	1.00	1.00						0.90	0.90		1.00	
Incremental Delay, d2	3.2	23.5						22.6	21.5		1.2	
Delay (s)	13.6	38.5						36.0	33.7		12.1	
Level of Service	B	D						D	C		B	
Approach Delay (s)		32.9			0.0			35.3			12.1	
Approach LOS		C			A			D			B	
Intersection Summary												
HCM 2000 Control Delay		28.2									C	
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		60.0							4.0			
Intersection Capacity Utilization		84.9%									E	
Analysis Period (min)		15										
c Critical Lane Group												

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING PLUS BASKETBALL – WEEKDAY PM PEAK

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	50	316	201	625	4	758	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	3.3	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.75	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.93	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	1.00	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1428	1030	2987	3079	1540	3073	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1428	1030	2987	3079	1540	3073	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	336	214	665	4	806	5
RTOR Reduction (vph)	0	217	0	0	0	1	0
Lane Group Flow (vph)	53	119	214	665	4	810	0
Confl. Peds. (#/hr)	80	271	80				190
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.0	5.9	37.6	
Effective Green, g (s)	39.0	39.0	20.0	50.9	8.8	39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.46	0.08	0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9	6.2	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	506	365	543	1424	123	1089	
v/s Ratio Prot			0.07		0.00	c0.26	
v/s Ratio Perm	0.04	c0.12		c0.22			
v/c Ratio	0.10	0.33	0.39	0.47	0.03	0.74	
Uniform Delay, d1	23.8	25.9	39.7	20.3	46.7	31.1	
Progression Factor	1.00	1.00	1.51	1.86	1.00	1.00	
Incremental Delay, d2	0.1	0.5	0.4	0.9	0.5	4.6	
Delay (s)	23.9	26.4	60.4	38.7	47.2	35.7	
Level of Service	C	C	E	D	D	D	
Approach Delay (s)	26.1			44.0		35.8	
Approach LOS	C			D		D	
Intersection Summary							
HCM 2000 Control Delay			37.4				HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.56				
Actuated Cycle Length (s)			110.0			Sum of lost time (s) 16.7	
Intersection Capacity Utilization			78.1%			ICU Level of Service D	
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	115	156	119	725	11	1025	38
Ideal Flow (vphpl)	1900	1900	1400	1400	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.78	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	0.94	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.99	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1441	1072	2201	3260	1377	3904	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1441	1072	2201	3260	1377	3904	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	170	129	788	12	1114	41
RTOR Reduction (vph)	0	100	0	0	0	4	0
Lane Group Flow (vph)	125	70	129	788	12	1151	0
Confl. Peds. (#/hr)	80	268	211				211
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.6	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	589	438	420	1256	132	1135	
v/s Ratio Prot			0.06	c0.24	0.01	c0.29	
v/s Ratio Perm	c0.09	0.06					
v/c Ratio	0.21	0.16	0.31	0.63	0.09	1.01	
Uniform Delay, d1	21.0	20.5	38.2	27.4	45.3	39.0	
Progression Factor	1.00	1.00	1.14	1.18	1.24	0.47	
Incremental Delay, d2	0.2	0.2	0.2	1.4	1.0	26.4	
Delay (s)	21.2	20.7	43.7	33.7	57.3	44.8	
Level of Service	C	C	D	C	E	D	
Approach Delay (s)	20.9			35.1		44.9	
Approach LOS	C			D		D	
Intersection Summary							
HCM 2000 Control Delay			38.2				HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.60				
Actuated Cycle Length (s)			110.0			Sum of lost time (s) 15.7	
Intersection Capacity Utilization			75.5%			ICU Level of Service D	
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	167	71	0	1145	1203	140
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		*0.50	*0.40	
Frpb, ped/bikes	1.00	0.65		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	896		2047	1535	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	896		2047	1535	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	178	76	0	1218	1280	149
RTOR Reduction (vph)	0	2	0	0	3	0
Lane Group Flow (vph)	178	74	0	1218	1426	0
Confl. Peds. (#/hr)	417	380	540			620
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	24.2	24.2		74.2	74.2	
Effective Green, g (s)	26.6	24.2		75.4	75.4	
Actuated g/C Ratio	0.24	0.22		0.69	0.69	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	372	197		1403	1052	
v/s Ratio Prot	c0.12			0.59	c0.93	
v/s Ratio Perm		0.08				
v/c Ratio	0.48	0.38		0.87	1.36	
Uniform Delay, d1	35.8	36.5		13.4	17.3	
Progression Factor	1.00	1.00		2.49	1.03	
Incremental Delay, d2	1.0	1.2		5.3	163.2	
Delay (s)	36.7	37.7		38.8	181.0	
Level of Service	D	D		D	F	
Approach Delay (s)	37.0			38.8	181.0	
Approach LOS	D			D	F	

Intersection Summary			
HCM 2000 Control Delay	108.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	164	120	6	191	979	2	963	309
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	7.1		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.80	1.00	*0.76	1.00
Frpb, ped/bikes	1.00	0.85		1.00	1.00	1.00	1.00	0.70
Flpb, ped/bikes	0.82	1.00		0.93	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1267	1172		1202	3275	1296	2074	813
Fit Permitted	0.95	1.00		0.27	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1267	1172		337	3275	1296	2074	813
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	171	125	6	199	1020	2	1003	322
RTOR Reduction (vph)	0	1	0	0	0	0	0	176
Lane Group Flow (vph)	171	124	0	205	1020	2	1003	146
Confl. Peds. (#/hr)	230	182		316				316
Turn Type	Perm	Perm	custom	Prot	NA	Prot	NA	custom
Protected Phases				5		1		
Permitted Phases	4	4	5		2		6	6
Actuated Green, G (s)	42.9	42.9		12.1	39.8	7.0	35.6	35.6
Effective Green, g (s)	46.0	42.9		15.0	42.7	9.3	37.0	37.0
Actuated g/C Ratio	0.42	0.39		0.14	0.39	0.08	0.34	0.34
Clearance Time (s)	7.1	7.1		6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	529	457		45	1271	109	697	273
v/s Ratio Prot						0.00		
v/s Ratio Perm	c0.13	0.11		c0.61	0.31		c0.48	0.18
v/c Ratio	0.32	0.27		4.56	0.80	0.02	1.44	0.54
Uniform Delay, d1	21.5	22.9		47.5	29.9	46.2	36.5	29.5
Progression Factor	1.00	1.00		0.71	0.51	1.23	0.91	0.83
Incremental Delay, d2	0.4	0.3		1641.9	4.6	0.0	198.3	0.7
Delay (s)	21.9	23.2		1675.7	19.7	56.8	231.5	25.1
Level of Service	C	C		F	B	E	F	C
Approach Delay (s)	22.4				296.8		181.2	
Approach LOS	C				F		F	

Intersection Summary			
HCM 2000 Control Delay	214.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	218	173	70	135	959	1029	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1700	1700
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.69		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.93	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	837		1485	2946	2733	
Flt Permitted	0.95	1.00		0.22	1.00	1.00	
Satd. Flow (perm)	3090	837		336	2946	2733	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	229	182	74	142	1009	1083	63
RTOR Reduction (vph)	0	1	0	0	0	4	0
Lane Group Flow (vph)	229	181	0	216	1009	1142	0
Confl. Peds. (#/hr)	224	406		270			493
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases		4	5				
Actuated Green, G (s)	42.3	42.3		15.6	55.7	33.7	
Effective Green, g (s)	45.3	45.3		18.6	58.7	36.7	
Actuated g/C Ratio	0.41	0.41		0.17	0.53	0.33	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	344		56	1572	911	
v/s Ratio Prot	0.07				0.34	c0.42	
v/s Ratio Perm		c0.22		c0.64			
v/c Ratio	0.18	0.53		3.86	0.64	1.25	
Uniform Delay, d1	20.6	24.3		45.7	18.2	36.6	
Progression Factor	1.00	1.00		0.81	1.98	0.22	
Incremental Delay, d2	0.3	5.7		1317.3	1.5	115.0	
Delay (s)	20.9	30.0		1354.4	37.6	123.0	
Level of Service	C	C		F	D	F	
Approach Delay (s)	24.9				269.8	123.0	
Approach LOS	C				F	F	
Intersection Summary							
HCM 2000 Control Delay		173.2			HCM 2000 Level of Service		F
HCM 2000 Volume to Capacity ratio		1.39					
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	9.4	
Intersection Capacity Utilization		98.2%			ICU Level of Service		F
Analysis Period (min)		15					
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	174	214	0	991	1058	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600
Total Lost time (s)	6.8	6.8		5.4	5.4	
Lane Util. Factor	1.00	1.00		*0.90	*0.80	
Frbp, ped/bikes	1.00	0.74		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	1026		2917	2038	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	1026		2917	2038	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	233	0	1077	1150	234
RTOR Reduction (vph)	0	4	0	0	12	0
Lane Group Flow (vph)	189	229	0	1077	1372	0
Confl. Peds. (#/hr)	343	310	220			360
Confl. Bikes (#/hr)						117
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	41.2	41.2		56.6	56.6	
Effective Green, g (s)	41.2	41.2		56.6	56.6	
Actuated g/C Ratio	0.37	0.37		0.51	0.51	
Clearance Time (s)	6.8	6.8		5.4	5.4	
Lane Grp Cap (vph)	576	384		1500	1048	
v/s Ratio Prot	0.12			0.37	c0.67	
v/s Ratio Perm		c0.22				
v/c Ratio	0.33	0.60		0.72	1.31	
Uniform Delay, d1	24.5	27.7		20.6	26.7	
Progression Factor	1.00	1.00		1.86	0.56	
Incremental Delay, d2	1.5	6.7		0.8	139.7	
Delay (s)	26.0	34.3		39.1	154.8	
Level of Service	C	C		D	F	
Approach Delay (s)	30.6				39.1	154.8
Approach LOS	C				D	F
Intersection Summary						
HCM 2000 Control Delay		93.4			HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio		1.01				
Actuated Cycle Length (s)		110.0			Sum of lost time (s)	12.2
Intersection Capacity Utilization		93.7%			ICU Level of Service	F
Analysis Period (min)		15				
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

TR-854

HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	4	246	0	0	0	0	930	0	0	1155	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.9	6.9						6.5			5.2	5.2
Lane Util. Factor	1.00	1.00						0.95			*0.90	*0.90
Frbp, ped/bikes	1.00	0.78						1.00			1.00	0.67
Flpb, ped/bikes	0.65	1.00						1.00			1.00	1.00
Frt	1.00	0.85						1.00			1.00	0.85
Fit Protected	0.95	1.00						1.00			1.00	1.00
Satd. Flow (prot)	998	1082						2593			2456	701
Fit Permitted	0.76	1.00						1.00			1.00	1.00
Satd. Flow (perm)	796	1082						2593			2456	701
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	4	267	0	0	0	0	1011	0	0	1255	127
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	65
Lane Group Flow (vph)	45	257						1011			1255	62
Confl. Peds. (#/hr)	645		244	244		645	220		5003	4830		297
Confl. Bikes (#/hr)			2						52			80
Turn Type	Perm	NA					Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	30.3	30.3						41.5			40.6	40.6
Effective Green, g (s)	30.3	30.3						41.5			40.6	40.6
Actuated g/C Ratio	0.28	0.28						0.38			0.37	0.37
Clearance Time (s)	6.9	6.9						6.5			5.2	5.2
Vehicle Extension (s)	3.0	3.0						3.0			3.0	3.0
Lane Grp Cap (vph)	219	298						978			906	258
v/s Ratio Prot		c0.24						c0.39			c0.51	
v/s Ratio Perm	0.06											0.09
v/c Ratio	0.21	0.86						1.03			1.39	0.24
Uniform Delay, d1	30.6	37.8						34.2			34.7	24.0
Progression Factor	1.00	1.00						0.89			1.20	1.76
Incremental Delay, d2	0.5	21.6						32.6			174.0	0.2
Delay (s)	31.1	59.4						63.1			215.8	42.4
Level of Service	C	E						E			F	D
Approach Delay (s)		55.4			0.0			63.1			199.8	
Approach LOS		E			A			E			F	
Intersection Summary												
HCM 2000 Control Delay		132.0										F
HCM 2000 Volume to Capacity ratio		1.17										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			19.3				
Intersection Capacity Utilization		84.0%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	366	0	0	172	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	411	0	0	193	0	0
Pedestrians	80			80	80	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked						
vC, conflicting volume			491		764	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			491		764	366
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1003		300	556
Direction, Lane #						
Volume Total	274	137	193	0		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1003	1700		
Volume to Capacity	0.16	0.08	0.00	0.00		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS				A		
Approach Delay (s)	0.0		0.0	0.0		
Approach LOS				A		
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			32.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕	↔
Volume (vph)	145	39	112	923	14	968	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.64	1.00	1.00	1.00	1.00	0.60
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	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	876	1540	3079	1540	3079	827
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	876	1540	3079	1540	3079	827
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	42	120	992	15	1041	451
RTOR Reduction (vph)	0	18	0	0	0	0	156
Lane Group Flow (vph)	156	24	120	992	15	1041	295
Confl. Peds. (#/hr)	146	690	80				213
Confl. Bikes (#/hr)							92
Turn Type	Prot	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	2	1	6	
Permitted Phases		4					6
Actuated Green, G (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Effective Green, g (s)	38.1	38.1	15.4	43.8	10.0	37.0	37.0
Actuated g/C Ratio	0.35	0.35	0.14	0.40	0.09	0.34	0.34
Clearance Time (s)	6.9	6.9	6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	303	215	1226	140	1035	278
v/s Ratio Prot	c0.10		0.08	c0.32	0.01	0.34	
v/s Ratio Perm		0.03					c0.36
v/c Ratio	0.29	0.08	0.56	0.81	0.11	1.01	1.06
Uniform Delay, d1	26.1	24.2	44.1	29.4	45.9	36.5	36.5
Progression Factor	1.00	1.00	0.61	0.87	0.89	0.91	1.29
Incremental Delay, d2	1.4	0.5	4.4	2.6	0.1	9.8	35.4
Delay (s)	27.5	24.7	31.2	28.2	40.9	43.1	82.4
Level of Service	C	C	C	C	D	D	F
Approach Delay (s)	26.9			28.5		54.9	
Approach LOS	C			C		D	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔			↔			↔	↕	↕	↔	↕
Volume (vph)	152	6	20	4	5	6	10	35	876	5	2	838
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1600	1600	1600	1600	1600
Total Lost time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Lane Util. Factor		1.00			1.00			1.00	0.95		1.00	0.95
Frbp, ped/bikes		0.96			0.86			1.00	1.00		1.00	0.94
Flpb, ped/bikes		0.71			0.93			1.00	1.00		1.00	1.00
Frt		0.98			0.95			1.00	1.00		1.00	0.98
Fit Protected		0.96			0.99			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1040			1209			1296	2582		1296	2380
Fit Permitted		0.75			0.94			0.95	1.00		0.95	1.00
Satd. Flow (perm)		810			1147			1296	2582		1296	2380
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)	163	6	22	4	5	6	11	38	942	5	2	901
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	1	0	0	14
Lane Group Flow (vph)	0	186	0	0	11	0	0	49	946	0	2	1067
Confl. Peds. (#/hr)	620		620	620		620		160		1000	600	
Confl. Bikes (#/hr)			30			30				30		
Turn Type		Perm	NA		Perm	NA		Prot	Prot	NA		Prot
Protected Phases		4			8			5	5	2		1
Permitted Phases		4		8								6
Actuated Green, G (s)		33.8			33.8			15.0	43.0		13.4	41.8
Effective Green, g (s)		33.8			33.8			15.0	43.0		13.4	41.8
Actuated g/C Ratio		0.31			0.31			0.14	0.39		0.12	0.38
Clearance Time (s)		7.0			7.0			7.0	7.0		5.8	5.4
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		248			352			176	1009		157	904
v/s Ratio Prot								0.04	c0.37		0.00	c0.45
v/s Ratio Perm		c0.23			0.01							
v/c Ratio		0.75			0.03			0.28	0.94		0.01	1.18
Uniform Delay, d1		34.3			26.6			42.6	32.2		42.5	34.1
Progression Factor		1.00			1.00			0.90	0.77		1.88	0.65
Incremental Delay, d2		12.0			0.0			2.3	11.4		0.0	84.5
Delay (s)		46.3			26.7			40.7	36.2		79.8	106.7
Level of Service		D			C			D	D		E	F
Approach Delay (s)		46.3			26.7			36.4				106.7
Approach LOS		D			C			D				F


Intersection Summary			
HCM 2000 Control Delay	70.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015




Movement	SBR
Lane Configurations	
Volume (vph)	167
Ideal Flow (vphpl)	1600
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	180
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	560
Confl. Bikes (#/hr)	30
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary	
HCM 2000 Control Delay	63.1
HCM 2000 Volume to Capacity ratio	0.81
Actuated Cycle Length (s)	110.0
Intersection Capacity Utilization	94.9%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	196	882	5	842	25	11	285
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	*0.90		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99		1.00	0.63
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	1.00		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1296	2593	1296	2421		1296	733
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1296	2593	1296	2421		1296	733
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	202	909	5	868	26	11	294
RTOR Reduction (vph)	0	0	0	2	0	0	192
Lane Group Flow (vph)	202	909	5	892	0	11	102
Confl. Peds. (#/hr)	160				560	560	670
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA		Prot	Perm
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	181	1056	98	801		450	254
v/s Ratio Prot	c0.16	0.35	0.00	c0.37		0.01	
v/s Ratio Perm							c0.14
v/c Ratio	1.12	0.86	0.05	1.11		0.02	0.40
Uniform Delay, d1	47.3	29.8	47.1	36.8		23.6	27.2
Progression Factor	0.81	1.44	0.63	0.54		1.00	1.00
Incremental Delay, d2	91.1	6.8	0.1	53.0		0.1	4.7
Delay (s)	129.3	49.5	29.8	73.0		23.7	31.9
Level of Service	F	D	C	E		C	C
Approach Delay (s)		64.0		72.7		31.6	
Approach LOS		E		E		C	

Intersection Summary			
HCM 2000 Control Delay	63.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↕↔		↔↔↔	↕↔			↕↕↕	↕			
Volume (vph)	911	826	12	137	954	36	53	999	255	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.66			
Flpb, ped/bikes	1.00	1.00		1.00	0.99			0.98	1.00			
Frt	1.00	1.00		1.00	0.99			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	3058		2515	2545			5467	905			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	3058		2515	2545			5467	905			
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)	939	852	12	141	984	37	55	1030	263	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	181	0	0	0
Lane Group Flow (vph)	939	863	0	141	1021	0	0	1085	82	0	0	0
Confl. Peds. (#/hr)	160		560	160		560	560		560	160		160
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	41.9		13.2	38.4			34.5	34.5			
Effective Green, g (s)	18.2	41.9		13.2	38.4			34.5	34.5			
Actuated g/C Ratio	0.17	0.38		0.12	0.35			0.31	0.31			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	718	1164		301	888			1714	283			
v/s Ratio Prot	c0.22	0.28		0.06	c0.40							
v/s Ratio Perm								0.20	0.09			
v/c Ratio	1.31	0.74		0.47	1.15			0.63	0.29			
Uniform Delay, d1	45.9	29.4		45.1	35.8			32.3	28.5			
Progression Factor	1.39	1.61		1.52	1.02			1.00	1.00			
Incremental Delay, d2	144.2	2.4		0.3	70.8			0.8	0.6			
Delay (s)	207.9	49.7		68.7	107.1			33.1	29.1			
Level of Service	F	D		E	F			C	C			
Approach Delay (s)		132.1			102.4			32.3			0.0	
Approach LOS		F			F			C			A	
Intersection Summary												
HCM 2000 Control Delay		92.9										F
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			20.4				
Intersection Capacity Utilization		104.3%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕			↕	↕	↕	↕↕	↕
Volume (vph)	151	1654	25	24	964	19	5	60	61	34	258	308
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.61	1.00	0.82	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98	1.00	0.65	1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85	1.00	0.95	0.85
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4387		1296	2553			1578	826	1004	2285	563
Fit Permitted	0.95	1.00		0.95	1.00			0.97	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1540	4387		1296	2553			1532	826	755	2285	563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	154	1688	26	24	984	19	5	61	62	35	263	314
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	40	0	53	115
Lane Group Flow (vph)	154	1713	0	24	1002	0	0	66	22	35	345	64
Confl. Peds. (#/hr)	140		901	140		835	1788		818	818	1788	1788
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases						4			4	7		7
Actuated Green, G (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	45.9		6.0	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.42		0.05	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1830		70	833			532	286	269	814	200
v/s Ratio Prot	0.10	c0.39		0.02	c0.39						c0.15	
v/s Ratio Perm								0.04	0.03	0.05		0.11
v/c Ratio	0.77	0.94		0.34	1.20			0.12	0.08	0.13	0.42	0.32
Uniform Delay, d1	46.2	30.6		50.1	37.0			24.5	24.1	23.9	26.8	25.7
Progression Factor	0.58	1.20		0.88	0.91			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.2		0.3	92.2			0.1	0.1	0.2	0.4	0.9
Delay (s)	28.5	37.9		44.3	126.1			24.6	24.2	24.1	27.2	26.6
Level of Service	C	D		D	F			C	C	C	C	C
Approach Delay (s)		37.1			124.2			24.4			26.9	
Approach LOS		D			F			C			C	
Intersection Summary												
HCM 2000 Control Delay		59.5										E
HCM 2000 Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			21.5				
Intersection Capacity Utilization		117.1%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1822	138	0	1277	86	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.99			1.00	1.00	0.91
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3031			3079	1540	1260
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3031			3079	1540	1260
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1898	144	0	1330	90	8
RTOR Reduction (vph)	5	0	0	0	0	4
Lane Group Flow (vph)	2037	0	0	1330	90	4
Confl. Peds. (#/hr)		117	117		81	83
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.1			62.1	36.6	36.6
Effective Green, g (s)	62.1			62.1	36.6	36.6
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	4.9			4.9	6.4	6.4
Lane Grp Cap (vph)	1711			1738	512	419
v/s Ratio Prot	c0.67			0.43	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	1.19			0.77	0.18	0.01
Uniform Delay, d1	23.9			18.4	26.0	24.6
Progression Factor	1.00			0.54	1.00	1.00
Incremental Delay, d2	91.8			0.3	0.7	0.0
Delay (s)	115.8			10.3	26.8	24.6
Level of Service	F			B	C	C
Approach Delay (s)	115.8			10.3	26.6	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	72.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↓			↑↑↑		↑	↑			↑	↑
Volume (vph)	24	189	164	5	588	57	126	99	14	2	124	255
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.0		4.5	4.5			4.5	4.5
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.90			0.97		1.00	0.98			1.00	0.69
Flpb, ped/bikes		1.00			1.00		0.75	1.00			1.00	1.00
Frt		0.94			0.99		1.00	0.98			1.00	0.85
Fit Protected		1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1516			1195		1282	1728			1795	898
Fit Permitted		0.76			0.94		0.67	1.00			1.00	1.00
Satd. Flow (perm)		1150			1121		902	1728			1793	898
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	208	180	5	646	63	138	109	15	2	136	280
RTOR Reduction (vph)	0	24	0	0	7	0	0	9	0	0	0	26
Lane Group Flow (vph)	0	390	0	0	707	0	138	116	0	0	138	255
Confl. Peds. (#/hr)	80		180	180		180	460		260	260		460
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		25.0			25.5		26.0	26.0				26.0
Effective Green, g (s)		25.0			25.5		26.0	26.0				26.0
Actuated g/C Ratio		0.42			0.42		0.43	0.43				0.43
Clearance Time (s)		4.5			4.0		4.5	4.5				4.5
Lane Grp Cap (vph)		479			476		390	748				389
v/s Ratio Prot								0.07				
v/s Ratio Perm		0.34			c0.63		0.15					0.08
v/c Ratio		0.81			1.49		0.35	0.15				0.18
Uniform Delay, d1		15.5			17.2		11.4	10.3				10.4
Progression Factor		0.74			1.00		1.00	1.00				1.00
Incremental Delay, d2		12.9			229.5		2.5	0.4				0.5
Delay (s)		24.4			246.7		13.9	10.8				10.9
Level of Service		C			F		B	B				B
Approach Delay (s)		24.4			246.7		12.4					18.2
Approach LOS		C			F		B					B

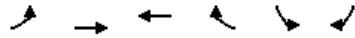
Intersection Summary			
HCM 2000 Control Delay	109.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Volume (vph)	172	191	72	43	96	93
Ideal Flow (vphpl)	1500	1500	1500	1500	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	*0.40	*0.40	*0.40	*0.40	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.92	1.00	0.48
Flpb, ped/bikes	0.96	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	468	435	512	400	1540	560
Fit Permitted	0.63	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	311	435	512	400	1540	560
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	191	212	80	48	107	103
RTOR Reduction (vph)	0	0	0	11	0	88
Lane Group Flow (vph)	191	212	80	37	107	15
Confl. Peds. (#/hr)	80		132	380	191	
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	76.4	76.4	76.4	76.4	14.6	14.6
Effective Green, g (s)	76.4	76.4	76.4	76.4	14.6	14.6
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237	332	391	305	224	81
v/s Ratio Prot		0.49	0.16		c0.07	
v/s Ratio Perm	c0.61			0.09		0.03
v/c Ratio	0.81	0.64	0.20	0.12	0.48	0.19
Uniform Delay, d1	7.2	5.4	3.3	3.1	39.2	37.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.6	9.1	1.2	0.8	1.6	1.1
Delay (s)	31.9	14.5	4.5	3.9	40.8	38.6
Level of Service	C	B	A	A	D	D
Approach Delay (s)		22.7	4.3		39.7	
Approach LOS		C	A		D	
Intersection Summary						
HCM 2000 Control Delay			24.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			69.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

5/28/2015



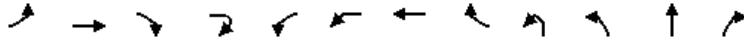
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕		↕	↕					↕	↕↕↕	↕
Volume (vph)	0	460	177	77	299	0	0	0	0	102	839	92
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frpb, ped/bikes		0.98		1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00		0.98	1.00					0.89	1.00	
Frt		0.96		1.00	1.00					1.00	0.99	
Fit Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2901		1274	1365					861	2717	
Fit Permitted		1.00		0.33	1.00					0.95	1.00	
Satd. Flow (perm)		2901		447	1365					861	2717	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	523	201	88	340	0	0	0	0	116	953	105
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	717	0	88	340	0	0	0	0	116	1036	0
Confl. Peds. (#/hr)	80		80	80		80	80		80	80		80
Parking (#/hr)			10									10
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6								4
Actuated Green, G (s)		29.0		29.0	29.0					21.0	21.0	
Effective Green, g (s)		29.0		29.0	29.0					21.0	21.0	
Actuated g/C Ratio		0.48		0.48	0.48					0.35	0.35	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1402		216	659					301	950	
v/s Ratio Prot		0.25			c0.25						c0.38	
v/s Ratio Perm				0.20						0.13		
v/c Ratio		0.51		0.41	0.52					0.39	1.09	
Uniform Delay, d1		10.6		10.0	10.7					14.7	19.5	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.3		5.6	2.9					3.7	57.0	
Delay (s)		12.0		15.6	13.5					18.4	76.5	
Level of Service		B		B	B					B	E	
Approach Delay (s)		12.0			14.0			0.0			70.8	
Approach LOS		B			B			A			E	
Intersection Summary												
HCM 2000 Control Delay				42.0		HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio				0.76								
Actuated Cycle Length (s)				60.0		Sum of lost time (s)				10.0		
Intersection Capacity Utilization				74.9%		ICU Level of Service				D		
Analysis Period (min)				15								
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↔					↔				↔	
Volume (vph)	30	94	23	8	43	61	19	48	22	13	9	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.89					0.93				0.91	
Flpb, ped/bikes		0.97					0.76				0.90	
Frt		0.97					0.96				0.92	
Fit Protected		0.99					0.97				0.98	
Satd. Flow (prot)		1274					867				975	
Fit Permitted		0.92					0.70				0.84	
Satd. Flow (perm)		1179					623				829	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	102	25	9	47	66	21	52	24	14	10	75
RTOR Reduction (vph)	0	0	0	0	0	0	15	0	0	0	43	0
Lane Group Flow (vph)	0	169	0	0	0	0	171	0	0	0	80	0
Confl. Peds. (#/hr)	131		166	280	166	280		131	280	280		146
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		2					6				8	
Permitted Phases	2				6	6			8	8		
Actuated Green, G (s)		27.0					27.0				38.0	
Effective Green, g (s)		27.0					27.0				38.0	
Actuated g/C Ratio		0.30					0.30				0.42	
Clearance Time (s)		5.0					5.0				5.0	
Vehicle Extension (s)		3.0					3.0				3.0	
Lane Grp Cap (vph)		353					186				350	
v/s Ratio Prot												
v/s Ratio Perm		0.14					0.27				0.10	
v/c Ratio		0.48					0.92				0.23	
Uniform Delay, d1		25.7					30.4				16.6	
Progression Factor		1.00					1.00				1.00	
Incremental Delay, d2		4.6					42.7				0.3	
Delay (s)		30.3					73.2				17.0	
Level of Service		C					E				B	
Approach Delay (s)		30.3					73.2				17.0	
Approach LOS		C					E				B	

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	SBL	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations		↔		↔	↔	↔	↔
Volume (vph)	81	32	174	209	59	121	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1800	1800
Total Lost time (s)		5.0		5.0	3.5	3.5	
Lane Util. Factor		0.95		0.95	1.00	1.00	
Frbp, ped/bikes		0.63		0.58	1.00	0.44	
Flpb, ped/bikes		0.98		1.00	1.00	1.00	
Frt		0.91		0.85	1.00	0.85	
Fit Protected		0.99		1.00	0.95	1.00	
Satd. Flow (prot)		812		713	1540	576	
Fit Permitted		0.88		1.00	0.95	1.00	
Satd. Flow (perm)		728		713	1540	576	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	35	189	227	64	132	17
RTOR Reduction (vph)	0	3	0	79	0	74	0
Lane Group Flow (vph)	0	332	0	125	64	75	0
Confl. Peds. (#/hr)	80		280	280	131		166
Confl. Bikes (#/hr)			12	12			
Parking (#/hr)							
Turn Type	Perm	NA		Perm	Prot	Perm	
Protected Phases		4			5		
Permitted Phases	4			4		5	
Actuated Green, G (s)		38.0		38.0	11.5	11.5	
Effective Green, g (s)		38.0		38.0	11.5	11.5	
Actuated g/C Ratio		0.42		0.42	0.13	0.13	
Clearance Time (s)		5.0		5.0	3.5	3.5	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		307		301	196	73	
v/s Ratio Prot					0.04		
v/s Ratio Perm		0.46		0.18		0.13	
v/c Ratio		1.08		0.42	0.33	1.03	
Uniform Delay, d1		26.0		18.2	35.7	39.2	
Progression Factor		1.00		1.00	1.00	1.00	
Incremental Delay, d2		74.9		0.9	4.4	112.6	
Delay (s)		100.9		19.2	40.1	151.8	
Level of Service		F		B	D	F	
Approach Delay (s)		70.0			118.3		
Approach LOS		E			F		

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015

	↖	→	↗	↙	←	↖	↙	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕	↕	↕	↕↕			↕↕	
Volume (vph)	51	185	0	0	921	48	79	153	187	4	0	214
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frbp, ped/bikes		1.00			1.00	0.91	1.00	0.92			0.93	
Flpb, ped/bikes		1.00			1.00	1.00	0.96	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	0.92			0.87	
Fit Protected		0.99			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1286			2047	662	1394	2474			1229	
Fit Permitted		0.68			1.00	1.00	0.62	1.00			0.99	
Satd. Flow (perm)		878			2047	662	914	2474			1223	
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)	54	195	0	0	969	51	83	161	197	4	0	225
RTOR Reduction (vph)	0	0	0	0	0	0	0	118	0	0	0	0
Lane Group Flow (vph)	0	249	0	0	969	51	83	240	0	0	229	0
Confl. Peds. (#/hr)	112		80	80		112	80		88	88		80
Confl. Bikes (#/hr)						10						
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		380			887	286	365	989			489	
v/s Ratio Prot					c0.47			0.10				
v/s Ratio Perm		0.28				0.08	0.09				c0.19	
v/c Ratio		0.66			1.09	0.18	0.23	0.24			0.47	
Uniform Delay, d1		13.5			17.0	10.4	11.9	12.0			13.3	
Progression Factor		0.47			1.22	1.14	1.00	1.00			1.00	
Incremental Delay, d2		5.4			43.7	0.1	1.4	0.6			3.2	
Delay (s)		11.7			64.4	12.0	13.3	12.5			16.5	
Level of Service		B			E	B	B	B			B	
Approach Delay (s)		11.7			61.8			12.7			16.5	
Approach LOS		B			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		38.8			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		60.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		115.1%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015

	↖	→	↗	↙	←	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBT	NBR	SEL	SER	
Lane Configurations	↕	↕↕			↕		↕		↕↕	↕	
Volume (vph)	253	444	154	12	107	108	174	78	252	52	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	4.0	3.0			2.0		2.0		6.0		
Lane Util. Factor	1.00	0.95			1.00		1.00		0.97		
Frbp, ped/bikes	1.00	0.95			0.87		0.96		1.00		
Flpb, ped/bikes	1.00	1.00			1.00		1.00		1.00		
Frt	1.00	0.96			0.94		0.96		0.97		
Fit Protected	0.95	1.00			1.00		1.00		0.96		
Satd. Flow (prot)	1459	2460			1245		1408		2787		
Fit Permitted	0.95	1.00			0.95		1.00		0.96		
Satd. Flow (perm)	1459	2460			1180		1408		2787		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	264	462	160	12	111	112	181	81	262	54	
RTOR Reduction (vph)	0	42	0	0	137	0	18	0	0	0	
Lane Group Flow (vph)	264	580	0	0	98	0	244	0	316	0	
Confl. Peds. (#/hr)	234		232	232		234		105			
Confl. Bikes (#/hr)						30					
Parking (#/hr)		10	10								
Turn Type	Prot	NA			Perm	NA		NA		Prot	
Protected Phases	5	2				6		8		4	
Permitted Phases					6						
Actuated Green, G (s)	7.0	26.4				15.4		20.0		19.0	
Effective Green, g (s)	9.0	29.4				17.4		23.0		19.0	
Actuated g/C Ratio	0.11	0.36				0.21		0.28		0.23	
Clearance Time (s)	6.0	6.0				4.0		5.0		6.0	
Vehicle Extension (s)	3.0	3.0				3.0		3.0		3.0	
Lane Grp Cap (vph)	159	877				249		393		642	
v/s Ratio Prot	c0.18	c0.24						c0.17		c0.11	
v/s Ratio Perm						0.08					
v/c Ratio						0.39		0.62		0.49	
Uniform Delay, d1	36.7	22.3				28.0		25.9		27.5	
Progression Factor	1.00	1.00				1.00		1.00		1.00	
Incremental Delay, d2	323.3	1.9				1.0		3.0		0.6	
Delay (s)	360.0	24.2				29.0		28.9		28.1	
Level of Service	F	C				C		C		C	
Approach Delay (s)		124.3				29.0		28.9		28.1	
Approach LOS		F				C		C		C	
Intersection Summary											
HCM 2000 Control Delay		78.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio		0.72									
Actuated Cycle Length (s)		82.4			Sum of lost time (s)			14.0			
Intersection Capacity Utilization		94.7%			ICU Level of Service			F			
Analysis Period (min)		15									
c Critical Lane Group											

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015



Movement	EBT	EBR	WBL	WBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations	↔		↔	↔	↔	↔	↔	↔	↔
Volume (vph)	171	65	703	512	23	42	42	1180	262
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1600	1600	1600	1600
Total Lost time (s)	3.0		5.0	3.0	3.0		3.0	5.0	3.0
Lane Util. Factor	1.00		0.91	0.91	1.00		1.00	0.88	1.00
Frbp, ped/bikes	0.91		1.00	1.00	1.00		1.00	0.89	0.92
Flpb, ped/bikes	1.00		1.00	1.00	1.00		0.91	1.00	1.00
Frt	0.96		1.00	1.00	0.86		1.00	0.85	0.85
Fit Protected	1.00		0.95	0.98	1.00		0.98	1.00	1.00
Satd. Flow (prot)	1350		1327	2536	1328		1216	1816	1063
Fit Permitted	1.00		0.39	0.64	1.00		0.98	1.00	1.00
Satd. Flow (perm)	1350		547	1656	1328		1216	1816	1063
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	173	66	710	517	23	42	42	1192	265
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	150
Lane Group Flow (vph)	239	0	383	844	5	0	84	1192	115
Confl. Peds. (#/hr)		80			150	150		80	97
Parking (#/hr)				10		10			
Turn Type	NA		pm+pt	NA	Over	Perm	NA	Perm	custom
Protected Phases	2		1	6	1		4		
Permitted Phases			6			4		4	6
Actuated Green, G (s)	8.0		24.0	24.0	11.0		26.0	26.0	24.0
Effective Green, g (s)	10.0		24.0	26.0	13.0		28.0	26.0	26.0
Actuated g/C Ratio	0.17		0.40	0.43	0.22		0.47	0.43	0.43
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	225		361	908	287		567	786	460
v/s Ratio Prot	0.18		0.19	c0.20	0.00				
v/s Ratio Perm			c0.23	0.20		0.07	c0.66	0.11	
v/c Ratio	1.06		1.06	0.93	0.02		0.15	1.52	0.25
Uniform Delay, d1	25.0		19.3	16.1	18.5		9.2	17.0	10.8
Progression Factor	1.00		1.33	1.28	1.00		1.00	1.00	1.00
Incremental Delay, d2	77.4		46.3	7.7	0.1		0.6	239.0	1.3
Delay (s)	102.4		72.0	28.4	18.6		9.7	256.0	12.1
Level of Service	F		E	C	B		A	F	B
Approach Delay (s)	102.4			42.0			200.6		
Approach LOS	F			D			F		

Intersection Summary			
HCM 2000 Control Delay	127.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

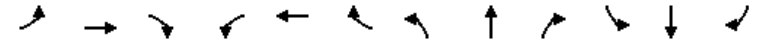
Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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DRAFT - SUBJECT TO REVIEW

HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔					↔	↔	↔
Volume (vph)	0	0	0	712	1435	0	0	0	0	0	1148	460
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1900	1900	1900
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.95	0.64
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.98	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4932						4879	715
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4932						4879	715
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	727	1464	0	0	0	0	0	1171	469
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	422	1769	0	0	0	0	0	1349	291
Confl. Peds. (#/hr)			80	275		479	575		737	737		575
Confl. Bikes (#/hr)				30		30			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				32.0	32.0						26.0	26.0
Effective Green, g (s)				33.5	33.5						28.0	28.0
Actuated g/C Ratio				0.37	0.37						0.31	0.31
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				439	1835						1517	222
v/s Ratio Prot				0.36	c0.36						0.28	
v/s Ratio Perm												c0.41
v/c Ratio				0.96	0.96						0.89	1.31
Uniform Delay, d1				27.6	27.7						29.5	31.0
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				34.3	14.1						8.2	168.3
Delay (s)				61.9	41.7						37.7	199.3
Level of Service				E	D						D	F
Approach Delay (s)		0.0			45.6		0.0				66.4	
Approach LOS		A			D		A				E	

Intersection Summary			
HCM 2000 Control Delay	54.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

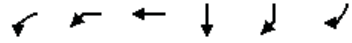
Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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TR-863

HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations						
Volume (vph)	183	759	1145	559	966	288
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)	2.4		2.4	5.7	2.7	2.7
Lane Util. Factor	0.81		0.81	0.91	0.91	1.00
Frbp, ped/bikes	1.00		1.00	0.99	0.98	0.92
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	0.93	0.85	0.85
Fit Protected	0.95		0.98	1.00	1.00	1.00
Satd. Flow (vph)	1050		4851	2121	1038	1070
Fit Permitted	0.95		0.98	1.00	1.00	1.00
Satd. Flow (perm)	1050		4851	2121	1038	1070
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	187	774	1168	570	986	294
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	168	0	1961	1063	493	280
Confl. Peds. (#/hr)					10	10
Confl. Bikes (#/hr)					10	10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)			10			
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)	35.6		35.6	43.3	43.3	43.3
Effective Green, g (s)	38.6		38.6	43.3	46.3	46.3
Actuated g/C Ratio	0.43		0.43	0.48	0.51	0.51
Clearance Time (s)	5.4		5.4	5.7	5.7	5.7
Lane Grp Cap (vph)	450		2080	1020	533	550
v/s Ratio Prot			c0.50			
v/s Ratio Perm	0.16		0.40		0.47	0.26
v/c Ratio	0.37		1.36dl	1.11dr	0.92	0.51
Uniform Delay, d1	17.5		24.6	23.4	20.2	14.4
Progression Factor	1.00		1.00	1.65	1.85	2.03
Incremental Delay, d2	2.4		10.2	29.7	11.9	1.3
Delay (s)	19.8		34.9	68.2	49.4	30.5
Level of Service	B		C	E	D	C
Approach Delay (s)			33.7	57.2		
Approach LOS			C	E		

Intersection Summary			
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	114.8%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Volume (vph)	749	113	132	610	385	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.96		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (vph)	5706		1459	1305	4121	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5706		1459	1305	4121	1122
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	797	120	140	649	410	15
RTOR Reduction (vph)	30	0	90	0	0	0
Lane Group Flow (vph)	887	0	50	649	412	13
Confl. Peds. (#/hr)		223	856			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1616		466	417	1076	292
v/s Ratio Prot	c0.16		0.03	c0.50	c0.10	
v/s Ratio Perm						0.01
v/c Ratio	0.55		0.11	1.56	0.38	0.04
Uniform Delay, d1	27.4		21.5	30.6	27.3	24.9
Progression Factor	1.00		0.85	0.78	1.00	1.00
Incremental Delay, d2	1.3		0.2	256.1	1.0	0.3
Delay (s)	28.7		18.6	280.1	28.3	25.1
Level of Service	C		B	F	C	C
Approach Delay (s)	28.7			233.7	28.2	
Approach LOS	C			F	C	


Intersection Summary			
HCM 2000 Control Delay	104.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015




Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑				↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	272	1175	161	52	302	537	219	241	722	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	2.0		2.0		2.0		2.0		2.0	
Lane Util. Factor	0.81		0.95		0.95		0.94		0.86	
Frbp, ped/bikes	0.98		1.00		0.94		0.99		0.78	
Flpb, ped/bikes	0.98		0.99		1.00		0.70		1.00	
Frt	0.99		1.00		0.96		1.00		0.85	
Fit Protected	0.99		0.99		1.00		0.95		1.00	
Satd. Flow (prot)	5626		2849		2402		2845		881	
Fit Permitted	0.99		0.66		1.00		0.95		1.00	
Satd. Flow (perm)	5626		1894		2402		2845		881	
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
Adj. Flow (vph)	296	1263	173	56	325	577	235	262	776	285
RTOR Reduction (vph)	0	22	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1710	0	0	381	810	0	0	1067	256
Confl. Peds. (#/hr)	130		180	180			180	130	180	180
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases	6		4		4		7		7	
Permitted Phases	6		4		7		7		7	
Actuated Green, G (s)	27.0		25.0		25.0		24.0		24.0	
Effective Green, g (s)	29.0		28.0		28.0		27.0		27.0	
Actuated g/C Ratio	0.32		0.31		0.31		0.30		0.30	
Clearance Time (s)	4.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	1812		589		747		853		264	
v/s Ratio Prot					c0.34					
v/s Ratio Perm	0.30		0.20				0.38		0.29	
v/c Ratio	0.94		0.65		1.08		1.25		0.97	
Uniform Delay, d1	29.7		26.7		31.0		31.5		31.1	
Progression Factor	1.48		1.00		1.00		1.00		1.00	
Incremental Delay, d2	8.4		5.4		58.1		122.6		48.2	
Delay (s)	52.2		32.1		89.1		154.1		79.2	
Level of Service	D		C		F		F		E	
Approach Delay (s)	52.2		32.1		89.1		139.6			
Approach LOS	D		C		F		F			

Intersection Summary			
HCM 2000 Control Delay	84.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	178	134	29	15	352	43	23	3	3	4	4	216
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	205	154	33	17	405	49	26	3	3	5	5	248
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	392	471	33	257								
Volume Left (vph)	205	17	26	5								
Volume Right (vph)	33	49	3	248								
Hadj (s)	0.09	-0.02	0.13	-0.54								
Departure Headway (s)	5.6	5.4	7.1	5.7								
Degree Utilization, x	0.61	0.71	0.07	0.41								
Capacity (veh/h)	611	644	413	564								
Control Delay (s)	17.2	20.6	10.6	12.7								
Approach Delay (s)	17.2	20.6	10.6	12.7								
Approach LOS	C	C	B	B								

Intersection Summary			
Delay		17.4	
Level of Service		C	
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑→		←↑→				←↑→			←↑→	
Volume (vph)	50	622	93	168	223	127	44	338	73	54	331	215
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		2.0		2.0				2.0			3.0	
Lane Util. Factor		0.95		0.95				0.95			0.95	
Frbp, ped/bikes		0.93		0.92				0.95			0.88	
Flpb, ped/bikes		0.99		0.95				0.99			0.99	
Frt		0.98		0.96				0.98			0.95	
Fit Protected		1.00		0.98				1.00			1.00	
Satd. Flow (prot)		2174		1997				2338			1950	
Fit Permitted		0.89		0.59				0.87			0.88	
Satd. Flow (perm)		1947		1200				2036			1719	
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)	53	655	98	177	235	134	46	356	77	57	348	226
RTOR Reduction (vph)	0	7	0	0	7	0	0	3	0	0	11	0
Lane Group Flow (vph)	0	799	0	0	539	0	0	476	0	0	620	0
Confl. Peds. (#/hr)	510		510	510		510	510		510	510		510
Confl. Bikes (#/hr)			20		6			3			23	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0
Parking (#/hr)		10	10	10	10						10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2		6				8			4	
Permitted Phases	2		6		8				4			
Actuated Green, G (s)		25.0		25.0				25.0			25.0	
Effective Green, g (s)		28.0		28.0				28.0			27.0	
Actuated g/C Ratio		0.47		0.47				0.47			0.45	
Clearance Time (s)		5.0		5.0				5.0			5.0	
Lane Grp Cap (vph)		908		560				950			773	
v/s Ratio Prot												
v/s Ratio Perm		0.41		c0.45				0.23			c0.36	
v/c Ratio		0.88		1.42dl				0.50			0.80	
Uniform Delay, d1		14.5		15.5				11.1			14.2	
Progression Factor		1.00		1.00				1.00			1.46	
Incremental Delay, d2		11.9		29.8				1.9			6.7	
Delay (s)		26.4		45.3				13.0			27.4	
Level of Service		C		D				B			C	
Approach Delay (s)		26.4		45.3				13.0			27.4	
Approach LOS		C		D				B			C	
Intersection Summary												
HCM 2000 Control Delay			28.3									C
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		60.0						5.0				
Intersection Capacity Utilization		113.1%										H
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane. c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

Synchro 8 Report
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HCM Signalized Intersection Capacity Analysis
28: Second St. & Bryant St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑→		←↑→				←↑→			←↑→	
Volume (vph)	354	571		71	0	0	0	0	512	223	12	537
Ideal Flow (vphpl)	1050	1050	1050	1800	1800	1800	1050	1050	1050	1600	1600	1600
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0	
Lane Util. Factor	*0.50	*0.50						*0.50	0.91		0.95	
Frbp, ped/bikes	1.00	0.97						0.99	0.68		1.00	
Flpb, ped/bikes	1.00	1.00						1.00	1.00		1.00	
Frt	1.00	0.98						0.99	0.85		1.00	
Fit Protected	0.95	1.00						1.00	1.00		1.00	
Satd. Flow (prot)	787	1212						878	474		2390	
Fit Permitted	0.95	1.00						1.00	1.00		0.93	
Satd. Flow (perm)	787	1212						878	474		2226	
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)	381	614	76	0	0	0	0	551	240	13	577	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	3	5	0	0	0
Lane Group Flow (vph)	381	678	0	0	0	0	0	572	211	0	590	0
Confl. Peds. (#/hr)	80		480	80		80	80		480	480		80
Confl. Bikes (#/hr)			1						17			
Parking (#/hr)	10	10	10									10
Turn Type	Split	NA						NA	Perm	Perm	NA	
Protected Phases	2	2						4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0	
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5	
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5	
Lane Grp Cap (vph)	373	575						402	217		1020	
v/s Ratio Prot	0.48	c0.56						c0.65				
v/s Ratio Perm									0.44		0.27	
v/c Ratio	1.02	1.18						1.42	0.97		0.58	
Uniform Delay, d1	15.8	15.8						16.2	15.9		12.0	
Progression Factor	1.00	1.00						0.73	0.71		1.00	
Incremental Delay, d2	52.2	97.6						203.4	51.1		2.4	
Delay (s)	67.9	113.3						215.4	62.4		14.4	
Level of Service	E	F						F	E		B	
Approach Delay (s)		97.2			0.0			173.6			14.4	
Approach LOS		F			A			F			B	
Intersection Summary												
HCM 2000 Control Delay			101.9									F
HCM 2000 Volume to Capacity ratio		1.27										
Actuated Cycle Length (s)		60.0						Sum of lost time (s)	4.0			
Intersection Capacity Utilization		86.4%						ICU Level of Service	E			
Analysis Period (min)		15										
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekday Peak, With Basketball (No Giants)

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TR-866

OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
INTERSECTION LEVEL OF SERVICE
EXISTING PLUS BASKETBALL – SATURDAY EVENING

HCM Signalized Intersection Capacity Analysis
1: The Embarcadero & Broadway

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	52	256	167	517	0	775	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	0.97	0.95		0.95	
Frbp, ped/bikes	1.00	0.69	1.00	1.00		0.99	
Flpb, ped/bikes	0.86	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	1.00	1.00		0.99	
Fit Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1331	954	2987	3079		3038	
Fit Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1331	954	2987	3079		3038	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	281	184	568	0	852	31
RTOR Reduction (vph)	0	181	0	0	0	3	0
Lane Group Flow (vph)	57	100	184	568	0	880	0
Confl. Peds. (#/hr)	150	341	150			260	
Parking (#/hr)							10
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5		1	6	
Permitted Phases	4	4		2			
Actuated Green, G (s)	36.5	36.5	17.1	48.4		37.6	
Effective Green, g (s)	39.0	39.0	20.0	51.3		39.0	
Actuated g/C Ratio	0.35	0.35	0.18	0.47		0.35	
Clearance Time (s)	6.5	6.5	6.9	6.9		5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	471	338	543	1435		1077	
v/s Ratio Prot			0.06			c0.29	
v/s Ratio Perm	0.04	c0.10		c0.18			
v/c Ratio	0.12	0.29	0.34	0.40		0.82	
Uniform Delay, d1	23.9	25.6	39.2	19.2		32.3	
Progression Factor	1.00	1.00	0.88	0.69		1.00	
Incremental Delay, d2	0.1	0.5	0.4	0.8		6.9	
Delay (s)	24.1	26.1	35.0	14.1		39.2	
Level of Service	C	C	C	B		D	
Approach Delay (s)	25.7			19.2		39.2	
Approach LOS	C			B		D	
Intersection Summary							
HCM 2000 Control Delay			29.3		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.56				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		16.7
Intersection Capacity Utilization			77.0%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

Synchro 7 - Report
Page 1

HCM Signalized Intersection Capacity Analysis
2: The Embarcadero & Washington

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	138	99	145	534	12	956	63
Ideal Flow (vphpl)	1900	1900	1400	1400	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.1	4.0	
Lane Util. Factor	1.00	1.00	0.97	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.72	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	0.88	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.99	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1355	996	2201	3260	1540	4300	
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1355	996	2201	3260	1540	4300	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	142	102	149	551	12	986	65
RTOR Reduction (vph)	0	60	0	0	0	6	0
Lane Group Flow (vph)	142	42	149	551	12	1045	0
Confl. Peds. (#/hr)	150	338	281				281
Turn Type	Perm	Perm	Prot	NA	Prot	NA	
Protected Phases			5	2	1	6	
Permitted Phases	4	4					
Actuated Green, G (s)	41.3	41.3	17.6	39.0	6.5	30.0	
Effective Green, g (s)	45.0	45.0	21.0	42.4	10.5	32.0	
Actuated g/C Ratio	0.41	0.41	0.19	0.39	0.10	0.29	
Clearance Time (s)	7.7	7.7	7.4	7.4	8.1	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	554	407	420	1256	147	1250	
v/s Ratio Prot			0.07	c0.17	0.01	c0.24	
v/s Ratio Perm	c0.10	0.04					
v/c Ratio	0.26	0.10	0.35	0.44	0.08	0.84	
Uniform Delay, d1	21.5	20.0	38.6	25.0	45.4	36.5	
Progression Factor	1.00	1.00	1.20	1.23	0.51	0.84	
Incremental Delay, d2	0.2	0.1	0.5	1.1	0.7	4.4	
Delay (s)	21.7	20.2	46.7	31.9	23.8	35.2	
Level of Service	C	C	D	C	C	D	
Approach Delay (s)	21.1			35.1		35.0	
Approach LOS	C			D		D	
Intersection Summary							
HCM 2000 Control Delay			33.3		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.52				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		15.8
Intersection Capacity Utilization			75.7%		ICU Level of Service		D
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

Synchro 7 - Report
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DRAFT - SUBJECT TO REVIEW

TR-868

HCM Signalized Intersection Capacity Analysis
3: The Embarcadero & Mission

5/28/2015



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	130	99	0	590	975	64
Ideal Flow (vphpl)	1900	1900	1600	1600	1600	1600
Total Lost time (s)	4.0	6.4		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	*0.80	
Frpb, ped/bikes	1.00	0.63		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.99	
Fit Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1540	874		3726	3136	
Fit Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1540	874		3726	3136	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	149	114	0	678	1121	74
RTOR Reduction (vph)	0	0	0	0	6	0
Lane Group Flow (vph)	149	114	0	678	1189	0
Confl. Peds. (#/hr)	517	650	1070			1150
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	35.6	35.6		62.8	62.8	
Effective Green, g (s)	38.0	35.6		64.0	64.0	
Actuated g/C Ratio	0.35	0.32		0.58	0.58	
Clearance Time (s)	6.4	6.4		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		0.2	0.2	
Lane Grp Cap (vph)	532	282		2167	1824	
v/s Ratio Prot	0.10			0.18	c0.38	
v/s Ratio Perm		c0.13				
v/c Ratio	0.28	0.40		0.31	0.65	
Uniform Delay, d1	26.1	28.9		11.8	15.5	
Progression Factor	1.00	1.00		1.37	0.40	
Incremental Delay, d2	0.3	0.9		0.4	1.3	
Delay (s)	26.4	29.9		16.5	7.5	
Level of Service	C	C		B	A	
Approach Delay (s)	27.9			16.5	7.5	
Approach LOS	C			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

Synchro 7 - Report
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HCM Signalized Intersection Capacity Analysis
4: The Embarcadero & Howard

5/28/2015



Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	67	49	8	206	519	4	850	221
Ideal Flow (vphpl)	1900	1900	1900	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	7.1		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.78		1.00	1.00	1.00	1.00	0.65
Flpb, ped/bikes	1.00	1.00		0.91	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	1068		1326	4191	1459	2917	843
Fit Permitted	0.95	1.00		0.31	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	1068		429	4191	1459	2917	843
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	76	56	9	234	590	5	966	251
RTOR Reduction (vph)	0	0	0	0	0	0	0	162
Lane Group Flow (vph)	76	56	0	243	590	5	966	89
Confl. Peds. (#/hr)	330	282		586				586
Turn Type	Prot	Perm	custom	Prot	NA	Prot	NA	Perm
Protected Phases	4			5	2	1	6	
Permitted Phases		4	5					6
Actuated Green, G (s)	42.9	42.9		10.1	39.8	7.0	37.6	37.6
Effective Green, g (s)	46.0	42.9		13.0	42.7	9.3	39.0	39.0
Actuated g/C Ratio	0.42	0.39		0.12	0.39	0.08	0.35	0.35
Clearance Time (s)	7.1	7.1		6.9	6.9	6.3	5.4	5.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	644	416		50	1626	123	1034	298
v/s Ratio Prot	0.05				0.14	0.00	c0.33	
v/s Ratio Perm		c0.05		c0.57				0.11
v/c Ratio	0.12	0.13		4.86	0.36	0.04	0.93	0.30
Uniform Delay, d1	19.6	21.6		48.5	24.0	46.3	34.3	25.6
Progression Factor	1.00	1.00		0.79	0.88	1.57	0.87	1.82
Incremental Delay, d2	0.1	0.1		1779.9	0.6	0.5	13.2	2.0
Delay (s)	19.7	21.7		1818.1	21.6	73.3	43.0	48.6
Level of Service	B	C		F	C	E	D	D
Approach Delay (s)	20.5				545.7		44.3	
Approach LOS	C				F		D	

Intersection Summary			
HCM 2000 Control Delay	233.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
5: The Embarcadero & Folsom St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	172	56	60	212	561	813	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1600	1600
Lane Width	12	12	11	12	12	12	12
Total Lost time (s)	3.7	3.7		3.4	2.3	2.3	
Lane Util. Factor	0.97	1.00		1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.67		1.00	1.00	0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	3090	813		1593	2946	2454	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	3090	813		1593	2946	2454	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	181	59	63	223	591	856	98
RTOR Reduction (vph)	0	0	0	0	0	8	0
Lane Group Flow (vph)	181	59	0	286	591	946	0
Confl. Peds. (#/hr)	354	536		540			763
Confl. Bikes (#/hr)							48
Parking (#/hr)		10			10		
Turn Type	Prot	Perm	Prot	Prot	NA	NA	
Protected Phases	4		5	5	2	6	
Permitted Phases		4					
Actuated Green, G (s)	42.3	42.3		12.6	55.7	36.7	
Effective Green, g (s)	45.3	45.3		15.6	58.7	39.7	
Actuated g/C Ratio	0.41	0.41		0.14	0.53	0.36	
Clearance Time (s)	6.7	6.7		6.4	5.3	5.3	
Lane Grp Cap (vph)	1272	334		225	1572	885	
v/s Ratio Prot	0.06			c0.18	0.20	c0.39	
v/s Ratio Perm		c0.07					
v/c Ratio	0.14	0.18		1.27	0.38	1.07	
Uniform Delay, d1	20.2	20.5		47.2	15.0	35.1	
Progression Factor	1.00	1.00		1.58	0.19	0.12	
Incremental Delay, d2	0.2	1.2		150.0	0.6	41.6	
Delay (s)	20.4	21.7		224.5	3.4	45.8	
Level of Service	C	C		F	A	D	
Approach Delay (s)	20.7				75.5	45.8	
Approach LOS	C				E	D	
Intersection Summary							
HCM 2000 Control Delay			55.5		HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			0.70				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		10.4
Intersection Capacity Utilization			96.7%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
6: The Embarcadero & Harrison St.

5/28/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (vph)	105	107	0	728	677	253	
Ideal Flow (vphpl)	1900	1900	1900	1900	1600	1600	
Total Lost time (s)	6.8	6.8		5.4	5.4		
Lane Util. Factor	1.00	1.00		0.95	0.95		
Frbp, ped/bikes	1.00	0.66		1.00	0.91		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		
Frt	1.00	0.85		1.00	0.96		
Flt Protected	0.95	1.00		1.00	1.00		
Satd. Flow (prot)	1540	912		3079	2259		
Flt Permitted	0.95	1.00		1.00	1.00		
Satd. Flow (perm)	1540	912		3079	2259		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	108	110	0	751	698	261	
RTOR Reduction (vph)	0	5	0	0	35	0	
Lane Group Flow (vph)	108	105	0	751	924	0	
Confl. Peds. (#/hr)	613	580	430			570	
Confl. Bikes (#/hr)						117	
Turn Type	Prot	Perm		NA	NA		
Protected Phases	4			2	6		
Permitted Phases		4					
Actuated Green, G (s)	41.2	41.2		56.6	56.6		
Effective Green, g (s)	41.2	41.2		56.6	56.6		
Actuated g/C Ratio	0.37	0.37		0.51	0.51		
Clearance Time (s)	6.8	6.8		5.4	5.4		
Lane Grp Cap (vph)	576	341		1584	1162		
v/s Ratio Prot	0.07			0.24	c0.41		
v/s Ratio Perm		c0.12					
v/c Ratio	0.19	0.31		0.47	0.80		
Uniform Delay, d1	23.1	24.3		17.1	21.9		
Progression Factor	1.00	1.00		1.87	0.84		
Incremental Delay, d2	0.7	2.3		0.8	0.5		
Delay (s)	23.9	26.7		32.9	19.0		
Level of Service	C	C		C	B		
Approach Delay (s)	25.3				32.9	19.0	
Approach LOS	C				C	B	
Intersection Summary							
HCM 2000 Control Delay			25.1		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.59				
Actuated Cycle Length (s)			110.0		Sum of lost time (s)		12.2
Intersection Capacity Utilization			91.7%		ICU Level of Service		F
Analysis Period (min)			15				
c Critical Lane Group							

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
7: The Embarcadero & Bryant St./Pier 30

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	3	118	0	0	0	0	673	0	0	682	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600	1600	1600
Total Lost time (s)	6.9	6.9						6.5			5.2	5.2
Lane Util. Factor	1.00	1.00						0.95			0.95	1.00
Frbp, ped/bikes	1.00	0.68						1.00			1.00	0.63
Flpb, ped/bikes	0.55	1.00						1.00			1.00	1.00
Frt	1.00	0.85						1.00			1.00	0.85
Fit Protected	0.95	1.00						1.00			1.00	1.00
Satd. Flow (prot)	843	944						3079			2593	731
Fit Permitted	0.76	1.00						1.00			1.00	1.00
Satd. Flow (perm)	672	944						3079			2593	731
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	3	126	0	0	0	0	716	0	0	726	109
RTOR Reduction (vph)	0	82	0	0	0	0	0	0	0	0	0	69
Lane Group Flow (vph)	59	47	0	0	0	0	0	716	0	0	726	40
Confl. Peds. (#/hr)	1225		454	454		1225	430		9703	9530		507
Confl. Bikes (#/hr)			2						52			80
Turn Type	Perm	NA					Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	38.1	38.1						41.5			36.8	36.8
Effective Green, g (s)	38.1	38.1						41.5			36.8	36.8
Actuated g/C Ratio	0.35	0.35						0.38			0.33	0.33
Clearance Time (s)	6.9	6.9						6.5			5.2	5.2
Lane Grp Cap (vph)	232	326						1161			867	244
v/s Ratio Prot		0.05						c0.23			c0.28	
v/s Ratio Perm	c0.09											0.06
v/c Ratio	0.25	0.14						0.62			0.84	0.17
Uniform Delay, d1	25.8	24.7						27.8			33.8	25.8
Progression Factor	1.00	1.00						0.80			0.82	0.58
Incremental Delay, d2	2.6	0.9						1.9			6.7	1.0
Delay (s)	28.4	25.6						24.2			34.6	16.0
Level of Service	C	C						C			C	B
Approach Delay (s)		26.5			0.0			24.2			32.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: SWL 330 Lot & Bryant St

5/28/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	331	0	0	150	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	430	0	0	195	0	0
Pedestrians	150			150	150	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	11			11	11	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	183			131		
pX, platoon unblocked						
vC, conflicting volume			580		925	515
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			580		925	515
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			877		210	396
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	287	143	195	0		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	877	1700		
Volume to Capacity	0.17	0.08	0.00	0.00		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS				A		
Approach Delay (s)	0.0		0.0	0.0		
Approach LOS				A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		33.2%	ICU Level of Service
Analysis Period (min)		15	A

HCM Signalized Intersection Capacity Analysis
9: The Embarcadero & Brannan St.

5/28/2015

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Volume (vph)	149	30	5	173	815	21	689	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.53		1.00	1.00	1.00	1.00	0.51
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	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	728		1540	3079	1540	3079	709
Fit Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1540	728		1540	3079	1540	3079	709
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	164	33	5	190	896	23	757	98
RTOR Reduction (vph)	0	7	0	0	0	0	0	47
Lane Group Flow (vph)	164	26	0	195	896	23	757	51
Confl. Peds. (#/hr)	246	1320		150				283
Confl. Bikes (#/hr)								92
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	4		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Effective Green, g (s)	38.1	38.1		11.4	43.8	10.0	41.0	41.0
Actuated g/C Ratio	0.35	0.35		0.10	0.40	0.09	0.37	0.37
Clearance Time (s)	6.9	6.9		6.6	5.2	6.0	6.0	6.0
Lane Grp Cap (vph)	533	252		159	1226	140	1147	264
v/s Ratio Prot	c0.11			c0.13	c0.29	0.01	c0.25	
v/s Ratio Perm		0.04						0.07
v/c Ratio	0.31	0.10		1.23	0.73	0.16	0.66	0.19
Uniform Delay, d1	26.3	24.4		49.3	28.1	46.1	28.7	23.3
Progression Factor	1.00	1.00		0.58	0.75	0.74	0.55	0.50
Incremental Delay, d2	1.5	0.8		131.0	2.4	1.7	2.0	1.1
Delay (s)	27.8	25.2		159.5	23.4	35.9	17.8	12.7
Level of Service	C	C		F	C	D	B	B
Approach Delay (s)	27.4				47.8		17.7	
Approach LOS	C				D		B	
Intersection Summary								
HCM 2000 Control Delay			33.7		HCM 2000 Level of Service			C
HCM 2000 Volume to Capacity ratio			0.60					
Actuated Cycle Length (s)			110.0		Sum of lost time (s)			19.5
Intersection Capacity Utilization			93.1%		ICU Level of Service			F
Analysis Period (min)			15					
c Critical Lane Group								

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	133	2	45	1	6	2	16	54	858	10	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1600
Total Lost time (s)		7.0			7.0			7.0	7.0			5.8
Lane Util. Factor		1.00			1.00			1.00	0.95			1.00
Frpb, ped/bikes		0.90			0.92			1.00	0.99			1.00
Flpb, ped/bikes		0.72			0.97			1.00	1.00			0.88
Frt		0.97			0.97			1.00	1.00			1.00
Fit Protected		0.96			1.00			0.95	1.00			0.95
Satd. Flow (prot)		979			1406			1540	3045			1139
Fit Permitted		0.78			0.98			0.95	1.00			0.43
Satd. Flow (perm)		788			1387			1540	3045			521
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	2	49	1	7	2	17	59	933	11	3	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	196	0	0	10	0	0	76	943	0	0	4
Confl. Peds. (#/hr)	830		830	830		830		320		1580		1180
Confl. Bikes (#/hr)			30			30				30		
Turn Type		Perm	NA		Perm	NA		Prot	Prot	NA	custom	Prot
Protected Phases			4			8		5	5	2		1
Permitted Phases		4			8						1	
Actuated Green, G (s)			38.0			38.0		15.0	43.0			9.2
Effective Green, g (s)			38.0			38.0		15.0	43.0			9.2
Actuated g/C Ratio			0.35			0.35		0.14	0.39			0.08
Clearance Time (s)			7.0			7.0		7.0	7.0			5.8
Lane Grp Cap (vph)			272			479		210	1190			43
v/s Ratio Prot								0.05	c0.31			
v/s Ratio Perm			c0.25			0.01						0.01
v/c Ratio			0.72			0.02		0.36	0.79			0.09
Uniform Delay, d1			31.4			23.7		43.2	29.6			46.5
Progression Factor			1.00			1.00		0.91	0.88			1.52
Incremental Delay, d2			15.2			0.1		3.1	3.5			3.3
Delay (s)			46.6			23.8		42.5	29.5			74.2
Level of Service			D			C		D	C			E
Approach Delay (s)			46.6			23.8			30.4			
Approach LOS			D			C			C			
Intersection Summary												
HCM 2000 Control Delay			27.2					HCM 2000 Level of Service			C	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			110.0					Sum of lost time (s)			19.8	
Intersection Capacity Utilization			91.7%					ICU Level of Service			F	
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
10: The Embarcadero & Townsend St./Pier 40

5/28/2015



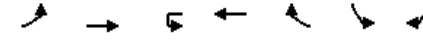
Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (vph)	661	59
Ideal Flow (vphpl)	1600	1600
Total Lost time (s)	5.4	
Lane Util. Factor	0.95	
Frbp, ped/bikes	0.97	
Flpb, ped/bikes	1.00	
Frt	0.99	
Fit Protected	1.00	
Satd. Flow (prot)	2482	
Fit Permitted	1.00	
Satd. Flow (perm)	2482	
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	718	64
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	776	0
Confl. Peds. (#/hr)		720
Confl. Bikes (#/hr)		30
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	37.6	
Effective Green, g (s)	37.6	
Actuated g/C Ratio	0.34	
Clearance Time (s)	5.4	
Lane Grp Cap (vph)	848	
v/s Ratio Prot	c0.31	
v/s Ratio Perm		
v/c Ratio	0.92	
Uniform Delay, d1	34.7	
Progression Factor	0.14	
Incremental Delay, d2	13.1	
Delay (s)	17.9	
Level of Service	B	
Approach Delay (s)	18.2	
Approach LOS	B	

Intersection Summary

HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
11: King St. & Second St.

5/28/2015



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑↑	↔	↑↑		↔	↔
Volume (vph)	123	913	4	663	56	15	209
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1900	1900
Total Lost time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Util. Factor	1.00	0.95	1.00	0.95		1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97		1.00	0.59
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00	0.99		1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1540	3079	1540	2488		1540	809
Fit Permitted	0.95	1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)	1540	3079	1540	2488		1540	809
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	132	982	4	713	60	16	225
RTOR Reduction (vph)	0	0	0	5	0	0	1
Lane Group Flow (vph)	132	982	4	768	0	16	224
Confl. Peds. (#/hr)		320			720	720	940
Confl. Bikes (#/hr)					10		30
Parking (#/hr)					10		
Turn Type	Prot	NA	Prot	NA		Prot	Perm
Protected Phases	5	2	1	6		4	
Permitted Phases							4
Actuated Green, G (s)	15.4	44.8	8.4	36.4		38.2	38.2
Effective Green, g (s)	15.4	44.8	8.4	36.4		38.2	38.2
Actuated g/C Ratio	0.14	0.41	0.08	0.33		0.35	0.35
Clearance Time (s)	6.6	5.2	6.6	6.6		6.8	6.8
Lane Grp Cap (vph)	215	1253	117	823		534	280
v/s Ratio Prot	0.09	c0.32	0.00	c0.31		0.01	
v/s Ratio Perm							c0.28
v/c Ratio	0.61	0.78	0.03	0.93		0.03	0.80
Uniform Delay, d1	44.5	28.4	47.0	35.6		23.7	32.5
Progression Factor	0.69	1.37	0.72	0.65		1.00	1.00
Incremental Delay, d2	9.2	3.7	0.2	9.9		0.1	21.0
Delay (s)	40.1	42.6	34.0	32.9		23.8	53.5
Level of Service	D	D	C	C		C	D
Approach Delay (s)		42.3		32.9		51.5	
Approach LOS		D		C		D	

Intersection Summary

HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: Third St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	701	894	58	143	650	80	43	534	151	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Lane Util. Factor	0.94	0.95		0.97	0.95			0.86	1.00			
Frpb, ped/bikes	1.00	0.98		1.00	0.96			1.00	0.63			
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00			
Frt	1.00	0.99		1.00	0.98			1.00	0.85			
Fit Protected	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (prot)	4342	2982		2515	2442			5404	867			
Fit Permitted	0.95	1.00		0.95	1.00			1.00	1.00			
Satd. Flow (perm)	4342	2982		2515	2442			5404	867			
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)	779	993	64	159	722	89	48	593	168	0	0	0
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	135	0	0	0
Lane Group Flow (vph)	779	1054		159	810			641	33			
Confl. Peds. (#/hr)	320		720	320		720	720		720	320		320
Confl. Bikes (#/hr)			10			10			10			
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			8				
Permitted Phases						8			8			
Actuated Green, G (s)	18.2	54.1		13.9	51.3			21.6	21.6			
Effective Green, g (s)	18.2	54.1		13.9	51.3			21.6	21.6			
Actuated g/C Ratio	0.17	0.49		0.13	0.47			0.20	0.20			
Clearance Time (s)	6.8	6.8		6.8	5.3			6.8	6.8			
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	718	1466		317	1138			1061	170			
v/s Ratio Prot	c0.18	c0.35		0.06	c0.33							
v/s Ratio Perm								0.12	0.04			
v/c Ratio	1.08	0.72		0.50	0.71			0.60	0.19			
Uniform Delay, d1	45.9	22.0		44.8	23.5			40.3	36.9			
Progression Factor	0.80	0.97		1.37	0.80			1.00	1.00			
Incremental Delay, d2	45.0	0.8		0.6	1.0			1.0	0.6			
Delay (s)	81.7	22.2		61.9	19.8			41.3	37.5			
Level of Service	F	C		E	B			D	D			
Approach Delay (s)		47.4			26.7			40.5			0.0	
Approach LOS		D			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
13: Fourth St. & King St.

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	1567	79	56	588	49	7	47	25	60	214	108
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	0.98		1.00	0.95			1.00	0.59	1.00	0.97	0.46
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.95	1.00	0.63	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.99	0.85
Fit Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1540	4302		1296	2424			1534	797	965	2848	563
Fit Permitted	0.95	1.00		0.95	1.00			0.96	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1540	4302		1296	2424			1480	797	731	2848	563
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	1667	84	60	626	52	7	50	27	64	228	115
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	18	0	3	66
Lane Group Flow (vph)	162	1747		60	673			57	9	64	237	37
Confl. Peds. (#/hr)	270		1031	270		965	1918		948	948		1918
Confl. Bikes (#/hr)			10			10			10			10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	5
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			7	
Permitted Phases								4		4	7	7
Actuated Green, G (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Effective Green, g (s)	14.4	40.0		11.9	35.9			38.2	38.2	39.2	39.2	39.2
Actuated g/C Ratio	0.13	0.36		0.11	0.33			0.35	0.35	0.36	0.36	0.36
Clearance Time (s)	7.6	6.0		7.1	7.1			6.8	6.8	5.8	5.8	5.8
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)	201	1564		140	791			513	276	260	1014	200
v/s Ratio Prot	0.11	c0.41		0.05	c0.28						0.08	
v/s Ratio Perm								0.04	0.01	c0.09		0.07
v/c Ratio	0.81	1.12		0.43	0.85			0.11	0.03	0.25	0.23	0.18
Uniform Delay, d1	46.4	35.0		45.9	34.5			24.4	23.7	25.0	24.9	24.4
Progression Factor	1.00	1.00		0.74	0.63			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.5	61.9		1.5	6.4			0.1	0.1	0.5	0.1	0.4
Delay (s)	66.9	96.9		35.2	28.3			24.5	23.8	25.5	25.0	24.8
Level of Service	E	F		D	C			C	C	C	C	C
Approach Delay (s)		94.3			28.9			24.2			25.0	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
14: Fifth St. & I-280 Ramps/King St.

5/28/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Volume (vph)	1743	80	0	702	30	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9			4.9	6.4	6.4
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	0.89
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Fit Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3047			3079	1540	1222
Fit Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3047			3079	1540	1222
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1915	88	0	771	33	60
RTOR Reduction (vph)	2	0	0	0	0	4
Lane Group Flow (vph)	2001	0	0	771	33	56
Confl. Peds. (#/hr)		187	187		151	153
Confl. Bikes (#/hr)		1				
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	62.6			62.6	7.9	7.9
Effective Green, g (s)	62.6			62.6	7.9	7.9
Actuated g/C Ratio	0.77			0.77	0.10	0.10
Clearance Time (s)	4.9			4.9	6.4	6.4
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2331			2356	148	118
v/s Ratio Prot	c0.66			0.25	0.02	
v/s Ratio Perm						c0.05
v/c Ratio	0.86			0.33	0.22	0.48
Uniform Delay, d1	6.6			3.0	34.1	35.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	3.4			0.1	0.8	3.0
Delay (s)	10.0			3.1	34.9	38.0
Level of Service	A			A	C	D
Approach Delay (s)	10.0			3.1	36.9	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay		9.0			HCM 2000 Level of Service A	
HCM 2000 Volume to Capacity ratio		0.82				
Actuated Cycle Length (s)		81.8			Sum of lost time (s) 11.3	
Intersection Capacity Utilization		96.5%			ICU Level of Service F	
Analysis Period (min)		15				
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
15: Main St & Harrison St

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑		↑	↑			↑	↑
Volume (vph)	28	280	210	10	358	74	83	278	20	3	88	74
Ideal Flow (vphpl)	1900	1900	1900	1100	1100	1100	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			*0.40		1.00	1.00			1.00	1.00
Frbp, ped/bikes		0.81			0.92		1.00	0.98			1.00	0.57
Flpb, ped/bikes		0.99			1.00		0.63	1.00			0.99	1.00
Frt		0.95			0.97		1.00	0.99			1.00	0.85
Fit Protected		1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1359			1117		1080	1743			1788	744
Fit Permitted		0.90			0.93		0.69	1.00			0.99	1.00
Satd. Flow (perm)		1232			1038		786	1743			1777	744
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)	31	311	233	11	398	82	92	309	22	3	98	82
RTOR Reduction (vph)	0	2	0	0	15	0	0	5	0	0	0	39
Lane Group Flow (vph)	0	573	0	0	476	0	92	326	0	0	101	43
Confl. Peds. (#/hr)	150		250	250		250	820		410	410		820
Parking (#/hr)			10			10			10			10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		26.0			26.0		26.0	26.0			26.0	26.0
Effective Green, g (s)		26.0			26.0		26.0	26.0			26.0	26.0
Actuated g/C Ratio		0.43			0.43		0.43	0.43			0.43	0.43
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)		533			449		340	755			770	322
v/s Ratio Prot								c0.19				
v/s Ratio Perm		c0.46			0.46		0.12				0.06	0.06
v/c Ratio		1.07			1.06		0.27	0.43			0.13	0.13
Uniform Delay, d1		17.0			17.0		10.9	11.9			10.2	10.2
Progression Factor		1.02			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		54.3			59.1		2.0	1.8			0.4	0.9
Delay (s)		71.6			76.1		12.9	13.7			10.6	11.1
Level of Service		E			E		B	B			B	B
Approach Delay (s)		71.6			76.1			13.5			10.8	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		51.6					HCM 2000 Level of Service D					
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		60.0					Sum of lost time (s) 8.0					
Intersection Capacity Utilization		75.5%					ICU Level of Service D					
Analysis Period (min)		15										
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

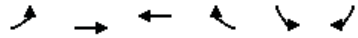
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DRAFT - SUBJECT TO REVIEW

TR-875

HCM Signalized Intersection Capacity Analysis
16: Bryant St & Main St

5/28/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Volume (vph)	196	133	70	31	40	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.78	1.00	0.46
Flpb, ped/bikes	0.86	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1327	1378	1621	1081	1540	543
Fit Permitted	0.70	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	985	1378	1621	1081	1540	543
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	225	153	80	36	46	86
RTOR Reduction (vph)	0	0	0	11	0	72
Lane Group Flow (vph)	225	153	80	25	46	14
Confl. Peds. (#/hr)	150		202	750	351	
Parking (#/hr)		10				10
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		6	2		8	
Permitted Phases	6			2		8
Actuated Green, G (s)	45.2	45.2	45.2	45.2	10.8	10.8
Effective Green, g (s)	45.2	45.2	45.2	45.2	10.8	10.8
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.17	0.17
Clearance Time (s)	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	684	958	1127	751	255	90
v/s Ratio Prot		0.11	0.05		c0.03	
v/s Ratio Perm	c0.23			0.02		0.03
v/c Ratio	0.33	0.16	0.07	0.03	0.18	0.16
Uniform Delay, d1	3.9	3.4	3.2	3.1	23.3	23.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	0.1	0.1	0.3	0.8
Delay (s)	5.2	3.7	3.3	3.2	23.6	24.0
Level of Service	A	A	A	A	C	C
Approach Delay (s)		4.6	3.3		23.9	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay			8.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.30			
Actuated Cycle Length (s)			65.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			41.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
17: Beale St & Mission St

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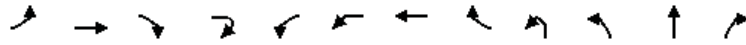
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕		↕	↕					↕	↕↕↕	↕
Volume (vph)	0	452	121	19	155	0	0	0	0	98	212	34
Ideal Flow (vphpl)	1900	1900	1900	1600	1600	1600	1900	1900	1900	1200	1200	1200
Total Lost time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00					1.00	0.91	
Frpb, ped/bikes		0.96		1.00	1.00					1.00	0.97	
Flpb, ped/bikes		1.00		0.94	1.00					0.76	1.00	
Frt		0.97		1.00	1.00					1.00	0.98	
Fit Protected		1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)		2876		1217	1365					742	2642	
Fit Permitted		1.00		0.37	1.00					0.95	1.00	
Satd. Flow (perm)		2876		475	1365					742	2642	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	497	133	21	170	0	0	0	0	108	233	37
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	590	0	21	170	0	0	0	0	108	248	0
Confl. Peds. (#/hr)	150		150	150		150	150		150	150		150
Parking (#/hr)			10									10
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		26.0		26.0	26.0					24.0	24.0	
Effective Green, g (s)		26.0		26.0	26.0					24.0	24.0	
Actuated g/C Ratio		0.43		0.43	0.43					0.40	0.40	
Clearance Time (s)		5.0		5.0	5.0					5.0	5.0	
Lane Grp Cap (vph)		1246		205	591					296	1056	
v/s Ratio Prot		c0.21			0.12						0.09	
v/s Ratio Perm				0.04						c0.15		
v/c Ratio		0.47		0.10	0.29					0.36	0.23	
Uniform Delay, d1		12.1		10.1	11.0					12.6	11.9	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.3		1.0	1.2					3.5	0.5	
Delay (s)		13.4		11.1	12.2					16.1	12.4	
Level of Service		B		B	B					B	B	
Approach Delay (s)		13.4			12.1			0.0			13.5	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)					10.0		
Intersection Capacity Utilization			45.0%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations		↔					↔				↔	
Volume (vph)	51	181	9	14	40	14	16	80	17	21	16	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0					5.0				5.0	
Lane Util. Factor		1.00					1.00				1.00	
Frbp, ped/bikes		0.94					0.80				0.92	
Flpb, ped/bikes		0.95					0.89				0.82	
Frt		0.99					0.93				0.94	
Fit Protected		0.99					0.98				0.98	
Satd. Flow (prot)		1346					846				903	
Fit Permitted		0.91					0.75				0.86	
Satd. Flow (perm)		1239					647				790	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	213	11	16	47	16	19	94	20	25	19	53
RTOR Reduction (vph)	0	0	0	0	0	0	55	0	0	0	18	0
Lane Group Flow (vph)	0	300	0	0	0	0	121	0	0	0	99	0
Confl. Peds. (#/hr)	201		236	350	236	350		201	350	350		216
Confl. Bikes (#/hr)			3	3								11
Parking (#/hr)					10	10	10	10	10	10	10	10
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		2					6				8	
Permitted Phases	2				6	6			8	8		
Actuated Green, G (s)		21.0					21.0				29.0	
Effective Green, g (s)		21.0					21.0				29.0	
Actuated g/C Ratio		0.28					0.28				0.39	
Clearance Time (s)		5.0					5.0				5.0	
Vehicle Extension (s)		3.0					3.0				3.0	
Lane Grp Cap (vph)		346					181				305	
v/s Ratio Prot												
v/s Ratio Perm		c0.24					0.19				0.12	
v/c Ratio		0.87					0.67				0.32	
Uniform Delay, d1		25.7					23.9				16.1	
Progression Factor		1.00					1.00				1.00	
Incremental Delay, d2		24.2					9.3				0.6	
Delay (s)		49.8					33.3				16.7	
Level of Service		D					C				B	
Approach Delay (s)		49.8					33.3				16.7	
Approach LOS		D					C				B	

Intersection Summary			
HCM 2000 Control Delay	63.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Delancey St. & Beale St. & Bryant St.

5/28/2015



Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations		↔		↔		↔	↔	↔
Volume (vph)	78	26	11	106	35	91	28	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0		3.5	3.5	
Lane Util. Factor		0.95		0.95		1.00	1.00	
Frbp, ped/bikes		0.90		0.53		1.00	0.41	
Flpb, ped/bikes		0.94		1.00		0.45	1.00	
Frt		0.97		0.85		1.00	0.85	
Fit Protected		0.97		1.00		0.95	1.00	
Satd. Flow (prot)		1159		657		692	571	
Fit Permitted		0.77		1.00		0.95	1.00	
Satd. Flow (perm)		920		657		692	571	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	92	31	13	125	41	107	33	7
RTOR Reduction (vph)	0	4	0	64	0	0	34	0
Lane Group Flow (vph)	0	145	0	48	0	148	6	0
Confl. Peds. (#/hr)	150		350	350		201		236
Confl. Bikes (#/hr)			12	12				
Parking (#/hr)								
Turn Type	Perm	NA		Perm	Perm	Prot	Perm	
Protected Phases		4				5		
Permitted Phases	4			4	5		5	
Actuated Green, G (s)		29.0		29.0		11.5	11.5	
Effective Green, g (s)		29.0		29.0		11.5	11.5	
Actuated g/C Ratio		0.39		0.39		0.15	0.15	
Clearance Time (s)		5.0		5.0		3.5	3.5	
Vehicle Extension (s)		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		355		254		106	87	
v/s Ratio Prot								
v/s Ratio Perm		c0.16		0.07		0.21	0.01	
v/c Ratio		0.41		0.19		1.40	0.07	
Uniform Delay, d1		16.7		15.2		31.8	27.2	
Progression Factor		1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.8		0.4		225.6	0.3	
Delay (s)		17.5		15.6		257.3	27.5	
Level of Service		B		B		F	C	
Approach Delay (s)		16.7				208.4		
Approach LOS		B				F		

Intersection Summary			
HCM 2000 Control Delay	63.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
19: Fremont St. & Harrison St./I-80 WB Off-Ramp

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕↕↕	↕	↕	↕↕			↕↕	
Volume (vph)	133	239	0	0	476	40	166	138	275	4	0	63
Ideal Flow (vphpl)	1800	1800	1800	1000	1000	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor		1.00			*0.80	1.00	1.00	0.95			1.00	
Frbp, ped/bikes		1.00			1.00	0.86	1.00	0.85			0.88	
Flpb, ped/bikes		0.98			1.00	1.00	0.89	1.00			0.99	
Frt		1.00			1.00	0.85	1.00	0.90			0.87	
Fit Protected		0.98			1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1254			2047	624	1296	2222			1162	
Fit Permitted		0.65			1.00	1.00	0.71	1.00			0.98	
Satd. Flow (perm)		826			2047	624	970	2222			1138	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	141	254	0	0	506	43	177	147	293	4	0	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	122	0	0	0	0
Lane Group Flow (vph)	0	395	0	0	506	43	177	318	0	0	71	0
Confl. Peds. (#/hr)	182		150	150		182	150		158	158		150
Confl. Bikes (#/hr)						10						
Parking (#/hr)	10	10										
Turn Type	Perm	NA			NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2					6	8			4		
Actuated Green, G (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Effective Green, g (s)		26.0			26.0	26.0	24.0	24.0			24.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.40	0.40			0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0			5.0	
Lane Grp Cap (vph)		357			887	270	388	888			455	
v/s Ratio Prot					0.25			0.14				
v/s Ratio Perm	c0.48					0.07	c0.18				0.06	
v/c Ratio	1.11				0.57	0.16	0.46	0.36			0.16	
Uniform Delay, d1	17.0				12.8	10.3	13.2	12.6			11.5	
Progression Factor	1.35				0.99	0.86	1.00	1.00			1.00	
Incremental Delay, d2	75.1				1.5	0.7	3.8	1.1			0.7	
Delay (s)	98.1				14.1	9.6	17.0	13.7			12.2	
Level of Service	F				B	A	B	B			B	
Approach Delay (s)	98.1				13.8			14.7			12.2	
Approach LOS	F				B			B			B	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
20: Fremont St. & Folsom St. & I-80 WB Off-Ramp

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL	NBT	NBR	SEL	SER	SER2
Lane Configurations	↕	↕↕			↕			↕		↕↕		
Volume (vph)	230	612	13	2	16	112	3	215	93	325	52	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	3.0			2.0			2.0		6.0		
Lane Util. Factor	1.00	0.95			1.00			1.00		0.97		
Frbp, ped/bikes	1.00	0.99			0.73			0.93		0.95		
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00		
Frt	1.00	1.00			0.88			0.96		0.98		
Fit Protected	0.95	1.00			1.00			1.00		0.96		
Satd. Flow (prot)	1459	2675			986			1373		2644		
Fit Permitted	0.95	1.00			0.97			1.00		0.96		
Satd. Flow (perm)	1459	2675			956			1373		2644		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	258	688	15	2	18	126	3	242	104	365	58	3
RTOR Reduction (vph)	0	2	0	0	118	0	0	17	0	115	0	0
Lane Group Flow (vph)	258	701	0	0	28	0	0	332	0	311	0	0
Confl. Peds. (#/hr)	304		302	302		304			175			165
Confl. Bikes (#/hr)												
Parking (#/hr)		10	10									
Turn Type	Prot	NA			Perm	NA		Perm	NA	Prot		
Protected Phases	5	2				6			8			4
Permitted Phases					6			8				
Actuated Green, G (s)	9.7	27.7				14.0		20.0		19.0		
Effective Green, g (s)	11.7	30.7				16.0		23.0		19.0		
Actuated g/C Ratio	0.14	0.37				0.19		0.27		0.23		
Clearance Time (s)	6.0	6.0				4.0		5.0		6.0		
Vehicle Extension (s)	3.0	3.0				3.0		3.0		3.0		
Lane Grp Cap (vph)	203	981				182		377		600		
v/s Ratio Prot	c0.18	c0.26								c0.12		
v/s Ratio Perm						0.03		0.24				
v/c Ratio	1.27	0.71				0.15		0.88		0.52		
Uniform Delay, d1	36.0	22.7				28.2		29.0		28.3		
Progression Factor	1.00	1.00				1.00		1.00		1.00		
Incremental Delay, d2	154.7	2.5				0.4		20.1		0.8		
Delay (s)	190.7	25.2				28.6		49.2		29.1		
Level of Service	F	C				C		D		C		
Approach Delay (s)	69.7					28.6		49.2		29.1		
Approach LOS	E					C		D		C		

Intersection Summary			
HCM 2000 Control Delay	53.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	14.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
21: Freeway & First St. & Harrison St.

5/28/2015

Movement	EBT	EBR2	WBL	WBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations									
Volume (vph)	254	14	287	418	45	73	0	957	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0	3.0	3.0		3.0	5.0	3.0
Lane Util. Factor	1.00		0.91	0.91	1.00		1.00	0.88	1.00
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00	0.81	0.87
Flpb, ped/bikes	1.00		1.00	1.00	1.00		0.75	1.00	1.00
Frt	0.99		1.00	1.00	0.86		1.00	0.85	0.85
Fit Protected	1.00		0.95	0.99	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1609		1401	2707	1402		1149	1965	1192
Fit Permitted	1.00		0.31	0.80	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1609		454	2182	1402		1149	1965	1192
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	285	16	322	470	51	82	0	1075	272
RTOR Reduction (vph)	106	0	0	0	40	0	0	0	154
Lane Group Flow (vph)	195	0	232	560	11	0	82	1075	118
Confl. Peds. (#/hr)					220	220		150	167
Parking (#/hr)				10		10			
Turn Type	NA		pm+pt	NA	Over	Perm	NA	Perm	custom
Protected Phases	2		1	6	1		4		
Permitted Phases			6			4		4	6
Actuated Green, G (s)	8.0		24.0	24.0	11.0		26.0	26.0	24.0
Effective Green, g (s)	10.0		24.0	26.0	13.0		28.0	26.0	26.0
Actuated g/C Ratio	0.17		0.40	0.43	0.22		0.47	0.43	0.43
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	268		355	1059	303		536	851	516
v/s Ratio Prot	c0.12		0.12	c0.11	0.01				
v/s Ratio Perm			0.14	0.11		0.07	c0.55	0.10	
v/c Ratio	0.73		0.65	0.53	0.04		0.15	1.26	0.23
Uniform Delay, d1	23.7		18.5	12.5	18.6		9.2	17.0	10.7
Progression Factor	1.00		0.69	0.64	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.9		8.1	1.7	0.2		0.6	127.9	1.0
Delay (s)	39.6		20.9	9.7	18.8		9.8	144.9	11.7
Level of Service	D		C	A	B		A	F	B
Approach Delay (s)	39.6			13.0			111.8		
Approach LOS	D			B			F		
Intersection Summary									
HCM 2000 Control Delay			71.1				HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			0.98						
Actuated Cycle Length (s)			60.0				Sum of lost time (s)		11.0
Intersection Capacity Utilization			91.3%				ICU Level of Service		F
Analysis Period (min)			15						
c Critical Lane Group									

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
22: Fourth St. & Howard St.

5/28/2015

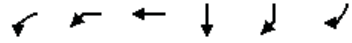
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	424	679	0	0	0	0	0	537	392
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				2.5	2.5						2.0	2.0
Lane Util. Factor				0.81	0.81						0.81	0.81
Frbp, ped/bikes				1.00	1.00						0.90	0.64
Flpb, ped/bikes				1.00	1.00						1.00	1.00
Frt				1.00	1.00						0.96	0.85
Fit Protected				0.95	0.99						1.00	1.00
Satd. Flow (prot)				1181	4917						4289	673
Fit Permitted				0.95	0.99						1.00	1.00
Satd. Flow (perm)				1181	4917						4289	673
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)	0	0	0	437	700	0	0	0	0	0	554	404
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	223	914	0	0	0	0	0	756	202
Confl. Peds. (#/hr)				150	345		549	645		807	807	645
Confl. Bikes (#/hr)				30			30			10		10
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type				Split	NA						NA	Perm
Protected Phases				6	6						4	
Permitted Phases												4
Actuated Green, G (s)				30.0	30.0						28.0	28.0
Effective Green, g (s)				31.5	31.5						30.0	30.0
Actuated g/C Ratio				0.35	0.35						0.33	0.33
Clearance Time (s)				4.0	4.0						4.0	4.0
Lane Grp Cap (vph)				413	1720						1429	224
v/s Ratio Prot				c0.19	0.19						0.18	
v/s Ratio Perm												c0.30
v/c Ratio				0.54	0.53						0.53	0.90
Uniform Delay, d1				23.4	23.4						24.3	28.6
Progression Factor				1.00	1.00						1.00	1.00
Incremental Delay, d2				5.0	1.2						1.4	39.1
Delay (s)				28.4	24.5						25.7	67.7
Level of Service				C	C						C	E
Approach Delay (s)		0.0			25.3		0.0				34.6	
Approach LOS		A			C		A				C	
Intersection Summary												
HCM 2000 Control Delay				29.5			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)			6.5		
Intersection Capacity Utilization				61.3%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
23: I-80 WB On-Ramp & Fourth St. & Harrison St.

5/28/2015



Movement	WBL2	WBL	WBT	SBT	SBR	SBR2
Lane Configurations						
Volume (vph)	89	526	369	250	575	104
Ideal Flow (vphpl)	1600	1600	1800	1600	1600	1600
Total Lost time (s)		5.4	2.4	5.7	2.7	2.7
Lane Util. Factor		0.81	0.81	0.91	0.91	1.00
Frbp, ped/bikes		1.00	1.00	0.99	0.98	0.88
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.92	0.85	0.85
Fit Protected		0.95	0.98	1.00	1.00	1.00
Satd. Flow (prot)		1050	4840	2094	1039	1021
Fit Permitted		0.95	0.98	1.00	1.00	1.00
Satd. Flow (perm)		1050	4840	2094	1039	1021
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	93	548	384	260	599	108
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	323	702	560	299	59
Confl. Peds. (#/hr)						171
Confl. Bikes (#/hr)					10	10
Bus Blockages (#/hr)	0	0	5	0	0	0
Parking (#/hr)				10		
Turn Type	Perm	Perm	NA	NA	Perm	Perm
Protected Phases			6	4		
Permitted Phases	6	6			4	4
Actuated Green, G (s)		32.6	32.6	46.3	46.3	46.3
Effective Green, g (s)		32.6	35.6	46.3	49.3	49.3
Actuated g/C Ratio		0.36	0.40	0.51	0.55	0.55
Clearance Time (s)		5.4	5.4	5.7	5.7	5.7
Lane Grp Cap (vph)		380	1914	1077	569	559
v/s Ratio Prot				0.27		
v/s Ratio Perm		c0.31	0.15		c0.29	0.06
v/c Ratio		0.85	0.37	0.52	0.53	0.11
Uniform Delay, d1		26.4	19.2	14.5	12.9	9.8
Progression Factor		1.00	1.00	1.05	1.09	2.29
Incremental Delay, d2		20.6	0.5	1.5	3.0	0.3
Delay (s)		47.0	19.8	16.7	17.0	22.7
Level of Service		D	B	B	B	C
Approach Delay (s)			28.4	17.5		
Approach LOS			C	B		

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.1
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Fourth St. & Bryant St. & I-80 EB Off-Ramp

5/28/2015



Movement	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Volume (vph)	402	92	68	271	760	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.5		4.2	4.2	4.5	4.5
Lane Util. Factor	0.81		1.00	1.00	0.94	0.86
Frbp, ped/bikes	0.94		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Fit Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5515		1459	1305	4120	1122
Fit Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5515		1459	1305	4120	1122
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	457	105	77	308	864	59
RTOR Reduction (vph)	46	0	52	0	0	0
Lane Group Flow (vph)	516	0	25	308	870	53
Confl. Peds. (#/hr)		293	926			
Confl. Bikes (#/hr)		10				
Parking (#/hr)	10	10		10		
Turn Type	NA		Split	NA	Prot	Perm
Protected Phases	2		7	7	4	
Permitted Phases						4
Actuated Green, G (s)	23.5		26.8	26.8	19.5	19.5
Effective Green, g (s)	25.5		28.8	28.8	23.5	23.5
Actuated g/C Ratio	0.28		0.32	0.32	0.26	0.26
Clearance Time (s)	5.5		6.2	6.2	8.5	8.5
Lane Grp Cap (vph)	1562		466	417	1075	292
v/s Ratio Prot	c0.09		0.02	c0.24	c0.21	
v/s Ratio Perm						0.05
v/c Ratio	0.33		0.05	0.74	0.81	0.18
Uniform Delay, d1	25.5		21.2	27.2	31.2	25.8
Progression Factor	1.00		1.53	0.97	1.00	1.00
Incremental Delay, d2	0.6		0.2	9.5	6.6	1.4
Delay (s)	26.1		32.5	35.8	37.7	27.2
Level of Service	C		C	D	D	C
Approach Delay (s)	26.1			35.1	37.1	
Approach LOS	C			D	D	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Fifth St. & I-80 WB Off-Ramp & Harrison St.

5/28/2015



Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↑↑↑↑				↑↑	↑↑			↑↑↑↑	↑
Volume (vph)	79	389	44	34	166	356	188	249	443	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.5				2.0	2.0			2.5	2.5
Lane Util. Factor	0.81				0.95	0.95			0.94	0.86
Frbp, ped/bikes	0.98				1.00	0.91			0.97	0.69
Flpb, ped/bikes	0.97				0.98	1.00			0.67	1.00
Frt	0.99				1.00	0.95			0.99	0.85
Fit Protected	0.99				0.99	1.00			0.95	1.00
Satd. Flow (prot)	5857				2973	2427			2815	816
Fit Permitted	0.99				0.83	1.00			0.95	1.00
Satd. Flow (perm)	5857				2496	2427			2815	816
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	81	401	45	35	171	367	194	257	457	270
RTOR Reduction (vph)	0	23	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	504	0	0	206	554	0	0	757	227
Confl. Peds. (#/hr)	200		250	250			250	200	250	250
Confl. Bikes (#/hr)			10				10			10
Bus Blockages (#/hr)	0	5	0	0	5	5	0	0	0	0
Parking (#/hr)		10				10				
Turn Type	Perm	NA		Perm	NA	NA		Perm	Prot	Perm
Protected Phases	6				4	4			7	
Permitted Phases	6		4				7		7	
Actuated Green, G (s)	20.5				22.0	22.0			14.5	14.5
Effective Green, g (s)	23.5				26.0	26.0			18.5	18.5
Actuated g/C Ratio	0.31				0.35	0.35			0.25	0.25
Clearance Time (s)	5.5				6.0	6.0			6.5	6.5
Lane Grp Cap (vph)	1835				865	841			694	201
v/s Ratio Prot					c0.23					
v/s Ratio Perm	0.09				0.08				0.27	c0.28
v/c Ratio	0.27				0.24	0.66			1.09	1.13
Uniform Delay, d1	19.3				17.4	20.7			28.2	28.2
Progression Factor	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4				0.6	4.0			61.5	102.6
Delay (s)	19.7				18.1	24.8			89.8	130.8
Level of Service	B				B	C			F	F
Approach Delay (s)	19.7				18.1	24.8			99.3	
Approach LOS	B				B	C			F	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

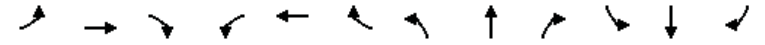
c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Unsignalized Intersection Capacity Analysis
26: Delancey St & Brannan St

5/28/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔			↔			↔	
Sign Control	Stop				Stop			Stop			Stop	
Volume (vph)	243	202	50	9	181	95	19	4	6	12	8	110
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	267	222	55	10	199	104	21	4	7	13	9	121
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	544	313	32	143								
Volume Left (vph)	267	10	21	13								
Volume Right (vph)	55	104	7	121								
Hadj (s)	0.07	-0.16	0.04	-0.46								
Departure Headway (s)	4.9	5.0	6.4	5.6								
Degree Utilization, x	0.74	0.43	0.06	0.22								
Capacity (veh/h)	714	689	482	572								
Control Delay (s)	20.7	11.7	9.7	10.2								
Approach Delay (s)	20.7	11.7	9.7	10.2								
Approach LOS	C	B	A	B								

Intersection Summary			
Delay	16.2		
Level of Service	C		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
27: Second St. & Brannan St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔		↔↔				↔↔			↔↔	
Volume (vph)	198	318	57	24	170	158	22	275	36	106	334	94
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0			2.0			3.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.94			0.85			0.96			0.94	
Flpb, ped/bikes		0.93			0.99			0.99			0.96	
Frt		0.99			0.93			0.98			0.97	
Fit Protected		0.98			1.00			1.00			0.99	
Satd. Flow (prot)		2300			2091			2702			2327	
Fit Permitted		0.71			0.90			0.91			0.81	
Satd. Flow (perm)		1653			1897			2471			1915	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	206	331	59	25	177	165	23	286	38	110	348	98
RTOR Reduction (vph)	0	6	0	0	7	0	0	3	0	0	4	0
Lane Group Flow (vph)	0	590	0	0	360	0	0	345	0	0	552	0
Confl. Peds. (#/hr)	610		610	610		610	610		610	610		610
Confl. Bikes (#/hr)			20			6			3			23
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	5	0
Parking (#/hr)		10	10	10	10	10					10	10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		23.0			23.0			27.0			27.0	
Effective Green, g (s)		26.0			26.0			30.0			29.0	
Actuated g/C Ratio		0.43			0.43			0.50			0.48	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		716			822			1235			925	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.19			0.14			c0.29	
v/c Ratio		0.82			0.44			0.28			0.60	
Uniform Delay, d1		15.0			11.9			8.7			11.3	
Progression Factor		1.00			1.00			1.00			0.63	
Incremental Delay, d2		10.4			1.7			0.6			2.3	
Delay (s)		25.4			13.6			9.3			9.4	
Level of Service		C			B			A			A	
Approach Delay (s)		25.4			13.6			9.3			9.4	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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HCM Signalized Intersection Capacity Analysis
28: Second St. & Bryant St.

5/28/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔↔						↔↔	↔		↔↔	
Volume (vph)	157	476	106	0	0	0	0	224	251	22	417	0
Ideal Flow (vphpl)	1000	1000	1000	1800	1800	1800	1000	1000	1000	1800	1800	1800
Total Lost time (s)	2.0	2.0						2.0	2.0		2.0	
Lane Util. Factor	*0.60	*0.60						*0.60	0.91		0.95	
Frbp, ped/bikes	1.00	0.94						0.90	0.67		1.00	
Flpb, ped/bikes	1.00	1.00						1.00	1.00		0.99	
Frt	1.00	0.97						0.95	0.85		1.00	
Fit Protected	0.95	1.00						1.00	1.00		1.00	
Satd. Flow (prot)	899	1336						875	444		2669	
Fit Permitted	0.95	1.00						1.00	1.00		0.92	
Satd. Flow (perm)	899	1336						875	444		2455	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	185	560	125	0	0	0	0	264	295	26	491	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	4	5	0	0	0
Lane Group Flow (vph)	185	656	0	0	0	0	0	381	169	0	517	0
Confl. Peds. (#/hr)	160		560	160		160	160		560	560		160
Confl. Bikes (#/hr)			1						17			
Parking (#/hr)	10	10	10									10
Turn Type	Split	NA						NA	Perm	Perm	NA	
Protected Phases	2	2						4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	27.0	27.0						26.0	26.0		26.0	
Effective Green, g (s)	28.5	28.5						27.5	27.5		27.5	
Actuated g/C Ratio	0.48	0.48						0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5						3.5	3.5		3.5	
Lane Grp Cap (vph)	427	634						401	203		1125	
v/s Ratio Prot	0.21	c0.49						c0.44				
v/s Ratio Perm									0.38		0.21	
v/c Ratio	0.43	1.03						0.95	0.83		0.46	
Uniform Delay, d1	10.4	15.8						15.6	14.2		11.2	
Progression Factor	1.00	1.00						0.91	0.92		1.00	
Incremental Delay, d2	3.2	44.8						31.6	28.4		1.4	
Delay (s)	13.6	60.6						45.8	41.5		12.5	
Level of Service		B	E					D	D		B	
Approach Delay (s)		50.6				0.0		44.5			12.5	
Approach LOS		D				A		D			B	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Warriors Arena (Pier 30-32) 5:00 pm 5/20/2013 EPP Weekend PM Late (7-9 PM), With Basketball, No Giants

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OFF-SITE ALTERNATIVE AT PIERS 30/32 & SWL 330
TRAFFIC CONTRIBUTIONS TO LOS E OR LOS F

PIER 30-32: EXISTING PLUS PROJECT WITH BASKETBALL GAME, WEEKDAY PM PEAK, NO GIANTS

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact?
4: Howard St / The Embarcadero	NBL/U	48	197	24.4%	Yes
	SBT	64	963	6.6%	Yes
7: Bryant St / The Embarcadero	EBT/R	19	250	7.6%	Yes
	NBT/R	167	930	18.0%	Yes
	SBT	27	1155	2.3%	No
10: Townsend St / The Embarcadero	SBT/R	29	1005	2.9%	No
11: King St/ Second St	EBL	0	196	0.0%	No
	WBT/R	29	867	3.3%	No
14: King St/ I-280 Ramps / Fifth St	EBT/R	133	1960	6.8%	Yes
15: Harrison St / Main St	WBL/T/R	30	650	4.6%	No
21: Harrison / Fourth St	WBL	7	703	1.0%	No
	SBR	9	1180	0.8%	No
24: Bryant St / Fourth St	SBT	26	610	4.3%	No
28: Bryant St / Second St	EBT/R	33	642	5.1%	Yes
	NBT	0	512	0.0%	No

PIER 30-32: EXISTING PLUS PROJECT WITH NO EVENT, WEEKDAY PM PEAK, NO GIANTS

Intersection	Critical Movement Operating at E or F	Project Contribution	2040 Total Volumes ¹	% Project Contribution	Impact?
4: Howard St / The Embarcadero	NBL/U	10	159	6.3%	Yes
	SBT	18	917	2.0%	No
5: Folsom St / The Embarcadero	NBL/U	0	94	0.0%	No
	SBT/R	18	1038	1.7%	No
7: Bryant St / The Embarcadero	NBL/U	117	308	38.0%	Yes
	SBT	42	1170	3.6%	No
10: Townsend St / The Embarcadero	SBT/R	15	991	1.5%	No
11: King St/ Second St	EBL	0	196	0.0%	No
	WBT/R	15	853	1.8%	No
14: King St/ I-280 Ramps / Fifth St	EBT/R	27	1854	1.5%	No
15: Harrison St / Main St	WBL/T/R	0	620	0.0%	No
21: Harrison / Fourth St	SBR	0	1171	0.0%	No
24: Bryant St / Fourth St	SBT	0	584	0.0%	No
28: Bryant St / Second St	EBT/R	15	624	2.4%	No
	NBT	0	512	0.0%	No

APPENDIX TR-13
PROJECT VARIANT PARKING TABLE

**VARIANT (75 fewer on-site spaces; assume they park at UCSF 3rd St Garage)
No Giants**

Parking Facility Grouping	No Event		Convention Event		Basketball Game	
	Midday	Evening	Midday	Evening	Midday	Evening
Weekday Conditions						
Existing Demand	5,409	2,111	5,409	2,111	5,409	2,111
Project Demand	1,049	489	1,906	669	1,072	4,270
Total Demand	6,458	2,600	7,315	2,780	6,481	6,381
Total Supply	8,610	6,130	8,610	6,130	8,610	7,530
Total Parking Occupancy	75%	42%	85%	45%	75%	85%
Surplus/(Shortfall) ^a	2,152	3,530	1,295	3,350	2,129	1,149
Shortfall if Additional Facilities Not Open	None closed	No shortfall	None closed	No shortfall	None closed	(176)
Shortfall if UCSF Facilities Not Open	No shortfall	No shortfall	No shortfall	No shortfall	No shortfall	No shortfall
Saturday Conditions						
Existing Demand	1,159	919	—	—	1,159	919
Project Demand	589	462	—	—	598	4,573
Total Demand	1,748	1,381	—	—	1,757	5,492
Total Supply	6,130	6,130	—	—	6,130	7,530
Total Parking Occupancy	29%	23%	—	—	29%	73%
Surplus/(Shortfall)	4,382	4,749	—	—	4,373	2,038
Shortfall if Additional Facilities Not Open	No shortfall	No shortfall	—	—	No shortfall	No shortfall
Shortfall if UCSF Facilities Not Open	No shortfall	No shortfall	—	—	No shortfall	No shortfall

APPENDIX NO

Noise Supporting Information

Existing Weekday PM (4pm - 6pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)		
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,420	95	1349	3	42.6	2	28.4	35	56	35	56	35	56	65.6	60.3	65.3	69.1
3rd Street 16th	Mariposa	1,706	95	1620.7	3	51.18	2	34.12	35	56	35	56	35	56	66.4	61.1	66.1	69.9
Illinois	Mariposa 20th	250	95	237.5	3	7.5	2	5	30	48	30	48	30	48	56.1	51.7	57.1	60.3
Tery Fran	South China B	443	97	429.71	2	8.86	1	4.43	25	40	25	40	25	40	56.4	51.2	55.9	59.8
16th	3rd I-280	1,010	95	959.5	3	30.3	2	20.2	30	48	30	48	30	48	62.2	57.8	63.2	66.4
Mariposa	3rd I-280	819	95	778.05	3	24.57	2	16.38	30	48	30	48	30	48	61.3	56.9	62.3	65.5

Assumptions: Traffic data from Advant

Existing Weekday PM + Convention

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)		
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,688	95	1603.6	3	50.64	2	33.76	35	56	35	56	35	56	66.4	61.1	66.0	69.8
3rd Street 16th	Mariposa	1,706	95	1620.7	3	51.18	2	34.12	35	56	35	56	35	56	66.4	61.1	66.1	69.9
Illinois	Mariposa 20th	605	95	574.75	3	18.15	2	12.1	30	48	30	48	30	48	60.0	55.6	61.0	64.2
Tery Fran	South China B	443	97	429.71	2	8.86	1	4.43	25	40	25	40	25	40	56.4	51.2	55.9	59.8
16th	3rd I-280	1,307	95	1241.7	3	39.21	2	26.14	30	48	30	48	30	48	63.3	58.9	64.3	67.5
Mariposa	3rd I-280	1,091	95	1036.5	3	32.73	2	21.82	30	48	30	48	30	48	62.5	58.1	63.5	66.7

Assumptions: Traffic data from Advant

Existing Weekday Evening (6pm - 8pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)		
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,231	95	1169.5	3	36.93	2	24.62	35	56	35	56	35	56	65.0	59.7	64.7	68.5
3rd Street 16th	Mariposa	1,423	95	1351.9	3	42.69	2	28.46	35	56	35	56	35	56	65.6	60.3	65.3	69.1
Illinois	Mariposa 20th	155	95	147.25	3	4.65	2	3.1	30	48	30	48	30	48	54.1	49.7	55.0	58.2
Tery Fran	South China B	261	97	253.17	2	5.22	1	2.61	25	40	25	40	25	40	54.1	48.9	53.6	57.5
16th	3rd I-280	851	95	808.45	3	25.53	2	17.02	30	48	30	48	30	48	61.5	57.1	62.4	65.6
Mariposa	3rd I-280	801	95	760.95	3	24.03	2	16.02	30	48	30	48	30	48	61.2	56.8	62.2	65.4

Assumptions: Traffic data from Advant

Existing Weekday Evening + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)		
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,652	95	1569.7	3	49.57	2	33.05	35	56	35	56	35	56	66.3	61.0	65.9	69.7
3rd Street 16th	Mariposa	1,430	95	1358.5	3	42.9	2	28.6	35	56	35	56	35	56	65.6	60.4	65.3	69.1
Illinois	Mariposa 20th	474	95	450.57	3	14.23	2	9.486	30	48	30	48	30	48	58.9	54.5	59.9	63.1
Tery Fran	South China B	286	97	277.55	2	5.723	1	2.861	25	40	25	40	25	40	54.5	49.3	54.0	57.9
16th	3rd I-280	1,163	95	1105.2	3	34.9	2	23.27	30	48	30	48	30	48	62.8	58.4	63.8	67.0
Mariposa	3rd I-280	1,327	95	1260.4	3	39.8	2	26.54	30	48	30	48	30	48	63.4	59.0	64.4	67.6

Assumptions: Traffic data from Advant

Existing Weekday Late (9pm - 11pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	388	95	368.6	3	11.64	2	7.76	35	56	35	56	35	56	60.0	54.7	59.6	63.4
3rd Street 16th	Mariposa	409	95	388.55	3	12.27	2	8.18	35	56	35	56	35	56	60.2	54.9	59.9	63.7
Illinois	Mariposa 20th	38	95	36.1	3	1.14	2	0.76	30	48	30	48	30	48	48.0	43.6	48.9	52.1
Tery Fran	South China B	101	97	97.97	2	2.02	1	1.01	25	40	25	40	25	40	50.0	44.8	49.4	53.4
16th	3rd I-280	245	95	232.75	3	7.35	2	4.9	30	48	30	48	30	48	56.0	51.7	57.0	60.2
Mariposa	3rd I-280	215	95	204.25	3	6.45	2	4.3	30	48	30	48	30	48	55.5	51.1	56.5	59.7

Assumptions: Traffic data from Advant

Existing Weekday Late + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	312	95	296.05	3	9.349	2	6.233	35	56	35	56	35	56	59.0	53.7	58.7	62.5
3rd Street 16th	Mariposa	412	95	391.77	3	12.37	2	8.248	35	56	35	56	35	56	60.2	55.0	59.9	63.7
Illinois	Mariposa 20th	390	95	370.43	3	11.7	2	7.798	30	48	30	48	30	48	58.1	53.7	59.0	62.2
Tery Fran	South China B	481	97	466.57	2	9.62	1	4.81	25	40	25	40	25	40	56.8	51.6	56.2	60.2
16th	3rd I-280	501	95	476.34	3	15.04	2	10.03	30	48	30	48	30	48	59.2	54.8	60.1	63.3
Mariposa	3rd I-280	644	95	612.07	3	19.33	2	12.89	30	48	30	48	30	48	60.2	55.9	61.2	64.4

Assumptions: Traffic data from Advant

Existing Saturday Evening (6pm - 8pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	519	95	493.05	3	15.57	2	10.38	35	56	35	56	35	56	61.2	56.0	60.9	64.7
3rd Street 16th	Mariposa	569	95	540.55	3	17.07	2	11.38	35	56	35	56	35	56	61.6	56.4	61.3	65.1
Illinois	Mariposa 20th	69	95	65.55	3	2.07	2	1.38	30	48	30	48	30	48	50.5	46.1	51.5	54.7
Tery Fran	South China B	116	97	112.52	2	2.32	1	1.16	25	40	25	40	25	40	50.6	45.4	50.0	54.0
16th	3rd I-280	319	95	303.05	3	9.57	2	6.38	30	48	30	48	30	48	57.2	52.8	58.2	61.4
Mariposa	3rd I-280	256	95	243.2	3	7.68	2	5.12	30	48	30	48	30	48	56.2	51.8	57.2	60.4

Assumptions: Traffic data from Advant

Existing Saturday Evening + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	902	95	856.59	3	27.05	2	18.03	35	56	35	56	35	56	63.6	58.4	63.3	67.1
3rd Street 16th	Mariposa	575	95	546.56	3	17.26	2	11.51	35	56	35	56	35	56	61.7	56.4	61.4	65.2
Illinois	Mariposa 20th	358	95	339.89	3	10.73	2	7.156	30	48	30	48	30	48	57.7	53.3	58.7	61.9
Tery Fran	South China B	143	97	138.8	2	2.862	1	1.431	25	40	25	40	25	40	51.5	46.3	51.0	54.9
16th	3rd I-280	584	95	554.66	3	17.52	2	11.68	30	48	30	48	30	48	59.8	55.4	60.8	64.0
Mariposa	3rd I-280	723	95	687.22	3	21.7	2	14.47	30	48	30	48	30	48	60.8	56.4	61.7	64.9

Assumptions: Traffic data from Advant

Cumulative Weekday

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	2,670	95	2536.1	3	80.09	2	53.39	35	56	35	56	35	56	68.4	63.1	68.0	71.8
3rd Street 16th	Mariposa	2,687	95	2552.7	3	80.61	2	53.74	35	56	35	56	35	56	68.4	63.1	68.0	71.8
Illinois	Mariposa 20th	309	95	294.01	3	9.285	2	6.19	30	48	30	48	30	48	57.1	52.7	58.0	61.2
Tery Fran	South China B	721	97	699.37	2	14.42	1	7.21	25	40	25	40	25	40	58.5	53.3	58.0	61.9
16th	3rd I-280	1,229	95	1167.1	3	36.86	2	24.57	30	48	30	48	30	48	63.1	58.7	64.0	67.2
Mariposa	3rd I-280	1,186	95	1126.4	3	35.57	2	23.71	30	48	30	48	30	48	62.9	58.5	63.9	67.1

Assumptions: Traffic data from Advant

Cumulative Weekday + Convention

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	2,938	95	2791.1	3	88.14	2	58.76	35	56	35	56	35	56	68.8	63.5	68.4	72.2
3rd Street 16th	Mariposa	2,687	95	2552.7	3	80.61	2	53.74	35	56	35	56	35	56	68.4	63.1	68.0	71.8
Illinois	Mariposa 20th	665	95	631.75	3	19.95	2	13.3	30	48	30	48	30	48	60.4	56.0	61.4	64.6
Tery Fran	South China B	721	97	699.37	2	14.42	1	7.21	25	40	25	40	25	40	58.5	53.3	58.0	61.9
16th	3rd I-280	1,524	95	1447.8	3	45.72	2	30.48	30	48	30	48	30	48	64.0	59.6	65.0	68.2
Mariposa	3rd I-280	1,458	95	1385.1	3	43.74	2	29.16	30	48	30	48	30	48	63.8	59.4	64.8	68.0

Assumptions: Traffic data from Advant

Cumulative Weekday + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	2,818	95	2677.1	3	84.54	2	56.36	35	56	35	56	35	56	68.6	63.3	68.3	72.1
3rd Street 16th	Mariposa	2,692	95	2557.4	3	80.76	2	53.84	35	56	35	56	35	56	68.4	63.1	68.1	71.9
Illinois	Mariposa 20th	531	95	504.45	3	15.93	2	10.62	30	48	30	48	30	48	59.4	55.0	60.4	63.6
Tery Fran	South China B	739	97	716.83	2	14.78	1	7.39	25	40	25	40	25	40	58.7	53.4	58.1	62.0
16th	3rd I-280	1,449	95	1376.6	3	43.47	2	28.98	30	48	30	48	30	48	63.8	59.4	64.7	67.9
Mariposa	3rd I-280	1,393	95	1323.4	3	41.79	2	27.86	30	48	30	48	30	48	63.6	59.2	64.6	67.8

Assumptions: Traffic data from Advant

Cumulative Saturday Evening + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,364	95	1295.8	3	40.92	2	27.28	35	56	35	56	35	56	65.4	60.2	65.1	68.9
3rd Street 16th	Mariposa	977	95	928.15	3	29.31	2	19.54	35	56	35	56	35	56	64.0	58.7	63.7	67.5
Illinois	Mariposa 20th	430	95	408.5	3	12.9	2	8.6	30	48	30	48	30	48	58.5	54.1	59.5	62.7
Tery Fran	South China B	329	97	319.13	2	6.58	1	3.29	25	40	25	40	25	40	55.1	49.9	54.6	58.5
16th	3rd I-280	673	95	639.35	3	20.19	2	13.46	30	48	30	48	30	48	60.4	56.0	61.4	64.6
Mariposa	3rd I-280	904	95	858.8	3	27.12	2	18.08	30	48	30	48	30	48	61.7	57.3	62.7	65.9

Assumptions: Traffic data from Advant

Cumulative Saturday Evening No Project

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	981	95	932.33	3	29.44	2	19.63	35	56	35	56	35	56	64.0	58.7	63.7	67.5
3rd Street 16th	Mariposa	947	95	899.65	3	28.41	2	18.94	35	56	35	56	35	56	63.8	58.6	63.5	67.3
Illinois	Mariposa 20th	141	95	133.57	3	4.218	2	2.812	30	48	30	48	30	48	53.6	49.2	54.6	57.8
Tery Fran	South China B	302	97	292.94	2	6.04	1	3.02	25	40	25	40	25	40	54.8	49.6	54.2	58.2
16th	3rd I-280	408	95	387.45	3	12.24	2	8.157	30	48	30	48	30	48	58.3	53.9	59.2	62.4
Mariposa	3rd I-280	436	95	414.58	3	13.09	2	8.728	30	48	30	48	30	48	58.6	54.2	59.5	62.7

Assumptions: Traffic data from Advant

Existing Weekday PM + No Project Alternative

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,509	95	1433.6	3	45.27	2	30.18	35	56	35	56	35	56	65.9	60.6	65.5	69.3
3rd Street 16th	Mariposa	1,724	95	1637.8	3	51.72	2	34.48	35	56	35	56	35	56	66.5	61.2	66.1	69.9
Illinois	Mariposa 20th	444	95	421.8	3	13.32	2	8.88	30	48	30	48	30	48	58.6	54.2	59.6	62.8
Tery Fran	South China B	443	97	429.71	2	8.86	1	4.43	25	40	25	40	25	40	56.4	51.2	55.9	59.8
16th	3rd I-280	1,154	95	1096.3	3	34.62	2	23.08	30	48	30	48	30	48	62.8	58.4	63.8	67.0
Mariposa	3rd I-280	971	95	922.45	3	29.13	2	19.42	30	48	30	48	30	48	62.0	57.6	63.0	66.2

Assumptions: Traffic data from Advant

Existing Saturday eve + No Project Alternative

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	528	95	501.6	3	15.84	2	10.56	35	56	35	56	35	56	61.3	56.0	61.0	64.8
3rd Street 16th	Mariposa	575	95	546.25	3	17.25	2	11.5	35	56	35	56	35	56	61.7	56.4	61.4	65.2
Illinois	Mariposa 20th	89	95	84.55	3	2.67	2	1.78	30	48	30	48	30	48	51.7	47.3	52.6	55.8
Tery Fran	South China B	116	97	112.52	2	2.32	1	1.16	25	40	25	40	25	40	50.6	45.4	50.0	54.0
16th	3rd I-280	344	95	326.8	3	10.32	2	6.88	30	48	30	48	30	48	57.5	53.1	58.5	61.7
Mariposa	3rd I-280	269	95	255.55	3	8.07	2	5.38	30	48	30	48	30	48	56.5	52.1	57.4	60.6

Assumptions: Traffic data from Advant

Existing Weekday PM + Reduced Density Alternative

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,650	95	1567.5	3	49.5	2	33	35	56	35	56	35	56	66.3	61.0	65.9	69.7
3rd Street 16th	Mariposa	1,727	95	1640.7	3	51.81	2	34.54	35	56	35	56	35	56	66.5	61.2	66.1	69.9
Illinois	Mariposa 20th	500	95	475	3	15	2	10	30	48	30	48	30	48	59.1	54.7	60.1	63.3
Tery Fran	South China B	443	97	429.71	2	8.86	1	4.43	25	40	25	40	25	40	56.4	51.2	55.9	59.8
16th	3rd I-280	1,233	95	1171.4	3	36.99	2	24.66	30	48	30	48	30	48	63.1	58.7	64.0	67.2
Mariposa	3rd I-280	1,037	95	985.15	3	31.11	2	20.74	30	48	30	48	30	48	62.3	57.9	63.3	66.5

Assumptions: Traffic data from Advant

Existing Saturday eve + Reduced Density Alternative

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	859	95	816.35	3	25.78	2	17.19	35	56	35	56	35	56	63.4	58.1	63.1	66.9
3rd Street 16th	Mariposa	600	95	569.71	3	17.99	2	11.99	35	56	35	56	35	56	61.9	56.6	61.5	65.3
Illinois	Mariposa 20th	297	95	282.32	3	8.915	2	5.944	30	48	30	48	30	48	56.9	52.5	57.9	61.1
Tery Fran	South China B	142	97	137.8	2	2.841	1	1.421	25	40	25	40	25	40	51.5	46.3	50.9	54.9
16th	3rd I-280	559	95	531.5	3	16.78	2	11.19	30	48	30	48	30	48	59.6	55.2	60.6	63.8
Mariposa	3rd I-280	683	95	649.18	3	20.5	2	13.67	30	48	30	48	30	48	60.5	56.1	61.5	64.7

Assumptions: Traffic data from Advant

Existing Weekday Evening + No TSP Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,815	95	1724.6	3	54.46	2	36.31	35	56	35	56	35	56	66.7	61.4	66.3	70.1
3rd Street 16th	Mariposa	1,469	95	1395.5	3	44.07	2	29.38	35	56	35	56	35	56	65.8	60.5	65.4	69.2
Illinois	Mariposa 20th	536	95	509.34	3	16.08	2	10.72	30	48	30	48	30	48	59.5	55.1	60.4	63.6
Tery Fran	South China B	289	97	279.91	2	5.771	1	2.886	25	40	25	40	25	40	54.6	49.4	54.0	58.0
16th	3rd I-280	1,241	95	1178.9	3	37.23	2	24.82	30	48	30	48	30	48	63.1	58.7	64.1	67.3
Mariposa	3rd I-280	1,439	95	1367	3	43.17	2	28.78	30	48	30	48	30	48	63.7	59.3	64.7	67.9

Assumptions: Traffic data from Advant

Existing Weekday Late + No TSP Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	327	95	311.02	3	9.822	2	6.548	35	56	35	56	35	56	59.2	54.0	58.9	62.7
3rd Street 16th	Mariposa	451	95	428.39	3	13.53	2	9.019	35	56	35	56	35	56	60.6	55.3	60.3	64.1
Illinois	Mariposa 20th	358	95	339.75	3	10.73	2	7.153	30	48	30	48	30	48	57.7	53.3	58.7	61.9
Tery Fran	South China B	473	97	458.35	2	9.451	1	4.725	25	40	25	40	25	40	56.7	51.5	56.1	60.1
16th	3rd I-280	747	95	709.29	3	22.4	2	14.93	30	48	30	48	30	48	60.9	56.5	61.9	65.1
Mariposa	3rd I-280	736	95	699.21	3	22.08	2	14.72	30	48	30	48	30	48	60.8	56.4	61.8	65.0

Assumptions: Traffic data from Advant

Existing Saturday Evening + No TSP Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)					
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT								
Calveno Peak																		
from: to:		%	Auto	%	MT	%	HT											
3rd Street South	China B	1,050	95	997.25	3	31.49	2	20.99	35	56	35	56	35	56	64.3	59.0	64.0	67.8
3rd Street 16th	Mariposa	605	95	574.53	3	18.14	2	12.1	35	56	35	56	35	56	61.9	56.6	61.6	65.4
Illinois	Mariposa 20th	416	95	395.54	3	12.49	2	8.327	30	48	30	48	30	48	58.4	54.0	59.3	62.5
Tery Fran	South China B	145	97	140.91	2	2.905	1	1.453	25	40	25	40	25	40	51.6	46.4	51.0	55.0
16th	3rd I-280	646	95	613.77	3	19.38	2	12.92	30	48	30	48	30	48	60.3	55.9	61.2	64.4
Mariposa	3rd I-280	824	95	783.07	3	24.73	2	16.49	30	48	30	48	30	48	61.3	56.9	62.3	65.5

Assumptions: Traffic data from Advant

OffSite Alternative Existing Weekday PM (4pm - 6pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)				
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT							
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	2,022	95	1920.9	3	60.66	2	40.44	30	48	30	48	30	48	65.2	60.8	66.2	69.4
Embarcad Brannan Townsnd	1,871	95	1777.5	3	56.13	2	37.42	30	48	30	48	30	48	64.9	60.5	65.9	69.1
Brannan Delancey Embarco	598	97	580.06	2	11.96	1	5.98	25	40	25	40	25	40	57.7	52.5	57.2	61.1
Bryant Rincon Embarco	540	97	523.8	2	10.8	1	5.4	25	40	25	40	25	40	57.3	52.1	56.7	60.7

Assumptions: Traffic data from Advant

OffSite Alternative Existing Weekday PM + Convention

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)				
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT							
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	2,131	95	2024.6	3	63.93	2	42.62	30	48	30	48	30	48	65.4	61.0	66.4	69.6
Embarcad Brannan Townsnd	1,946	95	1848.4	3	58.37	2	38.91	30	48	30	48	30	48	65.0	60.7	66.0	69.2
Brannan Delancey Embarco	635	97	615.95	2	12.7	1	6.35	25	40	25	40	25	40	58.0	52.8	57.4	61.4
Bryant Rincon Embarco	701	97	680.29	2	14.03	1	7.013	25	40	25	40	25	40	58.4	53.2	57.9	61.8

Assumptions: Traffic data from Advant

OffSite Alternative Existing Weekday Late (9pm - 11pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)				
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT							
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	1,221	95	1160	3	36.63	2	24.42	30	48	30	48	30	48	63.0	58.6	64.0	67.2
Embarcad Brannan Townsnd	1,285	95	1220.8	3	38.55	2	25.7	30	48	30	48	30	48	63.2	58.8	64.2	67.4
Brannan Delancey Embarco	145	97	140.65	2	2.9	1	1.45	25	40	25	40	25	40	51.6	46.4	51.0	55.0
Bryant Rincon Embarco	227	97	220.19	2	4.54	1	2.27	25	40	25	40	25	40	53.5	48.3	53.0	56.9

Assumptions: Traffic data from Advant

OffSite Alternative Existing Weekday Late + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED					NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)				
		Auto	MT	HT	Auto k/h	MT k/h	HT k/h	Auto	MT	HT							
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	1,887	95	1792.2	3	56.6	2	37.73	30	48	30	48	30	48	64.9	60.5	65.9	69.1
Embarcad Brannan Townsnd	1,456	95	1383.5	3	43.69	2	29.13	30	48	30	48	30	48	63.8	59.4	64.8	68.0
Brannan Delancey Embarco	181	97	175.59	2	3.62	1	1.81	25	40	25	40	25	40	52.5	47.3	52.0	55.9
Bryant Rincon Embarco	214	97	207.87	2	4.286	1	2.143	25	40	25	40	25	40	53.3	48.1	52.7	56.7

Assumptions: Traffic data from Advant

OffSite Alternative Existing Saturday Evening (6pm - 8pm)

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)			
		Auto	MT	HT	Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT				
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	1,344	95	1276.8	3	40.32	2	26.88	30	48	30	48	30	48	63.4	59.0	64.4	67.6
Embarcad Brannan Townsnd	1,382	95	1312.9	3	41.46	2	27.64	30	48	30	48	30	48	63.6	59.2	64.5	67.7
Brannan Delancey Embarco	304	97	294.88	2	6.08	1	3.04	25	40	25	40	25	40	54.8	49.6	54.2	58.2
Bryant Rincon Embarco	299	97	290.03	2	5.98	1	2.99	25	40	25	40	25	40	54.7	49.5	54.2	58.1

Assumptions: Traffic data from Advant

OffSite Alternative Existing Saturday Evening + Basketball Game

ROAD SEGMENT	TOTAL # VEHICLES	VEHICLE TYPE %			VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from roadway center)			
		Auto	MT	HT	Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT				
Calveno Peak																	
from: to:		%	Auto	%	MT	%	HT										
Embarcad Harrison Bryant	1,513	95	1437	3	45.38	2	30.25	30	48	30	48	30	48	64.0	59.6	64.9	68.1
Embarcad Brannan Townsnd	1,763	95	1675.3	3	52.9	2	35.27	30	48	30	48	30	48	64.6	60.2	65.6	68.8
Brannan Delancey Embarco	440	97	427.28	2	8.81	1	4.405	25	40	25	40	25	40	56.4	51.2	55.8	59.8
Bryant Rincon Embarco	279	97	270.17	2	5.571	1	2.785	25	40	25	40	25	40	54.4	49.2	53.8	57.8

Assumptions: Traffic data from Advant

Calculated Ldn from long-term noise monitoring data

	TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/8/2014	Midnight 0 / 24	68.5	7079458	70794578	22387211
	am 1:00	100 67.5	5623413	56234133	17782794
	2:00	200 62.2	1659587	16595869	5248075
	3:00	300 58.6	724436	7244360	2290868
	4:00	400 62.5	1778279	17782794	5623413
	5:00	500 69.9	9772372	97723722	30902954
	6:00	600 71.4	13803843	138038426	43651583
	7:00	700 71.4	13803843	138038426	43651583
	8:00	800 71.9	15488166	154881662	48977882
	9:00	900 71.9	15488166	154881662	48977882
	10:00	1000 71.7	14791084	147910839	46773514
	11:00	1100 71.5	14125375	141253754	44668359
	12:00	1200 72.5	17782794	177827941	56234133
	pm 1:00	1300 72.5	17782794	177827941	56234133
	2:00	1400 71.5	14125375	141253754	44668359
	3:00	1500 71.9	15488166	154881662	48977882
	4:00	1600 71.1	12882496	128824955	40738028
	5:00	1700 71.1	12882496	128824955	40738028
	6:00	1800 70.6	11481536	114815362	36307805
	7:00	1900 69.2	8317638	83176377	26302680
	8:00	2000 69.4	8709636	87096359	27542287
	9:00	2100 67.9	6165950	61659500	19498446
	10:00	2200 67.8	6025596	60255959	19054607
	pm 11:00	2300 68.3	6760830	67608298	21379621

Leq Morning Peak Hour 7:00-10:00 a.m.

72 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.

71 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)

68 dBA

Leq Daytime 7:00 am-10:00 p.m.

71.2 dBA

Leq 24-Hour

70 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

75 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m., and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

75 dBA

CNEL - Ldn 0.2879454

Calculated Ldn from long-term noise monitoring data

	TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/9/2014	Midnight	0 / 24	68.0	6309573	19952623
	am 1:00	100	66.4	4365158	13803843
	2:00	200	61.9	1548817	4897788
	3:00	300	58.8	758578	2398833
	4:00	400	65.7	3715352	11748976
	5:00	500	67.8	6025596	19054607
	6:00	600	70.4	10964782	34673685
	7:00	700	71.2	13182567	41686938
10/7/2014	8:00	800	72.3	16982437	53703180
	9:00	900	73.4	21877616	69183097
	10:00	1000	72.0	15848932	50118723
	11:00	1100	71.6	14454398	45708819
	12:00	1200	71.0	12589254	39810717
	pm 1:00	1300	71.0	12589254	39810717
	2:00	1400	71.0	12589254	39810717
	3:00	1500	71.1	12882496	40738028
	4:00	1600	71.4	13803843	43651583
	5:00	1700	71.1	12882496	40738028
	6:00	1800	70.3	10715193	33884416
	7:00	1900	69.7	9332543	29512092
	8:00	2000	69.1	8128305	25703958
	9:00	2100	70.5	11220185	35481339
	10:00	2200	69.3	8511380	26915348
	pm 11:00	2300	70.2	10471285	33113112

Leq Morning Peak Hour 7:00-10:00 a.m.

72 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.

71 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)

68 dBA

Leq Daytime 7:00 am-10:00 p.m.

71 dBA

Leq 24-Hour

70 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

75 dBA

**CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
and 10 dBA penalty for noise between
10:00 p.m. and 7:00 a.m.**

75 dBA

CNEL - Ldn 0.35608783

Addition of Construction Noise Levels from Concurrent Phases

Event Center At Mission Bay

Receptor 1: Madrone Bayside Residential Towers			
	Excavation Phase	Compaction Phase	Pile Installation
Noise Source	63.8	64	67.7
Remove LOG	2398832.919	2511886.432	5888436.554
	63.8	64	67.7
Summation of Noise Sources	70.9		

Receptor 2: Agua Vista Pier			
	Excavation Phase	Compaction Phase	Pile Installation
Noise Source	71.5	71.7	75.4
Remove LOG	14125375.45	14791083.88	34673685.05
	71.5	71.7	75.4
Summation of Noise Sources	78.6		

Receptor 3: UCSF Mission Bay Housing			
	Excavation Phase	Compaction Phase	Pile Installation
Noise Source	69.9	70	73.8
Remove LOG	9772372.21	10000000	23988329.19
	69.9	70	73.8
Summation of Noise Sources	78.0		

Receptor 4: UCSF Hospital			
	Excavation Phase	Compaction Phase	Pile Installation
Noise Source	72.4	72.5	76.3
Remove LOG	17378008.29	17782794.1	42657951.88
	72.4	72.5	76.3
Summation of Noise Sources	80.1		

Shoring	Existing
61.6	70.1
1445439.771	10232930
61.6	

Shoring	Existing
69.2	60.3
8317637.711	1071519
69.2	

Shoring	Existing
67.6	71.2
5754399.373	13182567
67.6	

Shoring	Existing
70.1	71.6
10232929.92	14454398
70.1	

Addition of Construction Noise from Multiple Construction Activities

Note: Pile installation is assumed to occur at the nearest distance (200 feet for UCSF Housing and 560 feet for Hospital)
 All other activities are assumed to occur at a further 200 feet in distance
 No adjustment assumed for Madrone Tower

Receptor 1: Madrone Residential Towers				
Noise Source	Excavation	Compaction	Pile Installation	Shoring
Noise Level (RCNM)	63.8	64	67.7	61.6
Remove Logarithm	2398832.919	2511886.43	5888436.554	1445439.77
Logarithmic sum	70.87944449			

Receptor 2: UCSF Housing Tower				
Noise Source	Excavation	Compaction	Pile Installation	Shoring
Noise Level (RCNM)	69.9	69.7	79.8	67.6
Remove Logarithm	9772372.21	9332543.01	95499258.6	5754399.37
Logarithmic sum	80.80477031			

Receptor 3: UCSF Hospital				
Noise Source	Excavation	Compaction	Pile Installation	Shoring
Noise Level (RCNM)	64.3	64.1	70.8	62
Remove Logarithm	2691534.804	2570395.78	12022644.35	1584893.19
Logarithmic sum	72.75759659			

RCNM Output Compacti on
Roadway Constructi on Noise Model (RCNM), Versi on 1.1

Report date: 03/11/2015
Case Descripti on: Warri ors Arena Compacti on

**** Receptor #1 ****

Descripti on	Land Use	Daytime	Basel i nes (dBA)	
			Eveni ng	Ni ght
UCSF Housi ng	Resi denti al	71.0	71.0	68.0

Equi pment

Descripti on	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Di stance (feet)	Esti mated Shi el di ng (dBA)
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		200.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		200.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		200.0	0.0

Resul ts

Noi se Li mi t Exceedance (dBA)						Noi se Li mi ts (dBA)						
Eveni ng		Ni ght		Cal cul ated (dBA)		Day		Eveni ng		Ni ght		Day
Leq	Lmax	Leq	Lmax	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	78.0	71.0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	78.0	71.0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	78.0	71.0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	Total	N/A	78.0	75.7	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

RCNM Output Compacti on

Description	Land Use	Daytime	Basel ines (dBA)	
			Evening	Night
Madrone	Residential	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		800.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		800.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		800.0	0.0

Results

Noise Limit Exceedance (dBA)						Noise Limits (dBA)						
Evening		Night		Calculated (dBA)		Day		Evening		Night		Day
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	65.9	58.9	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	65.9	58.9	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	65.9	58.9	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	65.9	63.7	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Daytime	Basel ines (dBA)	
			Evening	Night
UCSF Hospital	Commercial	71.0	71.0	68.0

Equipment

Description	RCNM		Output	Compaction	Receptor Distance (feet)	Estimated Shielding (dBA)
	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)		
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		560.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		560.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.0		560.0	0.0

Results

Noise Limit Exceedance (dBA)					Noise Limits (dBA)							
Evening		Night		Calculated (dBA)		Day		Evening		Night		Day
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	Total	N/A	69.0	66.8	N/A	N/A	N/A	N/A	N/A

RCNM Output Construction
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 03/11/2015
Case Description: Warriors Arena Building Construction

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
UCSF Housing	Residential	71.0	71.0	68.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Gradall	No	40		83.4	200.0	0.0
Gradall	No	40		83.4	200.0	0.0
Gradall	No	40		83.4	200.0	0.0
Gradall	No	40		83.4	200.0	0.0
Pumps	No	50		80.9	200.0	0.0
Pumps	No	50		80.9	200.0	0.0
Tractor	No	40	84.0		200.0	0.0

Results

Limit Exceedance (dBA)		Noise Limits (dBA)			Noise	
Evening	Night	Calculated (dBA)	Day	Evening	Night	Day

Equipment		RCNM Output Construction											
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor			72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Gradal I			71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Gradal I			71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Gradal I			71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Gradal I			71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Pumps			68.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Pumps			68.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Tractor			72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
		Total	72.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										

**** Receptor #2 ****

Description	Land Use	Daytime	RCNM Output Construction	
			Baselines (dBA)	Evening
Madrone	Residential	71.0	71.0	68.0

Equipment						
Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Gradall	No	40		83.4	800.0	0.0
Gradall	No	40		83.4	800.0	0.0
Gradall	No	40		83.4	800.0	0.0
Gradall	No	40		83.4	800.0	0.0
Pumps	No	50		80.9	800.0	0.0
Pumps	No	50		80.9	800.0	0.0
Tractor	No	40	84.0		800.0	0.0

Results											
Limit Exceedance (dBA)				Noise Limits (dBA)						Noise	
Evening		Night		Day		Evening		Night		Day	
Equipment		Calculated (dBA)		Day		Evening		Night		Day	
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	N/A	N/A	59.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	RCNM Output Construction		
				Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Gradall	No	40		83.4	560.0	0.0
Gradall	No	40		83.4	560.0	0.0
Gradall	No	40		83.4	560.0	0.0
Gradall	No	40		83.4	560.0	0.0
Pumps	No	50		80.9	560.0	0.0
Pumps	No	50		80.9	560.0	0.0
Tractor	No	40	84.0		560.0	0.0

Results

Limit Exceedance (dBA)				Noise Limits (dBA)						Noise	
Evening		Night		Day		Evening		Night		Day	
Equipment		Calculated (dBA)		Day		Evening		Night		Day	
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	N/A	63.0	59.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RCNM Output Excavation
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 03/11/2015
Case Description: Warriors Arena Demo/Excavation

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
UCSF Housing	Residential	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Scraper	No	40		83.6	200.0	0.0
Scraper	No	40		83.6	200.0	0.0
Scraper	No	40		83.6	200.0	0.0
Dozer	No	40		81.7	200.0	0.0
Dozer	No	40		81.7	200.0	0.0
Dozer	No	40		81.7	200.0	0.0

Results

Exceedance (dBA)			Noise Limits (dBA)								Noise Limit		
			Calculated (dBA)				Day		Evening		Night		Day
Evening	Night		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Equipment	Leq	Lmax	Leq										
Vacuum Street Sweeper	N/A	N/A	N/A	69.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	N/A	N/A	N/A	69.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RCNM Output Excavation

N/A	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	71.5	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	Total	71.5	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
Madrone	Residential	71.0	71.0	68.0

Equipment

Description	Impact Devi ce	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Di stance (feet)	Estimated Shi el di ng (dBA)
Vacuum Street Sweeper	No	10		81.6	800.0	0.0
Vacuum Street Sweeper	No	10		81.6	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Scraper	No	40		83.6	800.0	0.0
Scraper	No	40		83.6	800.0	0.0
Scraper	No	40		83.6	800.0	0.0
Dozer	No	40		81.7	800.0	0.0
Dozer	No	40		81.7	800.0	0.0
Dozer	No	40		81.7	800.0	0.0

RCNM Output Excavation

Results

Noise Limits (dBA)

Noise Limit

Exceedance (dBA)

			Calculated (dBA)					Noise Limits (dBA)					Noise Limit	
			Evening		Night		Day		Evening		Night		Day	
Equipment			Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Leq	Lmax	Leq	-----											
Vacuum Street Sweeper	N/A	N/A	57.5	47.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	N/A	N/A	57.5	47.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	57.6	53.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	57.6	53.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	57.6	53.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	Total	59.5	63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
UCSF Hospital	Commercial	71.0	71.0	68.0

Equipment

RCNM Output Excavation

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	560.0	0.0
Vacuum Street Sweeper	No	10		81.6	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Scraper	No	40		83.6	560.0	0.0
Scraper	No	40		83.6	560.0	0.0
Scraper	No	40		83.6	560.0	0.0
Dozer	No	40		81.7	560.0	0.0
Dozer	No	40		81.7	560.0	0.0
Dozer	No	40		81.7	560.0	0.0

Results

Exceedance (dBA)			Noise Limits (dBA)								Noise Limit		
Calculated (dBA)			Day		Evening		Night		Day				
Equipment	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Vacuum Street Sweeper	N/A	N/A	60.6	50.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	N/A	N/A	60.6	50.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	62.6	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	62.6	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	N/A	N/A	62.6	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

			RCNM Output Excavation										
Dozer			60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A											
Dozer			60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A											
Dozer			60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A											
	Total		62.6	66.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A											

RCNM Output Pile Installation
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 03/11/2015
Case Description: Warriors Arena Pile Installation

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines Evening	(dBA) Night
UCSF Housing	Residential	71.0	71.0	68.0

Equipment

Description	Impact Devi ce	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Di stance (feet)	Esti mated Shi el di ng (dBA)
Auger Drill Rig	No	20		84.4	200.0	0.0
Auger Drill Rig	No	20		84.4	200.0	0.0
Auger Drill Rig	No	20		84.4	200.0	0.0
Auger Drill Rig	No	20		84.4	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
All Other Equipment > 5 HP	No	50	85.0		200.0	0.0
All Other Equipment > 5 HP	No	50	85.0		200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Concrete Saw	No	20		89.6	200.0	0.0
Concrete Saw	No	20		89.6	200.0	0.0
Concrete Saw	No	20		89.6	200.0	0.0
Concrete Saw	No	20		89.6	200.0	0.0

Results

Noise Limit Exceedance (dBA)				Noise Limits (dBA)							
Evening		Night		Day		Evening		Night		Day	
Calculated (dBA)		Calculated (dBA)		Calculated (dBA)		Calculated (dBA)		Calculated (dBA)		Calculated (dBA)	
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq

RCNM Output Pile Installation

Auger Drill Rig	Rig		72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Auger Drill Rig	Rig		72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Auger Drill Rig	Rig		72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Auger Drill Rig	Rig		72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Crane			68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
All Other Equipment	> 5 HP		73.0	69.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
All Other Equipment	> 5 HP		73.0	69.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Excavator			68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Concrete Saw			77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Concrete Saw			77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Concrete Saw			77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
Concrete Saw			77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										
		Total	77.5	79.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A										

**** Receptor #2 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Madrone	Residential	71.0	71.0	68.0

Equipment

RCNM Output Pile Installation

Descripti on	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	800.0	0.0
Auger Drill Rig	No	20		84.4	800.0	0.0
Auger Drill Rig	No	20		84.4	800.0	0.0
Auger Drill Rig	No	20		84.4	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
All Other Equipment > 5 HP	No	50	85.0		800.0	0.0
All Other Equipment > 5 HP	No	50	85.0		800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Concrete Saw	No	20		89.6	800.0	0.0
Concrete Saw	No	20		89.6	800.0	0.0
Concrete Saw	No	20		89.6	800.0	0.0
Concrete Saw	No	20		89.6	800.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Calculated (dBA)					Noise Limits (dBA)							
Evening		Night		Leq	Day		Evening		Night		Day	
Lmax	Leq	Lmax	Leq		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig			60.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig			60.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig			60.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane			56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane			56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RCNM Output Pile Installation

N/A	N/A	N/A	N/A	56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane				N/A									
N/A	N/A	N/A	N/A	56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane				N/A									
N/A	N/A	N/A	N/A	60.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment	> 5 HP			N/A									
N/A	N/A	N/A	N/A	60.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment	> 5 HP			N/A									
N/A	N/A	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator				N/A									
N/A	N/A	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator				N/A									
N/A	N/A	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator				N/A									
N/A	N/A	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator				N/A									
N/A	N/A	N/A	N/A	65.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw				N/A									
N/A	N/A	N/A	N/A	65.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw				N/A									
N/A	N/A	N/A	N/A	65.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw				N/A									
N/A	N/A	N/A	N/A	65.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw				N/A									
N/A	N/A	Total	N/A	65.5	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A									

**** Receptor #3 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
UCSF Hospital	Commercial	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20	84.4	560.0	0.0	
Auger Drill Rig	No	20	84.4	560.0	0.0	
Auger Drill Rig	No	20	84.4	560.0	0.0	
Crane	No	16	80.6	560.0	0.0	
Crane	No	16	80.6	560.0	0.0	
Crane	No	16	80.6	560.0	0.0	
Crane	No	16	80.6	560.0	0.0	

RCNM Output Pile Installation					
All Other Equipment > 5 HP	No	50	85.0	560.0	0.0
All Other Equipment > 5 HP	No	50	85.0	560.0	0.0
Excavator	No	40	80.7	560.0	0.0
Excavator	No	40	80.7	560.0	0.0
Excavator	No	40	80.7	560.0	0.0
Excavator	No	40	80.7	560.0	0.0
Concrete Saw	No	20	89.6	560.0	0.0
Concrete Saw	No	20	89.6	560.0	0.0
Concrete Saw	No	20	89.6	560.0	0.0
Concrete Saw	No	20	89.6	560.0	0.0

Results

Noise Limit Exceedance (dBA)						Noise Limits (dBA)							
Calculated (dBA)						Day		Evening		Night		Day	
Evening		Night											
Equipment	Lmax	Leq	Lmax	Leq	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	N/A	N/A	N/A	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	N/A	N/A	N/A	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RCNM Output Pile Installation												
Excavator			59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
Excavator			59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
Concrete Saw			68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
Concrete Saw			68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
Concrete Saw			68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
Concrete Saw			68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									
		Total	68.6	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A									

RCNM Output Shoring
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 03/11/2015
Case Description: Warriors Arena Pile Shoring

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
UCSF Housing	Residential	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	200.0	0.0
Auger Drill Rig	No	20		84.4	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Crane	No	16		80.6	200.0	0.0
Slurry Plant	No	100		78.0	200.0	0.0
Slurry Plant	No	100		78.0	200.0	0.0
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	200.0	0.0

Results

Exceedance (dBA)				Noise Limits (dBA)						Noise Limit			
Evening		Night		Calculated (dBA)		Day		Evening		Night		Day	
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	N/A	N/A	N/A	72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	N/A	72.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

				RCNM Output Shoring											
Crane	N/A	N/A	N/A	68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	N/A	66.0	66.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	N/A	66.0	66.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	Total	72.3	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A												

**** Receptor #2 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
Madrone	Residential	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	800.0	0.0
Auger Drill Rig	No	20		84.4	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Slurry Plant	No	100		78.0	800.0	0.0
Slurry Plant	No	100		78.0	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Excavator	No	40		80.7	800.0	0.0

Results

Exceedance (dBA)				Noise Limits (dBA)						Noise Limit			
Evening		Night		Day		Evening		Night		Day			
Calculated (dBA)				Day		Evening		Night		Day			
Equipment		Lmax		Leq		Lmax		Leq		Lmax		Leq	
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq

RCNM Output Shoring

			Daytime	Evening	Night	Baseline (dBA)			Receptor Distance (feet)			Estimated Shielding (dBA)		
Auger Drill Rig	N/A	N/A	60.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	60.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	56.5	48.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	53.9	53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	53.9	53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	56.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		N/A	60.3	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Daytime	Evening	Night
UCSF Hospital	Commercial	71.0	71.0	68.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	560.0	0.0
Auger Drill Rig	No	20		84.4	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Crane	No	16		80.6	560.0	0.0
Slurry Plant	No	100		78.0	560.0	0.0
Slurry Plant	No	100		78.0	560.0	0.0
Excavator	No	40		80.7	560.0	0.0
Excavator	No	40		80.7	560.0	0.0

Results

Exceedance (dBA)	Noise Limits (dBA)	Noise Limit
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RCNM Output Shoring

Evening		Night		Calculated (dBA)		Day		Evening		Night		Day	
Equipment				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Lmax	Leq	Lmax	Leq										
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	N/A	N/A	N/A	63.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	N/A	N/A	N/A	59.6	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	N/A	57.0	57.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slurry Plant	N/A	N/A	N/A	57.0	57.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	N/A	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	Total	63.4	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A										

APPENDIX AQ

Air Quality Supporting Information

Air Quality Appendix

1 Introduction

At the request of Environmental Science Associates (ESA), on behalf of the Golden State Warriors (GSW or Sponsor), ENVIRON International Corporation (ENVIRON) conducted a California Environmental Quality Act (CEQA) analysis of criteria air pollutants (CAPs) and precursor emissions associated with the proposed construction of a multi-purpose event center and ancillary development Mission Bay Blocks 29-32 in San Francisco, CA (“Project” or “Site”).¹ The analysis prepared by ENVIRON will be used to inform preparation of the Subsequent Environmental Impact Report (SEIR) on the project. This Air Quality Protocol describes the methodology used for evaluation of air quality impacts from construction and operational sources.

The proposed project is not located in an Air Pollution Exposure Zone (APEZ) as defined by the San Francisco Planning Department, Environmental Planning Division (SFEP). However, in the event that the proposed project could result in increased emissions over those assumed for prior approved development for the site in the Mission Bay Final Subsequent Environmental Impact Report (FSEIR), the project impacts could be substantial enough to create a new APEZ. Therefore, preparation of a construction health risk assessment (HRA) and operational HRA are included as part of the air quality impact analysis to demonstrate that the Project will not create an APEZ at nearby sensitive receptors.

1.1 Project Understanding

The proposed Project would be located at Blocks 29-32 of Mission Bay, as designated in the Mission Bay Redevelopment Area. The Mission Bay Redevelopment Area has a Final Supplemental Environmental Impact Report (FSEIR) from 1998.

Two alternatives to the project are also considered, as discussed below.

1.1.1 Proposed Project

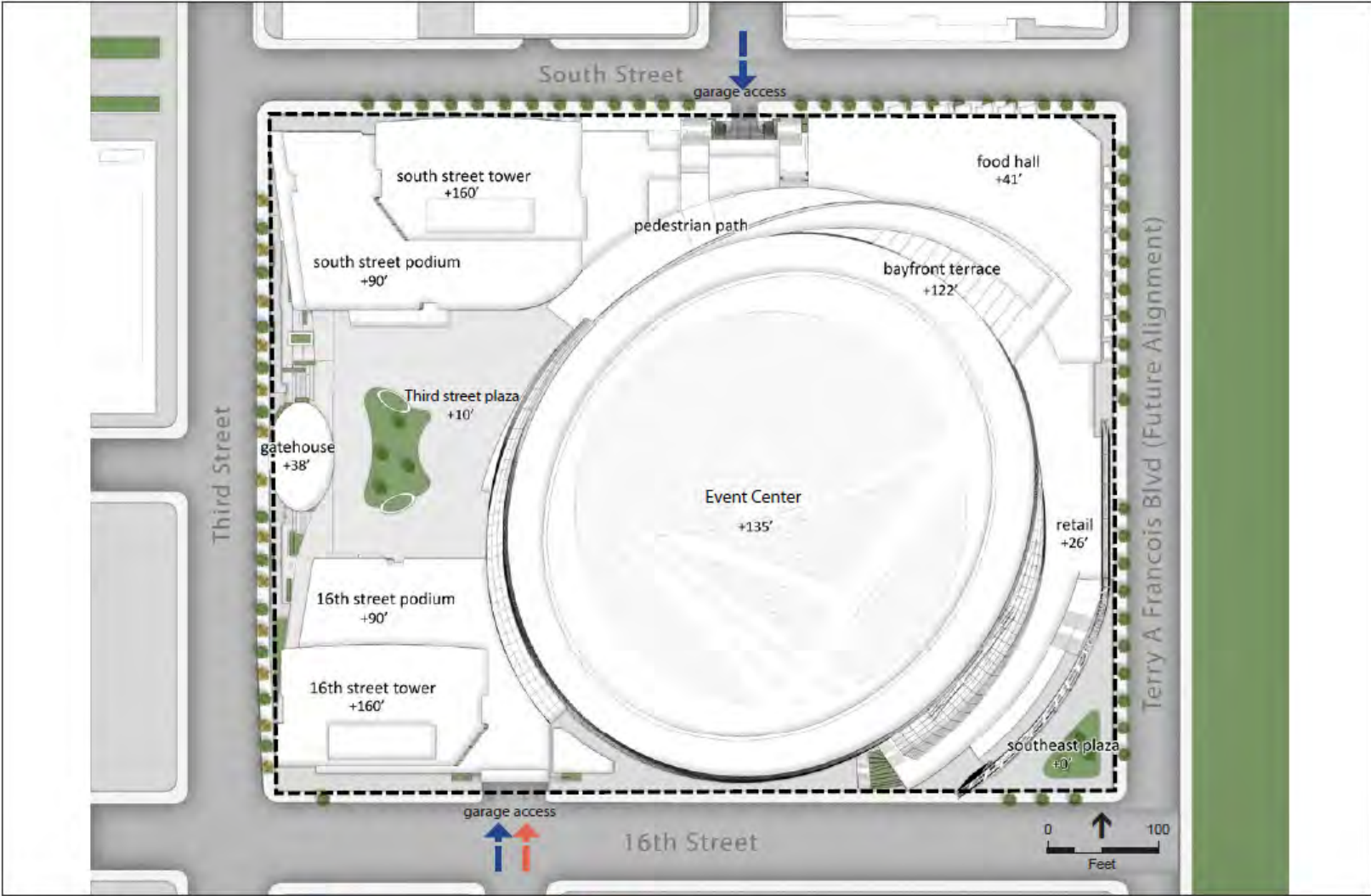
The Project would be located at Blocks 29-32 of Mission Bay within the Mission Bay Redevelopment Area of San Francisco. The rectangular site is bound by Third Street to the west, South Street to the north, Terry Francois Boulevard to the east, and 16th Street to the south. Blocks 29-32 are approximately 11 acres, which are currently vacant. Currently, there are residential land uses to the northwest and south of the proposed Project site, but none immediately adjacent to the site.

The GSW, the Project proponent, propose to create a new approximately 18,000-seat multi-purpose event center and ancillary development including multiple office buildings, retail, restaurants, structured parking, plaza areas, and other amenities. Based on data provided by the GSW, the Project build-out for Blocks 29-32 would include approximately 750,000 gross square feet (gsf) for a multi-use events center and 25,000 gsf for the GSW offices; 580,000 gsf of non-GSW office space; 475,000 gsf of parking (950 spaces); 125,000 gsf of retail space including sit-down restaurants, quick-service restaurants, and soft goods retail.² The privately

¹ A separate greenhouse gas inventory will be prepared using similar methods as part of an application for judicial streamlining under Public Resources Code 21178-21189.3.

² Notice of Preparation, Table 1. November 19, 2014.

Figure 1. Conceptual Design Site Plan



- Project Site Boundary
- ← Auto Access Location
- ← Truck Loading Access

financed events center would host the Bay Area's National Basketball Association (NBA) basketball team, the GSW, during the NBA season, as well as provide a year-round venue for a variety of other uses, including, but not limited to, concerts, cultural events, family shows, conferences, and conventions. The preliminary, conceptual layout is shown in Figure 1 of this Air Quality Protocol. The Project will also include new back-up engines.

Construction of the Project is anticipated to proceed with the offices and arena being built concurrently. The air quality analysis used the construction schedule and phases proposed by the Project Sponsor to estimate construction impacts.

1.1.2 Project Alternatives

The SEIR alternatives analysis included the No Project Alternative (the currently approved development on Blocks 29-32) and one other alternative, a reduced intensity project. These alternatives are analyzed qualitatively in this study.

Alternative A: No Project

- Under the first alternative, all aspects of the current operation at Oracle Arena in Oakland are retained.
- In Alternative A, the No Project Alternative, 1,056,000 square feet of office space would be constructed at the Project site instead of the proposed arena plus office buildings and other uses. As part of the 1998 Mission Bay Redevelopment Area SEIR, Blocks 29-32 are entitled for up to 1,056,000 square feet of office space. Alternative A also includes up to 31,700 gsf of retail use.
- ENVIRON evaluated construction and operation of Alternative A to an equal level of detail as the Project. ENVIRON modeled construction emissions using accepted methodologies such as modeling with California Emissions Estimator Model (CalEEMod[®]). Because there is no change at the Oracle Arena in Alternative A, the sole impacts come from the office and retail space at Blocks 29-32. As such, only the office and retail space is considered in the impacts analysis.

Alternative B: Reduced Intensity at Blocks 29-32

- Under Alternative B, Blocks 29-32 adjustments will be made to retail uses, office uses, and parking spaces at Blocks 29-32. All other aspects of the proposed Project will remain unchanged.
- From an air quality perspective, this Alternative is expected to have reduced impacts from those of the Project because of its reduced scope.

1.2 Objective

The purpose of the air quality analysis is to assess potential criteria pollutant emissions and ozone precursor emissions that would result from construction and operation of the proposed Project consistent with guidelines and methodologies from air quality agencies, specifically, the Bay Area Air Quality Management District (BAAQMD), the California Air Resources Board (ARB), and the US Environmental Protection Agency (USEPA).

Consistent with CEQA requirements, this Air Quality Analysis evaluates mass emissions of CAPs from both construction and operational activities (including traffic generated from the proposed Project). The scope of this Air Quality Analysis also includes a construction HRA and operational HRA to determine whether the Project contributes to cumulative effects at nearby receptors over the significance thresholds used by SFEP.

1.3 Project Methodology

Construction emissions associated with the Project would be from off-road construction equipment and on-road mobile sources. There would also be operational emissions associated with the Project from traffic-related sources and stationary sources such as boilers and five standby emergency generators. An equivalent level of detail was used in analyzing the Project and the Alternatives. To that extent, the “Project Methodology” discussed throughout this document applies to all Alternatives.

The City of San Francisco, in conjunction with the BAAQMD, has recently completed a City-wide HRA to evaluate cumulative cancer risks and fine particulate matter less than 2.5 micrometer in diameter (PM_{2.5}) concentrations from existing stationary and mobile sources. The construction HRA and operational HRA in this Air Quality Analysis was conducted to be consistent with the City-wide HRA.

1.3.1 Project Impacts

The following three sources of emissions were analyzed in the Project build-out year of 2018. For the construction years, ENVIRON assumed uncontrolled emissions based on the construction fleet statewide average for that year. For example, in 2015, the fleet-average emission factor for 2015 were used, and in 2016 the fleet-average emission factor for 2016 were used. Estimation of trip lengths relied on state survey data and season ticket holder addresses.

The three sources of emissions considered are:

1. Project construction (both without implementation of measures to reduce Project impacts and with such measures in place as per Section 5 of this Analysis);
2. Project stationary source emissions in the first Project operation year; and
3. Project traffic emissions in the first Project operation year.

2 Emissions Estimates

The methods used to estimate the emissions of CAPs and Toxic Air Contaminants (TACs) from the Project are described here. Because estimation techniques are different for construction and operation, they are discussed separately below.

2.1 Calculation Methodologies for Construction Emission Sources

Construction emission calculation methodologies cover off-road equipment, which is primarily diesel-fueled, on-road vehicles, and architectural coatings. Calculation methodologies for each type of emissions are explained separately. The methodology used to calculate emissions from each category is presented in Table 1: Emissions Calculations Methodology.

2.1.1 Off-road Diesel Equipment

Project-specific construction equipment inventories that include details on the type, quantity, construction schedule, and hours of operation anticipated for each piece of equipment for each construction phase were provided by the Sponsor. For the diesel-fueled equipment, ENVIRON used methodologies consistent with CalEEMod[®] to estimate emissions.³ Where Project-specific equipment information is not available, CalEEMod[®] default values were used. Load factors for each piece of equipment were based on the default load factor in ARB's 2011 Off-Road Equipment Model (OFFROAD2011).

2.1.2 On-road Haul Trucks and Delivery Trucks and Vans

On-road truck emissions were calculated using the total number of trucks provided by the Sponsor as part of the SEIR project description and emission factors from ARB's Emission FACTor model (EMFAC2011) model. For haul trucks, a 20-mile one-way trip length was used, based on CalEEMod[®] default truck trip lengths, and for vendor trucks a 7.3-mile trip length was used, based on the regional default vendor trip length from CalEEMod[®]. The emission factors for running emissions for criteria pollutants were generated with the last version of the EMFAC2011, released on September 30, 2011, and updated in January 2013. The model includes updated information on California's car and truck fleets and travel activity.

Emissions reported by the model were converted to units of grams of pollutant emitted per vehicle mile traveled (VMT) using the daily VMT for running emissions, or grams of pollutant emitted per trip for idling, starting, and evaporative emissions.

2.1.3 Construction Worker Commuting Vehicles

Worker commute trip emissions were included in the emissions inventory for construction. The number of trips by workers was estimated based on data received from ESA in coordination with the Sponsor with regard to construction phasing. ENVIRON used emission factors from EMFAC2011 and default construction worker trip lengths from CalEEMod[®] to estimate worker trip emissions.

³ <http://caleemod.com/>

**Table 1: Emissions Calculations Methodology
 GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
 San Francisco, California**

Type	Source	Methodology and Formula	Reference
Construction Equipment	Off-Road Equipment ¹	$E_c = \sum(EF_c * HP * LF * Hr * C)$	ARB/USEPA Engine Standards USEPA NONROAD
Construction and Operational On-Road Mobile Sources ²	Running Exhaust and Running Losses	$E_R = \sum(EF_R * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2011
	Starting Exhaust and Evaporative ROG	$E_S = \sum(EF_S * Trip\ Number * C)$	EMFAC2011
	Idling Exhaust	$E_I = \sum(EF_I * Trip\ Number * T_I * C)$	EMFAC2011
Operational On-Road Mobile Sources	Fugitive Road Dust from Paved Roads ³	$E_{ext} = [k * (sL)^{0.91} * (W)^{1.02}] * (1 - P/4N)$	USEPA 2011
Operation	Generator ⁴	$E = EF * HP * Hr$	ARB/USEPA Off-Road Engine Standards

Notes:

1. E_c : off-road equipment exhaust emissions (lb).

2. On-road mobile sources include all diesel truck trips

E_R : running exhaust and running losses emissions (lb).

E_S : vehicle starting exhaust and evaporative ROG emissions (lb).

E_I : vehicle idling emissions (lb).

EF: vehicle idling emission factor (g/hr-trip). From EMFAC2011.

T_I : idling time

C: unit conversion factor.

3. E_{ext} : annual or other long-term average emission factor (lb/VMT).

k: particle size multiplier for particle size range (lb/VMT); sL: road surface silt loading (g/m²); W: average weight (tons) of all the vehicles traveling the road; P: number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period; N: number of days in the averaging period (365 for annual).

4. E: generator engine emissions

EF: compression-ignition (diesel) engine emission factor. ARB/USEPA engine PM standard based on engine tier will be used.

HP: generator horsepower; Hr: generator hours. Assume 50 hours of operation annually as a conservative assumption.

Other Abbreviations:

ARB: California Air Resources Board; BAAQMD: Bay Area Air Quality Management District;; EF: Emission Factor; EMFAC: Emission Factor Model EP: Environmental Planning; g: gram; HP: Horsepower; lb: pound; LF: Load Factor; mi: mile; USEPA: United States Environmental Protection Agency; VMT: vehicle miles traveled

References:

ARB/USEPA. 2013. Table 1: ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls

ARB. 2011. Emission FACTors Model, 2011 (EMFAC2011).

USEPA. 2011. AP 42, Volume I, Fifth Edition. §13.2.1. Paved Roads. Available online at: <http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0201.pdf>

2.1.4 Architectural Coating and Consumer Products Emissions

ENVIRON used CalEEMod[®] to estimate reactive organic gas (ROG) emissions from architectural coating. Compliance with BAAQMD regulations restricting the volatile organic compound (VOC) content of commercial paints was assumed. ENVIRON used the San Francisco-specific area source emission factors developed by SFEP for ROG from consumer products which is 1.51E-05 lb/ROG/sqft/day.

2.1.5 Summary of Project Construction Criteria Pollutant Emissions

CAPs from Project construction phases were added and then normalized over the number of days in the construction period.

2.2 Calculation Methodologies for Operational Emission Sources

Operational emission calculation methodologies are divided into stationary, area, and mobile sources. For each category, emissions are estimated based on data from the Project Sponsor. The methodology used to calculate operational emissions from each category is presented in Table 1: Emissions Calculations Methodology.

2.2.1 Stationary Sources

The proposed Project will include new natural gas-fired boilers and five diesel back-up engines. Emissions were calculated based on information provided by the Project Sponsor and assume Tier 4 ARB and USEPA off-road diesel engine standards (ARB 2013). It should be noted that these stationary sources will be permitted with the BAAQMD and all sources are expected to comply with applicable Best Available Control Technology (BACT) and Best Available Control Technology for Toxics (TBACT) requirements.

2.2.2 Area Sources

The proposed Project includes area sources such architectural coatings, landscape equipment, and consumer products use. These emissions were estimated using CalEEMod[®], based on the type and size of land uses associated with the Project. ENVIRON used San Francisco-specific area source emission factors developed by SFEP for ROG from consumer products.

2.2.3 Mobile Sources

The proposed Project would generate vehicle trips, which were provided by SEIR transportation analysts in coordination with ESA. Project traffic was evaluated using EMFAC2011 for the vehicle fleet mix in the San Francisco Bay Area. Additionally, Project-specific types of traffic such as delivery trucks were evaluated using vehicle-type specific emission factors from EMFAC2011, based on Project-specific traffic data as provided by ESA in coordination with the Sponsor. Fugitive road dust emissions are estimated using methodologies consistent with CalEEMod[®]. The methodologies used to calculate operational mobile emissions can be found in Table 1: Emissions Calculations Methodology.

3 Health Risk Assessment

3.1 Introduction

The objective of the HRA is to evaluate the potential impacts of construction and operation of the Project on off-site receptors in the Mission Bay neighborhood of San Francisco. The criterion for whether or not the Project presents a significant air quality impact under the CEQA is if the Project will “expose sensitive receptors to substantial pollutant concentrations,” from Appendix G of the CEQA Guidelines.⁴ To evaluate impacts in San Francisco, SFEP requires an HRA for an Environmental Impact Report (EIR) if a project is within an APEZ,⁵ defined as an area in which modeled air pollution exceeds “either: (1) a cancer risk of greater than 100 per one million exposed, and/or (2) PM_{2.5} concentrations in excess of 10 microgram per cubic meter (µg/m³) (including ambient).”⁶

The Project is not in an APEZ, based on air dispersion modeling performed by the San Francisco Department of Public Health in conjunction with SFEP and the BAAQMD.⁷ The Project is not bounded by an APEZ, either, with the nearest APEZ falling over the University of California, San Francisco (UCSF) Mission Bay campus, to the west of the Project. The parcels immediately surrounding the Project have average excess cancer risks below 50 in one million persons, with lower risks to the east of Third Street. The nearest residential parcel is the UCSF dormitory to the northwest of the Project; risks at this parcel are below 26 in one million, although the average period of residence in the dormitory is less than the 70 years assumed in excess cancer risk calculations. Another sensitive receptor is located at the UCSF Medical Center at Mission Bay to the southwest of the Project; risks at this parcel are below 45 in one million, but again the average period of residence is less than 70 years. At the dormitory, background PM_{2.5} concentration from the City-wide modeling is 8.5 µg/m³. At the UCSF Medical Center, background PM_{2.5} concentration is 8.6 µg/m³.

Since the Project is not in an APEZ, the subsequent criterion of significance is whether or not the Project will create an APEZ. The Project’s excess cancer risk and PM_{2.5} contribution is evaluated for contributions from two schemes, construction and operation. A lifetime cumulative risk and annual average PM_{2.5} concentration including both construction and operation is considered and compared against the APEZ thresholds. Annual average PM_{2.5} concentration

⁴ Appendix G to the CEQA Guidelines, California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.

⁵ San Francisco Planning Department, Environmental Planning. AQ Interim Standard Language – Negative Declarations and Environmental Impact Reports.

⁶ Department of Public Health, Environmental Health, City and County of San Francisco. 2014. Memorandum to file Re 2014 Air Pollutant Exposure Zone Map. April 9.

⁷ See Air Pollutant Exposure Zone map (<http://www.sfdph.org/dph/files/EHSdocs/AirQuality/AirPollutantExposureZoneMap.pdf>) and DPH website (<http://www.sfdph.org/dph/eh/Air/Article38.asp>).

For parcel-specific information, see the Zoning designation for Mission Bay South Redevelopment Plan Blocks 29-32; Assessor’s Block 8722, Lots 001 and 008. This is the parcel bounded by South Street on the north, Third Street on the west, 16th Street on the south, and roughly by the future planned realigned Terry A. Francois Boulevard on the east.

The Project is not in a “health vulnerability layer” as defined in the 2014 Air Pollutant Exposure Zone Map memorandum, either, as it is not in the affected zip codes or within 500 feet of a freeway.

during both construction and after operation of the Project as considered individually and compared against the APEZ thresholds.

To show that the Project will not create an APEZ at nearby residential or sensitive receptors, ENVIRON performed a construction HRA using the USEPA AERMOD model⁸ and performed an operational HRA using the BAAQMD screening tools and the USEPA SCREEN3 model.⁹

Many elements of the HRA are designed to provide conservative (that is, health protective) overestimates of impacts to off-site receptors. For residential receptors, the assumption of 24 hours per day of exposure represents a maximum exposure, since based on USEPA activity studies people spend on average 58 to 82% of their time at home, depending on age group (USEPA 2011). In addition, indoor air concentrations are not the same as outdoor air concentrations, however this analysis assumes that there is no filtration or attenuation in the indoor air. Other conservative assumptions made here include the use of BAAQMD screening tables for on-road traffic and the maximum generator risk of 30 in one million, assuming the generators are permitted as three separate projects. The BAAQMD HRA guidelines are also designed to be protective of human health, for example relying on the 80th percentile breathing rate for adults rather than the average and the upper 95th percentile breathing rate for children rather than the average (BAAQMD 2010).

3.2 Estimated Air Concentrations for Construction HRA

Consistent with the City-wide HRA, the air toxics analysis evaluated health risks and PM_{2.5} concentrations resulting from the Project upon the surrounding community. Project construction is planned for a 27-month period starting in late 2015. The Project Sponsor provided ENVIRON with the proposed construction off-road equipment list, count, and activity; and on-road vehicle traffic. ARB tools and methods were used to estimate emissions of diesel particulate matter (DPM) and other TACs from the off- and on-road equipment list.

3.2.1 Chemical Selection

The cancer risk analysis in the construction HRA is based on DPM concentrations and total organic gases (TOGs) from diesel equipment and on-road vehicles. Diesel exhaust, a complex mixture that includes hundreds of individual constituents (California Environmental Protection Agency [Cal/EPA] 1998), is identified by the State of California as a known carcinogen (Cal/EPA 2014). Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole (Cal/EPA 2014). Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole because the identity of all chemicals in the mixture may not be known or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that “potential cancer risk from inhalation exposure to whole diesel exhaust will exceed the multi-

⁸ Available at http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod.

⁹ Available at http://www.epa.gov/ttn/scram/dispersion_screening.htm.

pathway cancer risk from the speciated components (Cal/EPA 2003).” The analysis of DPM for this Project is based on the surrogate approach, as recommended by Cal/EPA.

3.2.2 Project Sources

Near-field air dispersion modeling of DPM and PM_{2.5} from Project construction sources was conducted using the USEPA AERMOD model.¹⁰ For each receptor location, the model generates average air concentrations that result from emissions from multiple sources.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological parameters, topography information, and receptor parameters. When site-specific information was unknown, ENVIRON used default parameter sets that are designed to produce conservative (i.e., overestimated) air concentrations.

3.2.3 Meteorological Data

Air dispersion modeling applications require the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. For this HRA, BAAQMD’s Mission Bay meteorological data for the year 2008 was used, which aligns with the San Francisco City-wide HRA Methodology (BAAQMD 2012).

3.2.4 Terrain Considerations

Elevation and land use data was imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey (USGS 2013). An important consideration in an air dispersion modeling analysis is the selection of whether or not to model an urban area. Due to the urban nature of San Francisco, the site was modeled with the urban population of 805,235, corresponding to the 2010 US Census.

3.2.5 Emission Rates

Emitting activities were modeled to reflect the actual hours of construction. Emissions were modeled using the χ/Q (“chi over q”) method, such that each phase has unit emission rates (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of [$\mu\text{g}/\text{m}^3$]/[g/s]).

For annual average ambient air concentrations, the estimated annual average dispersion factors are multiplied by the annual average emission rates. The emission rates will vary day to day, with some days having no emissions. For simplicity, the model assumed a constant emission rate during the entire year.

In the construction model, modeled meteorological hours of the day are restricted to 7:00 am to 1:00 pm, the likely hours for emissions to occur. This way, only representative meteorological data was considered in determining the dispersion factors. Emission rates are adjusted such that on average, unit emission rates are modeled, i.e. 1 g/s for 24 hours a day, 7 days a week. Thus, the model provides an annual average concentration that can be incorporated directly into the health risk calculations assuming 24 hours of daily exposure.

¹⁰ On November 9, 2005, the USEPA promulgated final revisions to the federal Guideline on Air Quality Models, in which it recommended that AERMOD be used for dispersion modeling evaluations of criteria air pollutant and toxic air pollutant emissions from typical industrial facilities.

3.2.6 Source Parameters

Source location and parameters are necessary to model the dispersion of air emissions. The duration of construction on Blocks 29-32 is anticipated to be up to 27 months, with arena and office building construction proceeding concurrently. At any given time there will be multiple emissions sources associated with construction equipment within the construction zone.

Table 2: Modeling Parameters summarizes the source parameters associated with the construction HRA. The construction area was modeled as an Area source encompassing the entire Project site, following City-wide HRA Methodology. The Area source model included emissions from both off-road construction equipment and off-site trucks (trucks going to and from construction zones¹¹). A release height of 5 meters was used, with an initial vertical dimension of 1.4 meters. Emissions were distributed uniformly throughout the area source representing construction of that phase.

**Table 2: Modeling Parameters
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California**

Period	Source	Source Dimension	Number of Sources ^{1,2}	Release Height ³	Initial Vertical Dimension ⁴	Initial Lateral Dimension
		[m]		[m]	[m]	[m]
Construction	Construction Equipment and On-Road Trucks	Project Area	2	5.0	1.4	N/A

Notes:

1. Due to lack of specific instructions on modeling of construction emissions from BAAQMD, ENVIRON used methodology from the City-wide HRA when setting up the model. According to the City-wide HRA methodology, construction sources are modeled as area sources.
2. The number of sources is to be determined based on the geometry of the truck routes.
3. According to the City-wide HRA methodology, release height of the modeled construction was set to 5 meters
4. According to the City-wide HRA methodology, initial vertical dimension of the modeled construction sources was set to 1.4 meters.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HRA: Health Risk Assessment
K: Kelvin
m: meter
s: second

Reference:

BAAQMD, 2012. *The San Francisco Community Risk Reduction Plan: Technical Support Documentation, V9.*

¹¹ ENVIRON assumed a 20 mile one-way trip length for Construction Hauling, based on CalEEModTM default values, if Project-specific data is not available.

3.2.7 Receptors

Offsite receptors were placed at locations collocated with the grid receptors used in the City-wide HRA and within 2,000 feet of the Project site. Receptors were modeled at a height of 1.8 meters above terrain height, a default breathing height for ground-floor receptors, consistent with the City-wide HRA analysis. As discussed previously, average annual dispersion factors were estimated for each receptor location.

3.2.8 Modeling Adjustment Factors

Cal/EPA (2003) recommends applying an adjustment factor to the annual average concentration modeled assuming continuous emissions (i.e., 24 hours per day, 7 days per week), when the actual emissions are less than 24 hours per day and exposures are concurrent with construction activities occurring at the Project.

Off-site residents are assumed to be exposed to construction emissions 24 hours per day, seven days per week. This assumption is consistent with the modeled emission rates (24 hours per day, 7 days per week), even though actual construction operations may occur for fewer than 24 hours per day and fewer than 7 days per week. Thus, the annual average concentration need not be adjusted. This approach simplifies the model set up, yet does not underestimate exposure since ENVIRON is evaluating chronic health risk impacts and follows City-wide HRA Methodology.

3.3 Risk Characterization Methods for Construction HRA

The following sections discuss in detail the various components required to conduct the HRA.

3.3.1 Exposure Assessment

3.3.1.1 Potentially Exposed Populations

The Construction HRA conservatively evaluated impacts at the off-site receptors assuming child residents.¹² As the residential exposure assumptions are more conservative than those for other sensitive receptor types, a conservative approach of considering all receptors as residential receptors was used. In addition, for the purposes of the cumulative APEZ analysis, the HRA also evaluated impacts at the UCSF Medical Center at Mission Bay assuming a child receptor. The impacts at the hospital consider outdoor air concentrations only, although indoor air at hospitals is filtered to lower indoor air particulate matter concentrations versus outdoor air.

3.3.1.2 Exposure Assumptions

The exposure parameters used to estimate excess lifetime cancer risks for all potentially exposed populations for the construction and operation scenarios are based on risk assessment guidelines from Cal/EPA (2003) and BAAQMD (2010), unless otherwise noted, and are presented in Table 3: Exposure Parameters.

¹² As Child Resident exposure assumptions are more conservative than those for Adult Residents, a conservative approach of considering all off-site receptors as Child Residents during Construction scenario is used in this HRA.

**Table 3: Exposure Parameters
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California**

Exposure Parameter	Units	Construction	
		Child Resident	Hospital Child
Daily Breathing Rate (DBR) ¹	[L/kg-day]	581	581
Exposure Time (ET) ²	[hours/24 hours]	24	24
Exposure Frequency (EF) ³	[days/year]	350	365
Exposure Duration (ED) ⁴	[years]	2	1
Averaging Time (AT)	[days]	25,550	25,550
Intake Factor, Inhalation (IF _{inh})	[m ³ /kg-day]	0.016	0.0083

Notes:

1. Daily breathing rate for child resident reflects default breathing rate from BAAQMD 2010.
2. Exposure time for child resident reflects default exposure time from BAAQMD 2010.
3. Exposure frequency for child resident reflects default exposure frequency from BAAQMD 2010.
- 4 The exposure duration was assumed to be 2 years for child resident reflecting the actual construction duration. Exposure time was conservatively assumed to be 1 year for hospital child.

Abbreviations:

BAAQMD = Bay Area Air Quality Management District; L = liter; kg = kilogram; m³ = cubic meter

Reference:

BAAQMD. 2010. Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.

3.3.1.3 Calculation of Intake

The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, can be calculated as follows:

$$IF_{inh} = \frac{DBR * ET * EF * ED * CF}{AT}$$

Where:

- IF_{inh} = Intake Factor for Inhalation (m³/kg-day)
- DBR = Daily Breathing Rate (L/kg-day)
- ET = Exposure Time (hours/24 hours)
- EF = Exposure Frequency (days/year)
- ED = Exposure Duration (years)
- AT = Averaging Time (days)
- CF = Conversion Factor, 0.001 (m³/L)

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in Office of Environmental Health Hazard Assessment (OEHHA) Hot Spots guidance (Cal/EPA 2003).

3.3.2 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure.

Following City-wide HRA Methodology for cancer risk calculations, ENVIRON included toxicity for DPM for all source categories, and additionally included organic gases from on-road gasoline-powered vehicles. Toxicity values are summarized in Table 4: Carcinogenic Toxicity Values.

**Table 4: Carcinogenic Toxicity Values
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California**

Source	Analysis	Chemical	Cancer Potency Factor
			[mg/kg-day] ⁻¹
Construction Diesel Vehicles	Cancer Risk	Diesel PM	1.1
Construction Gasoline Vehicles	Cancer Risk	1,3-Butadiene	0.6
		Acetaldehyde	0.01
		Benzene	0.1
		Ethylbenzene	0.0087
		Formaldehyde	0.021
		Naphthalene	0.12

Abbreviations:

ARB: Air Resources Board; Cal/EPA: California Environmental Protection Agency; mg/kg-day: per milligram per kilogram-day; OEHHA - Office of Environmental Health Hazard Assessment; PM: Particulate Matter

Reference:

Cal/EPA. 2014. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. July.

3.3.3 Calculated Age-Specific Sensitivity Factors

The estimated excess lifetime cancer risks for a resident child were adjusted using the age sensitivity factors (ASFs) recommended in the Cal/EPA OEHHA Technical Support Document (TSD) (2009) and the cancer risk adjustment factors (CRAFs) recommended by BAAQMD (2010). This approach accounts for an “anticipated special sensitivity to carcinogens” of infants and children. Cancer risk estimates are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 to 70 years.

3.3.4 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific Cancer Potency Factor (CPF).

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$\text{Risk}_{\text{inh}} = C_i \times CF \times IF_{\text{inh}} \times CPF \times ASF$$

Where:

Risk _{inh}	=	Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)
C _i	=	Annual Average Air Concentration for Chemical _i (µg/m ³)
CF	=	Conversion Factor (mg/µg)
IF _{inh}	=	Intake Factor for Inhalation (m ³ /kg-day)
CPF _i	=	Cancer Potency Factor for Chemical _i (mg chemical/kg body weight-day) ⁻¹
ASF	=	Age Sensitivity Factor (unitless)

3.4 Operational Traffic Screening

BAAQMD on-road traffic tools were used along with Project-specific data to estimate PM_{2.5} and health-risk impacts from on-road traffic. The BAAQMD San Francisco County Surface Street Screening Tables¹³ provide screening risk estimates for this level of traffic for north-south roadways and east-west roadways in San Francisco County. All traffic generated by the Project was assumed to travel along the four segments surrounding the Project Site, resulting in a conservative estimate of impacts from mobile sources, as all Project traffic may not take these routes.

3.5 Operational Stationary Sources

The Project will include new natural gas-fired boilers to provide heating to the proposed arena. According to the BAAQMD,¹⁴ non-diesel boilers are regarded as minor, low-impact sources that can be excluded from the CEQA process. The Project will also include 5 stationary emergency diesel engines which will require stationary source permits from the BAAQMD. BAAQMD Rule 2-5-302 limits project risks to 10 in one million, so for screening purposes incremental risk from the generators is assumed to be 10 in one million. In the worst case, the generators might have up to 3 different owners, resulting in 3 permits with risks of up to 10 in one million each, for a total potential generator risk of 30 in one million.

PM_{2.5} impacts were modeled using the USEPA SCREEN3 model. SCREEN3 is a Gaussian air dispersion model that uses a worst-case, not site-specific, meteorological dataset to estimate maximum impacts.

¹³ BAAQMD. 2011. Roadway Screening Analysis Tables. December. Available online at : <http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en>

¹⁴ BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. Available online at : <http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

4 Measures to Reduce Project Impacts

Based on the analysis above, a consultation was conducted with OCII, EP, ESA, and the Project sponsor to identify and develop feasible control measures that would reduce Project impacts. For construction emissions two compliance levels of emissions control measures were assessed: use of construction equipment with EPA Tier 2 engines with Level 3 Verifiable Diesel Emission Control Strategy (VDECS) and EPA Tier 4 engines. While use of equipment with Tier 4 would be the most effective emissions control strategy, the analysis also considers a minimum compliance scenario using use of equipment with EPA Tier 2 engines with Level 3 VDECS, acknowledging that there may be instances where a particular piece of off-road equipment with a Tier 4 engine is: (1) technically not feasible, (2) would not produce desired emissions reductions due to expected operating modes, or (3) there is a compelling emergency need to use off-road equipment that do not have Tier 4 engines.

5 References

- Bay Area Air Quality Management District (BAAQMD). 2010. Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January. Available online at: http://www.baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx.
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- California Air Resources Board (ARB). 2013. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Std.xls.
- California Environmental Protection Agency (Cal/EPA). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting. Available online at: <http://www.arb.ca.gov/toxics/dieseltac/de-fnds.htm>.
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- Cal/EPA. 2014. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. July. Available online at: <http://www.arb.ca.gov/toxics/healthval/contable.pdf>.
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6 Results

Project Tables

Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Off-road Equipment Emissions	13	175	7.1	7.1
Truck and Vehicle emissions	14.6	70	1.45	1.34
Architectural Coating Emissions	39	0	0	0
Totala	66	246	8.6	8.5

Controlled Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
With Tier 4 Off-road Equipment				
Off-road Equipment Emissions	2.5	22	0.37	0.37
Truck and Vehicle emissions	14.6	70	1.45	1.34
Architectural Coating Emissions	39	0	0	0
Totala	56	93	1.8	1.7
With Tier 2 + ARB NOx VDECS Off-road Equipment				
Off-road Equipment Emissions	0.52	93	0.59	0.59
Truck and Vehicle emissions	14.6	70	1.45	1.34
Architectural Coating Emissions	39	0	0	0
Totala	54.2	164	2.0	1.9

Average Daily and Maximum Annual Operational Emissions

	Average Daily Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile (Project - GSW Trips)	42	108	77	22
Standby Diesel Generators	0.30	0.97	0.04	0.04
Boilers	2.1	14	2.9	2.9
Area Sources	35	<0.01	<0.01	<0.01
Total (Project - GSW Trips)	79	124	80	25
	Maximum Annual Emissions (short tons/year)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile (Project - GSW Trips)	7.6	20	14	4.0
Standby Diesel generators	0.055	0.18	0.0072	0.0072
Boilers	0.38	2.6	0.52	0.52
Area Sources	6.4	<0.01	<0.01	<0.01
Total (Project - GSW Trips)	14.4	23	14.6	4.5

Lifetime Excess Cancer Risk at off-site Receptors

Source	Excess Cancer Risk (in one million)			
	UCSF Hearst Tower		UCSF Hospital Receptor	Uber/ARE Receptor
	Child Resident	Adult Resident	Child Resident	Daycare Child
Background at the maximally impacted receptor	26	26	44	20
Uncontrolled Construction Contribution	54	2.8	28	73
Controlled (Tier 2 + NOx VDECS) Construction Contribution	9.2	0.48	4.8	12.5
Project Operations – Generators	30	30	30	30
Project Operations – Mobile Sources	7.2	7.2	7.2	7.2
Cumulative Total (Uncontrolled/with Mitigation)	117/ 72	66/ 64	109/ 86	131/ 70
Significance Threshold	100	100	100	100
Significant (Uncontrolled/with Mitigation)?	Yes/ No	No/ No	Yes/ No	Yes/ No

NOTE: The cumulative total risks may not sum precisely due to rounding of subtotals.

Annual Average PM_{2.5} Concentrations at off-site Receptors

Source	PM _{2.5} Concentration (µg/m ³ , Annual Average)		
	UCSF Hearst Tower Receptor	UCSF Hospital Receptor	Uber/ARE Receptor
Construction			
Background at the maximally impacted receptor	8.5	8.6	8.4
Uncontrolled Construction Contribution	0.31	0.31	1.2
Controlled (Tier 2 + NOx VDECS) Construction Contribution	0.053	0.053	0.21
Cumulative Total (Uncontrolled/with Mitigation)	8.8/ 8.5	8.9/ 8.7	9.6/ 8.6
Significance Threshold	10	10	10
Significant?	No	No	No
Operation			
Background at the maximally impacted receptor	8.5	8.6	8.4
Project Operations – Generators	0.055	0.055	0.055
Project Operations – Mobile Sources	0.32	0.32	0.32
Cumulative Total (Project, Uncontrolled)	8.9	9.0	8.7
Significance Threshold	10	10	10
Significant?	No	No	No

NOTE: The cumulative total concentrations may not sum precisely due to rounding of subtotals.

Table 6.1-1
Toxicity-Weighted Construction Emissions
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Uncontrolled Project Emissions³ (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ⁴	3.0E-04	4,112	1.2	99.8%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions ²	1.81E-06	1,263	0.0023	0.18%
TACs from Speciated Gasoline TOG due to Evaporative Losses ²	1.07E-07	1,861	0.0002	0.02%

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Controlled Tier 4 Project Emissions³ (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ⁴	3.0E-04	586	0.18	98.6%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions ²	1.81E-06	1,263	0.0023	1.3%
TACs from Speciated Gasoline TOG Evaporative Losses ²	1.07E-07	1,861	0.0002	0.1%

Notes:

1. From Cal/EPA 2013.
2. From BAAQMD 2012.
3. Emissions estimates are subject to change before publication of draft Environmental Impact Report.
4. Includes DPM emissions from off-road equipment and on-road sources. Emissions in the controlled scenario reflect the use of Tier 4 off-road equipment.

Abbreviations:

PM: particulate matter
lb: pound
g: gram
s: second
TOG: Total Organic Gas
µg: microgram

References:

Bay Area Air Quality Management District (BAAQMD). 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.
<http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Table 6.1-2
Construction Particulate Matter Emissions
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Emissions	Units	Uncontrolled Scenario	Controlled Tier 4 Scenario	Controlled Tier 2 + ARB NOx VDECS Scenario
Project construction PM _{2.5} emissions ¹	[lb/project]	4,118	592	706
Project construction DPM emissions ¹	[lb/project]	4,112	586	701
Construction duration	[years]	2	2	2
Annual DPM emissions	[lb/year]	2,056	293	350.25
Average PM _{2.5} emissions	[g/s]	0.030	0.004	0.005
Average DPM emissions	[g/s]	0.030	0.004	0.005

Notes:

1. Includes emissions from off-road equipment and on-road sources. Emissions in the controlled scenario reflect the use of Tier 4 or Tier 2 + ARB NOx VDECS off-road equipment.

Abbreviations:

DPM: Diesel particulate matter

lb: pound

g: gram

s: second

Table 6.1-3
Annual Average Daily Traffic from Project Operation
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Trip Type	Scenario	Days Per Year	Daily One-way Vehicle Trips¹
Mission Bay, Weekday Trips	Basketball Event Days	30	13,691
	Concert Event Days ²	45	13,691
	Convention Event Days	61	9,023
	No Event Days	125	6,990
Mission Bay, Weekend Trips	Basketball Event Days	30	12,330
	Concert Event Days ²	55	12,330
	No Event Days	19	5,877
Annual One-way Vehicle Trips:			3,610,691
Annual Average Daily Traffic (AADT):			9,892

Notes:

1. Based on preliminary traffic data from Adavant Consulting.
2. Trips conservatively assumed to be equal to basketball event days.

Table 6.1-4
Screening PM_{2.5} Concentrations and Cancer Risks from Operational Traffic
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Impact ¹	North-South Roadway Impact	East-West Roadway Impact	Total Impact from 4 Adjacent Roadways
PM _{2.5} Concentration (ug/m ³)	0.080	0.078	0.32
Lifetime Cancer Risk (in a million)	2.2	1.4	7.2

Notes:

1. Based on BAAQMD County Surface Street Screening Tables for San Francisco County. A distance of 10 feet from the roadway is conservatively assumed and impacts are interpolated for estimated traffic volume.

References:

Bay Area Air Quality Management District (BAAQMD). 2011. Roadway Screening Analysis Tables. December. Available online at :
<http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en>

Table 6.1-5
AERMOD Construction Screening Inputs and Outputs
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Parameter	Inputs and Outputs		
Source	Construction		
Source Type	Area		
Emission Rate (g/s-m ²)	2.19869E-05		
Release Height (m)	5		
Area (m ²)	45481.57185		
Receptor Height (m)	1.8		
Urban/Rural (U/R)	U		
Meteorological Station	Mission Bay 2008		
Dispersion Factor (µg/m³ per g/s)			
Annual Average Dispersion Factor at Dormitory Receptor	10.4		
Annual Average Dispersion Factor at Hospital Receptor	10.4		
Concentration	Uncontrolled	Tier 4 Controlled	Tier 2 + ARB NOx VDECS Controlled
PM _{2.5} Emission Rate (g/s)	0.030	0.0043	0.0051
Annual Maximum PM_{2.5} Conc at Dormitory Receptor (µg/m³)	0.31	0.044	0.053
Annual Maximum PM_{2.5} Conc at Hospital Receptor (µg/m³)	0.31	0.044	0.053
Diesel PM Emission Rate (g/s)	0.030	0.0042	0.0050
Annual Maximum DPM Conc at Dormitory Receptor (µg/m³)	0.31	0.044	0.052
Annual Maximum DPM Conc at Hospital Receptor (µg/m³)	0.31	0.044	0.052

Abbreviations:

g: gram
m: meter
m²: square meter
m³: cubic meter
PM: particulate matter
s: second
µg: microgram

Table 6.1-6
Screening PM_{2.5} Concentration Results
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Concentration [µg/m ³]		
	Dormitory Receptor	Hospital Receptor	Daycare Receptor
Construction			
PM _{2.5} Concentration from Uncontrolled Construction Emissions	0.31	0.31	1.2
PM _{2.5} Concentration from Tier 4 Controlled Construction Emissions	0.044	0.044	0.17
PM _{2.5} Concentration from Tier 2 + ARB NOx VDECS Controlled Construction Emissions	0.053	0.053	0.21
2014 Background PM _{2.5} Concentration ¹	8.5	8.6	8.4
Total PM _{2.5} Concentration (Construction, Uncontrolled scenario)	8.8	8.9	9.6
Total PM _{2.5} Concentration (Construction, Tier 4 Controlled scenario)	8.5	8.7	8.5
Total PM _{2.5} Concentration (Construction, Tier 2 + ARB NOx VDECS Controlled scenario)	8.5	8.7	8.6
Cumulative Threshold ²	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Uncontrolled scenario)	No	No	No
Total PM _{2.5} Concentration Exceeds Threshold? (Tier 4 Controlled scenario)	No	No	No
Total PM _{2.5} Concentration Exceeds Threshold? (Tier 2 + ARB NOx VDECS Controlled scenario)	No	No	No
Operational			
PM _{2.5} Concentration from Operational Traffic	0.32	0.32	0.32
PM _{2.5} Concentration from Emergency Diesel Generators ³	0.055	0.055	0.055
2014 Background PM _{2.5} Concentration ¹	8.5	8.6	8.4
Total PM _{2.5} Concentration (Operational)	8.9	9.0	8.7
Cumulative Threshold ²	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Operational)	No	No	No

Notes:

1. 2014 background risk from the Citywide HRA database for all receptors.
2. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.
3. Back-calculated assuming a cancer risk of 10 in a million for each of the three generators (total of 30 in a million). The cancer risk of 10 in a million is the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, and exposure assumptions for a 70-year resident.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HRA: Health Risk Assessment
µg: microgram
m³: cubic meter

Table 6.1-7
Exposure Parameters and Cancer Risk Adjustment Factors
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Exposure Parameter	Units	Construction			
		Child Resident	Adult Resident	Hospital Child	Daycare Child
Daily Breathing Rate (DBR) ¹	[L/kg-day]	581	302	581	581
Exposure Time (ET) ²	[hours/24 hours]	24	24	24	11
Exposure Frequency (EF) ³	[days/year]	350	350	365	253
Exposure Duration (ED) ⁴	[years]	2.0	2.0	1.0	0.67
Averaging Time (AT)	[days]	25,550	25,550	25,550	25,550
Intake Factor, Inhalation (IF _{inh})	[m ³ /kg-day]	0.016	0.0083	0.0083	0.0018
Cancer Risk Adjustment Factor ⁵	[-]	10	1.0	10	10
Modeling Adjustment Factor ⁶	[-]	N/A	N/A	N/A	3.15

Notes:

1. Daily breathing rate reflects default breathing rate from BAAQMD 2010.
2. Exposure time reflects default exposure time from BAAQMD 2010.
3. Exposure frequency reflects default exposure frequency from BAAQMD 2010.
4. Assumes all construction-related emissions will be emitted within the first two years. Operation of the daycare center is not expected to take place until mid- to late-2017; since Project construction will be largely completed by that time, an exposure duration of 8 months was used as a conservative estimate.
5. Based on BAAQMD 2010.
6. Construction emissions are conservatively assumed to occur concurrently with the operation of the daycare center. As such, a modeling adjustment factor of $(365/253) \times (24/11) = 3.15$ is applied for the daycare child receptor.

Calculation:

$$IF_{inh} = DBR * ET * EF * ED * CF / AT$$

$$CF = 0.001 \text{ (m}^3\text{/L)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District

L: liter

kg: kilogram

m³: cubic meter

References:

BAAQMD. 2010. BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.
http://baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx?la=en

Table 6.1-8
Screening Cancer Risk Results
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Units	Dormitory Receptor		Hospital Child Receptor	Daycare Child Receptor
		Child Resident	Adult Resident		
Diesel PM Cancer Potency Factor (CPF) ¹	[mg/kg-day] ⁻¹	1.1	1.1	1.1	1.1
Excess Cancer Risk from Uncontrolled Construction Emissions ²	[in a million]	54	2.8	28	73
Excess Cancer Risk from Tier 4 Controlled Construction Emissions ²	[in a million]	7.7	0.40	4.0	10.4
Excess Cancer Risk from Tier 2 + ARB NOx VDECS Controlled Construction Emissions ²	[in a million]	9.2	0.48	4.8	12.5
Excess Cancer Risk from Operational Traffic Emissions ³	[in a million]	7.2	7.2	7.2	7.2
Excess Cancer Risk from Emergency Diesel Generators ⁴	[in a million]	30	30	30	30
2014 Background Risk ⁵	[in a million]	26	26	44	20
Total Excess Cancer Risk (Uncontrolled Scenario)	[in a million]	117	66	109	131
Total Excess Cancer Risk (Tier 4 Controlled Scenario)	[in a million]	71	64	85	68
Total Excess Cancer Risk (Tier 2 + ARB NOx VDECS) Controlled Scenario)	[in a million]	72	64	86	70
Cumulative Threshold ⁶	[in a million]	100	100	100	100
Total Risk Exceeds Threshold? (Uncontrolled Scenario)	-	Yes	No	Yes	Yes
Total Risk Exceeds Threshold? (Tier 4 Controlled Scenario)	-	No	No	No	No
Total Risk Exceeds Threshold? (Tier 2 + ARB NOx VDECS Controlled Scenario)	-	No	No	No	No

Notes:

1. From Cal/EPA 2013.
2. Represent health impacts for a residential receptor at the dormitory, hospital, or daycare.
3. The screening values reflect a 70-year cancer risk with age sensitivity factors applied (BAAQMD 2012).
4. A cancer risk of 10 in a million, the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, is conservatively assumed.
5. 2014 background risk from the Citywide HRA database for all receptors.
6. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.

Calculation:

$$\text{Cancer Risk} = [\text{AnnualConc}] \times [\text{CF}] \times [\text{IF}_{\text{inh}}] \times [\text{CPF}] \times [\text{CRAF}] \times [\text{MAF}]$$

$$\text{CF} = 0.001 \text{ (mg/}\mu\text{g)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
 Cal/EPA: California Environmental Protection Agency
 CRAF: Cancer Risk Adjustment Factor
 HRA: Health Risk Assessment
 IF_{inh}: Intake Factor, Inhalation
 kg: kilogram
 mg: milligram
 PM: Particulate Matter
 μg: microgram

References:

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. Available online at: <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Bay Area Air Quality Management District (BAAQMD). 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available online at: <http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Data Request Instructions for Mission Bay Site

Table 1: Off-Road Construction Equipment List

Phase Name	Project Equipment at Site	Horsepower	Equipment Quantity	Usage Hours per Workday	Equipment Start Date (Month #)	Equipment End Date (Month #)	Workdays per Week
Demolition/Mass Excavation	Street Sweeper	285	2	7	1	10	5
Mass Excavation	Large Excavator	523	3	7	1	3	5
Mass Excavation	Scraper	500	3	7	1	3	5
Mass Excavation	Wheel Loader	211	3	7	1	3	5
Mass Excavation	Track Type Tractor Blde/Ripper	150	2	7	1	3	5
Rapid Impact Compaction	Track type tractor with hammer	150	3	7	1	3	5
Pile Installation	Drill Rig (for installation of Auger Cast piles)	1205	4	7	2	4	5
Pile Installation	Crawler Cranes	530	4	7	2	4	5
Pile Installation	Large Forklifts	93	2	7	2	4	5
Pile Installation	Bobcat or small excavators	71	4	7	2	4	5
Pile Installation	Cutting and chopping saws		4	7	2	4	5
Shoring	Drill Rig	150	2	7	2	4	5
Shoring	Support Crane	530	2	7	2	4	5
Shoring	Grout-mixing plant	20	2	7	2	4	5
Shoring	Small Excavator	71	2	7	2	4	5
Shoring	Cut off wall (CDSM) equipment	150	4	7	1	2	5
Building Construction (including arena)	Concrete Boom Pumps	480	2	7	2	13	5
Building Construction (including arena)	Bobcat	71	2	7	2	23	5
Building Construction (including arena)	Small Excavator	404	2	7	2	23	5
Building Construction (including arena)	Large Excavator	523	2	7	2	13	5
Building Construction (including arena)	Crawler Cranes	530	4	7	3	16	5
Building Construction (including arena)	Mobile Cranes	530	4	7	3	23	5
Building Construction (including arena)	Grandall-type Forklifts	93	8	7	3	24	5
Building Construction (including arena)	Cutting/chopping saws		15	7	3	24	5
Building Construction (including arena)	Tile cutting saws		10	7	8	24	5
Building Construction (including arena)	Drywall stud impact guns		25	7	8	20	5

Construction Equipment List

Table 6.1-9

Phase ID	Phase	Project Equipment	OFFROAD Equipment	HP	OFFROAD HP Bin	Tier HP Bin	LF	Quantity	Total Hours	Calendar Year	Construction Year	Fuel
1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	2	3,042	2015	1	Diesel
2	Mass Excavation	Large Excavator	Excavators	523	750	600	0.3819	3	1,369	2015	1	Diesel
2	Mass Excavation	Scraper	Scrapers	500	500	600	0.4824	3	1,369	2015	1	Diesel
2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	211	250	300	0.3685	3	1,369	2015	1	Diesel
2	Mass Excavation	Track Type Tractor Bld/ripper	Tractors/Loaders/Backhoes	150	175	175	0.3685	2	913	2015	1	Diesel
3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	150	175	175	0.3685	3	1,369	2015	1	Diesel
4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,205	9,999	2,000	0.5025	4	1,825	2015	1	Diesel
4	Pile Installation	Crawler Cranes	Cranes	530	750	600	0.2881	4	1,825	2015	1	Diesel
4	Pile Installation	Large Forklifts	Forklifts	93	120	120	0.201	2	913	2015	1	Diesel
4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	71	120	75	0.3618	4	1,825	2015	1	Diesel
4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	0	50	11	0.4154	4	1,825	2015	1	Electric
5	Shoring	Drill Rig	Bore/Drill Rigs	150	175	175	0.5025	2	913	2015	1	Diesel
5	Shoring	Support Crane	Cranes	530	750	600	0.2881	2	913	2015	1	Diesel
5	Shoring	Grout-mixing plant	Other Material Handling Equipment	20	50	25	0.3953	2	913	2015	1	Diesel
5	Shoring	Small Excavator	Excavators	71	120	75	0.3819	2	913	2015	1	Diesel
5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	150	175	175	0.5025	4	1,217	2015	1	Diesel
6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	3,346	2015	1	Diesel
6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	71	120	75	0.3618	2	3,346	2015	1	Diesel
6	Building Construction (including arena)	Small Excavator	Excavators	404	500	600	0.3819	2	3,346	2015	1	Diesel
6	Building Construction (including arena)	Large Excavator	Excavators	523	750	600	0.3819	2	3,346	2015	1	Diesel
6	Building Construction (including arena)	Crawler Cranes	Cranes	530	750	600	0.2881	4	6,083	2015	1	Diesel
6	Building Construction (including arena)	Mobile Cranes	Cranes	530	750	600	0.2881	4	6,083	2015	1	Diesel
6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	93	120	120	0.201	8	12,167	2015	1	Diesel
6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	0	50	11	0.4154	15	22,813	2015	1	Electric
6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	0	50	11	0.4154	10	7,604	2015	1	Electric
6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	0	50	11	0.4154	25	19,010	2015	1	Electric
6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	304	2016	2	Diesel
6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	71	120	75	0.3618	2	3,346	2016	2	Diesel
6	Building Construction (including arena)	Small Excavator	Excavators	404	500	600	0.3819	2	3,346	2016	2	Diesel
6	Building Construction (including arena)	Large Excavator	Excavators	523	750	600	0.3819	2	304	2016	2	Diesel
6	Building Construction (including arena)	Crawler Cranes	Cranes	530	750	600	0.2881	4	2,433	2016	2	Diesel
6	Building Construction (including arena)	Mobile Cranes	Cranes	530	750	600	0.2881	4	6,692	2016	2	Diesel
6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	93	120	120	0.201	8	14,600	2016	2	Diesel
6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	0	50	11	0.4154	15	27,375	2016	2	Electric
6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	0	50	11	0.4154	10	18,250	2016	2	Electric
6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	0	50	11	0.4154	25	30,417	2016	2	Electric

Uncontrolled Offroad Equipment Activities and Emissions

Table 6.1-10

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	8,830	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	311	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	586	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0,000	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0.0	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0.0	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0,000	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0.0	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12167	93	120	120	Diesel	3310	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12167	93	120	120	Diesel	278.0	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12167	93	120	120	Diesel	385.3	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	5117	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	166.4	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	356.6	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	8830	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	310.9	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	585.6	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	3658	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	118.6	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	264.1	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0,000	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0.0	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0.0	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	1247	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	107	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	152	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	0,304	0,480	0,500	0,600	Diesel	0,547	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	0,304	0,480	0,500	0,600	Diesel	20	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	0,304	0,480	0,500	0,600	Diesel	41	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2433	530	750	600	Diesel	3534	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2433	530	750	600	Diesel	125.2	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2433	530	750	600	Diesel	239.35	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0.0	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0.0	lb	ROG	OFFROAD	0
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3042	285	500	300	Diesel	5265.4	lb	Nox	OFFROAD	0
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3042	285	500	300	Diesel	228.7	lb	PM	OFFROAD	0
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3042	285	500	300	Diesel	0,406	lb	ROG	OFFROAD	0
1	2	Mass Excavation	Large Excavator	Excavators	1369	523	750	600	Diesel	2093.1	lb	Nox	OFFROAD	0
1	2	Mass Excavation	Large Excavator	Excavators	1369	523	750	600	Diesel	68.07	lb	PM	OFFROAD	0
1	2	Mass Excavation	Large Excavator	Excavators	1369	523	750	600	Diesel	0,146	lb	ROG	OFFROAD	0
1	2	Mass Excavation	Scraper	Scrapers	1369	500	500	600	Diesel	4429.5	lb	Nox	OFFROAD	0
1	2	Mass Excavation	Scraper	Scrapers	1369	500	500	600	Diesel	178.9	lb	PM	OFFROAD	0
1	2	Mass Excavation	Scraper	Scrapers	1369	500	500	600	Diesel	0,344	lb	ROG	OFFROAD	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	537.8	lb	Nox	OFFROAD	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	27.2	lb	PM	OFFROAD	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	0,913	150	175	175	Diesel	0,047	lb	ROG	OFFROAD	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	1122.2	lb	Nox	OFFROAD	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	36.5	lb	PM	OFFROAD	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	0,076	lb	ROG	OFFROAD	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	807	lb	Nox	OFFROAD	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	41	lb	PM	OFFROAD	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	0,070	lb	ROG	OFFROAD	0
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	725	lb	Nox	OFFROAD	0
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	63	lb	PM	OFFROAD	0

Uncontrolled Offroad Equipment Activities and Emissions

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	88	lb	ROG	OFFROAD	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	2649	lb	Nox	OFFROAD	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	93	lb	PM	OFFROAD	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	176	lb	ROG	OFFROAD	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0,000	lb	ROG	OFFROAD	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1205	9999	2000	Diesel	10387	lb	Nox	OFFROAD	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1205	9999	2000	Diesel	255	lb	PM	OFFROAD	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1205	9999	2000	Diesel	0,434	lb	ROG	OFFROAD	0
1	4	Pile Installation	Large Forklifts	Forklifts	0,913	93	120	120	Diesel	248	lb	Nox	OFFROAD	0
1	4	Pile Installation	Large Forklifts	Forklifts	0,913	93	120	120	Diesel	21	lb	PM	OFFROAD	0
1	4	Pile Installation	Large Forklifts	Forklifts	0,913	93	120	120	Diesel	0,029	lb	ROG	OFFROAD	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	789	lb	Nox	OFFROAD	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	35	lb	PM	OFFROAD	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	0,061	lb	ROG	OFFROAD	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	0,913	150	175	175	Diesel	592	lb	Nox	OFFROAD	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	0,913	150	175	175	Diesel	27	lb	PM	OFFROAD	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	0,913	150	175	175	Diesel	46	lb	ROG	OFFROAD	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	0,913	20	50	25	Diesel	92	lb	Nox	OFFROAD	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	0,913	20	50	25	Diesel	9	lb	PM	OFFROAD	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	0,913	20	50	25	Diesel	0,028	lb	ROG	OFFROAD	0
1	5	Shoring	Small Excavator	Excavators	0,913	71	120	75	Diesel	273.8	lb	Nox	OFFROAD	0
1	5	Shoring	Small Excavator	Excavators	0,913	71	120	75	Diesel	20.4	lb	PM	OFFROAD	0
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	0,028	lb	ROG	OFFROAD	0
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	1324.5	lb	Nox	OFFROAD	0
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	46.6	lb	PM	OFFROAD	0
1	5	Shoring	Support Crane	Cranes	0,913	530	750	600	Diesel	0,088	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	1329	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	115	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	162	lb	ROG	OFFROAD	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	6494	lb	Nox	OFFROAD	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	239	lb	PM	OFFROAD	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	477	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	3,744	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	313	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	435	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	450	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	14.8	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	32.4	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	9,718	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	344	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	658	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	3,203	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	103	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	243	lb	ROG	OFFROAD	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	PM	OFFROAD	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	ROG	OFFROAD	0

Controlled Offroad Equipment Activities and Emissions (Tier 4)

Table 6.1-11

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	0,226	lb	Nox	Tier 4	0
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	7	lb	PM10	Tier 4	0
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	52	lb	ROG	Tier 4	0
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	0,157	lb	Nox	Tier 4	0
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	4.8	lb	PM10	Tier 4	0
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	36.2	lb	ROG	Tier 4	0
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	0,189	lb	Nox	Tier 4	0
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	6	lb	PM10	Tier 4	0
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	43.7	lb	ROG	Tier 4	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	29	lb	Nox	Tier 4	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	0.9	lb	PM10	Tier 4	0
1	2	Mass Excavation	Track Type Tractor Blde/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	6.7	lb	ROG	Tier 4	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	61	lb	Nox	Tier 4	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	1.9	lb	PM10	Tier 4	0
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	14.1	lb	ROG	Tier 4	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	43	lb	Nox	Tier 4	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	1.3	lb	PM10	Tier 4	0
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	10.0	lb	ROG	Tier 4	0
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	283	lb	Nox	Tier 4	0
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	0.8	lb	PM10	Tier 4	0
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	12.4	lb	ROG	Tier 4	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	0,160	lb	Nox	Tier 4	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	4.9	lb	PM10	Tier 4	0
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	36.9	lb	ROG	Tier 4	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	Nox	Tier 4	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	PM10	Tier 4	0
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	ROG	Tier 4	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	5,457	lb	Nox	Tier 4	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	39	lb	PM10	Tier 4	0
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	146	lb	ROG	Tier 4	0
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	10	lb	Nox	Tier 4	0
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	0.3	lb	PM10	Tier 4	0
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	2.26	lb	ROG	Tier 4	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	53	lb	Nox	Tier 4	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	1.6	lb	PM10	Tier 4	0
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	12.1	lb	ROG	Tier 4	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	39	lb	Nox	Tier 4	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	1.2	lb	PM10	Tier 4	0
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	9.1	lb	ROG	Tier 4	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	85	lb	Nox	Tier 4	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	4.8	lb	PM10	Tier 4	0
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	4.77	lb	ROG	Tier 4	0
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	149	lb	Nox	Tier 4	0
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	0.4	lb	PM10	Tier 4	0
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	6.5	lb	ROG	Tier 4	0
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	80	lb	Nox	Tier 4	0
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	2.5	lb	PM10	Tier 4	0
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	18.4	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	519	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	1.5	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	22.7	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	0,382	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	12	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	88	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	0,532	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	16	lb	PM10	Tier 4	0

Controlled Offroad Equipment Activities and Emissions (Tier 4)

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	123	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	0,130	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	4	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	30	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	0,383	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	12	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	88	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	0,532	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	16	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	123	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	0,296	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	9	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	68	lb	ROG	Tier 4	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	Nox	Tier 4	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	PM10	Tier 4	0
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	519	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	1.5	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	22.7	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	35	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	1.1	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	8.0	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	0,213	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	7	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	49	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	0,156	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	5	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	36	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	35	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	1.1	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	8.0	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	0,586	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	18	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	135	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	0,296	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	9	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	68	lb	ROG	Tier 4	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	Nox	Tier 4	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	PM10	Tier 4	0
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	ROG	Tier 4	0

Controlled Offroad Equipment Activities and Emissions (Tier 2 + ARB NOx VDECS)

Table 6.1-12

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	2,168	lb	Nox	Tier 2	1
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	11	lb	PM10	Tier 2	1
1	1	Demolition/Mass Excavation	Street Sweeper	Sweepers/Scrubbers	3,042	285	500	300	Diesel	10	lb	ROG	Tier 2	1
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	1,371	lb	Nox	Tier 2	1
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	8.0	lb	PM10	Tier 2	1
1	2	Mass Excavation	Large Excavator	Excavators	1,369	523	750	600	Diesel	7.2	lb	ROG	Tier 2	1
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	1,655	lb	Nox	Tier 2	1
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	10	lb	PM10	Tier 2	1
1	2	Mass Excavation	Scraper	Scrapers	1,369	500	500	600	Diesel	8.7	lb	ROG	Tier 2	1
1	2	Mass Excavation	Track Type Tractor Blade/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	278	lb	Nox	Tier 2	1
1	2	Mass Excavation	Track Type Tractor Blade/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	2.1	lb	PM10	Tier 2	1
1	2	Mass Excavation	Track Type Tractor Blade/Ripper	Tractors/Loaders/Backhoes	913	150	175	175	Diesel	2.1	lb	ROG	Tier 2	1
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	584	lb	Nox	Tier 2	1
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	3.1	lb	PM10	Tier 2	1
1	2	Mass Excavation	Wheel Loader	Tractors/Loaders/Backhoes	1,369	211	250	300	Diesel	2.8	lb	ROG	Tier 2	1
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	417	lb	Nox	Tier 2	1
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	3.2	lb	PM10	Tier 2	1
1	3	Rapid Impact Compaction	Track type tractor with hammer	Tractors/Loaders/Backhoes	1,369	150	175	175	Diesel	3.2	lb	ROG	Tier 2	1
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	295	lb	Nox	Tier 2	1
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	3.0	lb	PM10	Tier 2	1
1	4	Pile Installation	Bobcat or small excavators	Rubber Tired Loaders	1,825	71	120	75	Diesel	2.4	lb	ROG	Tier 2	1
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	1,397	lb	Nox	Tier 2	1
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	8.1	lb	PM10	Tier 2	1
1	4	Pile Installation	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	7.4	lb	ROG	Tier 2	1
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	Nox	Tier 2	1
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	PM10	Tier 2	1
1	4	Pile Installation	Cutting and chopping saws	Other Construction Equipment	1,825	0	50	11	Electric	0	lb	ROG	Tier 2	1
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	5,540	lb	Nox	Tier 2	1
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	32	lb	PM10	Tier 2	1
1	4	Pile Installation	Drill Rig (for installation of Auger Cast piles)	Bore/Drill Rigs	1,825	1,205	9,999	2,000	Diesel	29	lb	ROG	Tier 2	1
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	107	lb	Nox	Tier 2	1
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	1.1	lb	PM10	Tier 2	1
1	4	Pile Installation	Large Forklifts	Forklifts	913	93	120	120	Diesel	0.86	lb	ROG	Tier 2	1
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	506	lb	Nox	Tier 2	1
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	3.9	lb	PM10	Tier 2	1
1	5	Shoring	Cut off wall (CDSM) equipment	Bore/Drill Rigs	1,217	150	175	175	Diesel	3.8	lb	ROG	Tier 2	1
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	379	lb	Nox	Tier 2	1
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	2.9	lb	PM10	Tier 2	1
1	5	Shoring	Drill Rig	Bore/Drill Rigs	913	150	175	175	Diesel	2.9	lb	ROG	Tier 2	1
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	51	lb	Nox	Tier 2	1
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	1.4	lb	PM10	Tier 2	1
1	5	Shoring	Grout-mixing plant	Other Material Handling Equipment	913	20	50	25	Diesel	0.48	lb	ROG	Tier 2	1
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	155	lb	Nox	Tier 2	1
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	1.6	lb	PM10	Tier 2	1
1	5	Shoring	Small Excavator	Excavators	913	71	120	75	Diesel	1.3	lb	ROG	Tier 2	1
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	699	lb	Nox	Tier 2	1
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	4.1	lb	PM10	Tier 2	1
1	5	Shoring	Support Crane	Cranes	913	530	750	600	Diesel	3.7	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	540	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	5.5	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	4.4	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	3,345	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	19	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	18	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	4,657	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	27	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Crawler Cranes	Cranes	6,083	530	750	600	Diesel	25	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	Nox	Tier 2	1

Controlled Offroad Equipment Activities and Emissions (Tier 2 + ARB NOx VDECS)

1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	22,813	0	50	11	Electric	0	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	1,429	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	14	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	12,167	93	120	120	Diesel	12	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	3,350	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	19	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Large Excavator	Excavators	3,346	523	750	600	Diesel	18	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	4,657	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	27	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,083	530	750	600	Diesel	25	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	2,588	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	15	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	14	lb	ROG	Tier 2	1
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	Nox	Tier 2	1
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	PM10	Tier 2	1
1	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	7,604	0	50	11	Electric	0	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	540	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	5.5	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Bobcat	Rubber Tired Loaders	3,346	71	120	75	Diesel	4.4	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	304	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	1.8	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	304	480	500	600	Diesel	1.6	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	1,863	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	11	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Crawler Cranes	Cranes	2,433	530	750	600	Diesel	10	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	27,375	0	50	11	Electric	0	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	1,715	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	17	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	120	Diesel	14	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	305	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	1.8	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Large Excavator	Excavators	304	523	750	600	Diesel	1.6	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	5,122	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	30	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Mobile Cranes	Cranes	6,692	530	750	600	Diesel	27	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	2,588	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	15	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Small Excavator	Excavators	3,346	404	500	600	Diesel	14	lb	ROG	Tier 2	1
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	Nox	Tier 2	1
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	PM10	Tier 2	1
2	6	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	18,250	0	50	11	Electric	0	lb	ROG	Tier 2	1

Table 6.1-13
Project Construction Trip Estimates

Phase	Duration [months]	Average Number of Daily Construction Trucks ¹	Average Number of Daily Construction Workers ¹	Number of Work Days	Total One-Way Trips		
					Hauling Trips	Vendor Trips	Worker Trips
Entire Site							
Demolition (Entire Site)	1	8	10	22	352	-	440
Excavation and Shoring (Entire Site)	3	300	25	66	39,600	-	3,300
Arena							
Foundation & Below Grade Construction (Piles & Concrete)	6	20	100	131	-	5,240	26,200
Base Building	16	25	200	348	-	17,400	139,200
Exterior Finishing	10	25	50	218	-	10,900	21,800
Interior Finishing	18.5	30	150	402	-	24,120	120,600
Garage/Podium							
Foundation & Below Grade Construction (Piles & Concrete)	6	20	50	131	-	5,240	13,100
Base Building	9	20	50	196	-	7,840	19,600
NW Tower							
Base Building	8	15	40	174	-	5,220	13,920
Exterior Finishing	5	2	10	109	-	436	2,180
Interior Finishing	12	10	100	261	-	5,220	52,200
SW Tower							
Base Building	8	15	40	174	-	5,220	13,920
Exterior Finishing	5	2	10	109	-	436	2,180
Interior Finishing	12	10	100	261	-	5,220	52,200
Entire Site							
Street Improvements	5	10	40	109	-	2,180	8,720
Total Construction Trips					39,952	94,672	489,560

Notes:

1. Proposed number of construction trucks and workers provided by Project Sponsor in a table titled "Summary of Construction Phases and Duration, and Daily Construction Trucks and Workers by Phase," dated 11/25/2014.

Onroad Equipment Activities, Emission Factors and Emissions

Table 6.1-14

								Running Exhaust and Running Losses Emission Factor (g/mile)				
Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	ROG Exhaust	ROG Running Loss	NOx Exhaust	PM ₁₀ Exhaust	PM _{2.5} Exhaust
Mission Bay	2015	Worker	LDA	GAS	50%	489,560	12.4	0.039	0.067	0.12	0.0023	0.0021
	2015	Worker	LDT1	GAS	25%	489,560	12.4	0.079	0.22	0.27	0.0043	0.0040
	2015	Worker	LDT2	GAS	25%	489,560	12.4	0.041	0.10	0.21	0.0022	0.0020
	2015	Vendor	T6	DSL	50%	94,672	7.3	0.22	0	4.6	0.12	0.11
	2015	Vendor	T7	DSL	50%	94,672	7.3	0.29	0	7.4	0.12	0.11
	2015	Hauling	T7	DSL	100%	39,952	20	0.29	0	7.4	0.12	0.11

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Table 6.1-15

								Running Exhaust and Running Losses Emissions (lb)				
Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	ROG Exhaust	ROG Running Loss	NOx Exhaust	PM ₁₀ Exhaust	PM _{2.5} Exhaust
Mission Bay	2015	Worker	LDA	GAS	50%	489,560	12.4	263	446	797	15	14.04
	2015	Worker	LDT1	GAS	25%	489,560	12.4	264	740	888	15	13.38
	2015	Worker	LDT2	GAS	25%	489,560	12.4	137	350	692	7.4	6.83
	2015	Vendor	T6	DSL	50%	94,672	7.3	169	0	3,525	93	85.41
	2015	Vendor	T7	DSL	50%	94,672	7.3	221	0	5,609	89	81.86
	2015	Hauling	T7	DSL	100%	39,952	20	512	0	12,969	206	189.28

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Table 6.1-16

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Idling Emission Factor (g/hr-vehicle)				Idling Exhaust Emissions (lb) [5 min per one-way trip for mass emissions]			
								ROG	NOx	PM ₁₀	PM _{2.5}	ROG	NOx	PM ₁₀	PM _{2.5}
Mission Bay	2015	Worker	LDA	GAS	50%	489,560	12.4	0	0	0	0	0	0	0	0.00
	2015	Worker	LDT1	GAS	25%	489,560	12.4	0	0	0	0	0	0	0	0.00
	2015	Worker	LDT2	GAS	25%	489,560	12.4	0	0	0	0	0	0	0	0.00
	2015	Vendor	T6	DSL	50%	94,672	7.3	2.0	80	0.36	0.33	18	694	3.1	2.85
	2015	Vendor	T7	DSL	50%	94,672	7.3	6.4	66	0.31	0.28	56	576	2.7	2.44
	2015	Hauling	T7	DSL	100%	39,952	20	6.4	66	0.31	0.28	47	486	2.2	2.06

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Table 6.1-17

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Starting Exhaust Emission Factor (g/one-way trip)				Starting Exhaust Emissions (lb) [Once per one-way trip for mass emissions]			
								ROG	NOx	PM ₁₀	PM _{2.5}	ROG	NOx	PM ₁₀	PM _{2.5}
Mission Bay	2015	Worker	LDA	GAS	50%	489,560	12.4	0.22	0.18	0.0030	0.0027	118	95	1.6	1.46
	2015	Worker	LDT1	GAS	25%	489,560	12.4	0.43	0.31	0.0046	0.0042	115	82	1.2	1.14
	2015	Worker	LDT2	GAS	25%	489,560	12.4	0.28	0.34	0.0027	0.0025	74	92	0.73	0.68
	2015	Vendor	T6	DSL	50%	94,672	7.3	0	0	0	0	0	0	0	0.00
	2015	Vendor	T7	DSL	50%	94,672	7.3	0	0	0	0	0	0	0	0.00
	2015	Hauling	T7	DSL	100%	39,952	20	0	0	0	0	0	0	0	0

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Table 6.1-18

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Evaporative ROG Emission Factor (g/one-way trip)			Evaporative ROG Emissions (lb)		
								Diurnal	Hot-Soak	Resting Loss	Diurnal	Hot-Soak	Resting Loss
Mission Bay	2015	Worker	LDA	GAS	50%	489,560	12.4	0.046	0.15	0.041	25	82	22
	2015	Worker	LDT1	GAS	25%	489,560	12.4	0.10	0.28	0.083	28	77	22
	2015	Worker	LDT2	GAS	25%	489,560	12.4	0.050	0.16	0.047	13	43	13
	2015	Vendor	T6	DSL	50%	94,672	7.3	0	0	0	0	0	0
	2015	Vendor	T7	DSL	50%	94,672	7.3	0	0	0	0	0	0
	2015	Hauling	T7	DSL	100%	39,952	20	0	0	0	0	0	0

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Construction Area Emissions Estimates

Table 6.1-19

Venue	Floor Area [ft ²]	Building Surface Area ¹ [ft ²]	Architectural Coatings			
			Reapplication Rate	Indoor Paint VOC EF ²	Outdoor Paint VOC EF ²	Architectural Coating VOC emissions ³ [lb/yr]
				[g/L]	[g/L]	
Event Center	750,000	1,500,000	100%	100	150	7,823
GSW Office Space	25,000	50,000				261
Office Space	580,000	1,160,000				6,050
Retail Space	125,000	250,000				1,304
Parking and Loading	475,000	950,000				4,955

Notes:

1. Consistent with CalEEMod, residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area.
2. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.
3. Uses CalEEMod assumptions of 1 gallon of paint covers 180 square feet.

Area Sources	Total Emissions [ton/yr]				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Architectural Coatings	10.20	--	--	--	--
Total Project Emissions:	10.20	0.00	0.00	0.00	0.00

Mobile Source CAP Emissions Estimates

Table 6.1-20

Project CAPs Emission Factors

Emission Factor ¹	Units	Pollutant				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Running Exhaust	[g/mile]	0.068	1.5	0.45	0.0066	0.0060
Idling Exhaust	[g/trip]	0.013	0.1	0.09	0.0003	0.0003
Starting Exhaust	[g/trip]	0.279	3.5	0.33	0.0030	0.0028
PM Brake Wear	[g/mile]	-	-	-	0.0420	0.0180
PM Tire Wear	[g/mile]	-	-	-	0.0088	0.0022
ROG Running Loss	[g/mile]	0.079	-	-	-	-
ROG Diurnal	[g/trip]	0.052	-	-	-	-
ROG Hot-Soak	[g/trip]	0.148	-	-	-	-
ROG Resting Loss	[g/trip]	0.044	-	-	-	-

Notes:

1. From EMFAC2011, calendar year 2017, San Francisco Bay Area. Emission factors are weighted by VMT for all vehicle categories.

Mobile Source CAP Emissions Estimates

Table 6.1-21

Project CAPs Emission Calculations

Trip Type	Scenario	Daily One-way Vehicle Trips ¹			Days Per Year ²	Weighted Trip Length [mile] ³	Emissions				
		Arena	Retail	Office			ROG	CO	NO _x	PM ₁₀	PM _{2.5}
							[ton/yr]				
Mission Bay, Weekend Trips	Basketball Event Days	8,715	3,106	509	30	20.1	1.4	14	3.9	0.47	0.22
	Concert Event Days	8,715	3,106	509	55	20.1	2.6	26	7.1	0.86	0.40
	No Event Days	55	5,313	509	19	7.8	0.21	1.9	0.49	0.055	0.026
Mission Bay, Weekday Trips	Basketball Event Days	8,589	2,560	2,542	30	18.7	1.5	15	4.0	0.49	0.22
	Concert Event Days	8,589	2,560	2,542	45	18.7	2.2	22	6.1	0.73	0.34
	Convention Event Days	3,921	2,560	2,542	61	15.4	1.7	16	4.5	0.54	0.25
	No Event Days	55	4,393	2,542	125	7.9	1.6	15	3.9	0.44	0.20
Total Emissions:							11	110	30	3.6	1.6

Notes:

- Daily vehicle trips provided by Advant Consulting in a final memorandum titled "Travel, Parking, and Loading Demand Estimates for the Proposed Event Center & Mixed-Use Development at Mission Bay Blocks 29-32 - Case No. 2014.1441E". Office use includes GSW offices.
- The maximum number of home games (60) in a season was conservatively assumed. Furthermore, it is assumed that half of the games will take place on weekends. Vehicle generation associated with all concert and family show events is approximated by concert trips, while the other 61 events are assumed to be convention events on weekdays.
- Trip length for each scenario is weighted by the number of trips in each land use category. Arena vehicle trips are assumed to have a trip length of 25 miles/trip based on season ticket holder addresses. Season ticket holders account for approximately 60% seating at Warrior games. Vehicle trips from retail and office space are assumed to have a trip length of 11.98 miles/trip, based on 2006 average commute trip length in the Bay Area (MTC 2008).

Mobile Source CAP Emissions Estimates

Table 6.1-22
Road Dust Calculations

Total Annual VMT

Trip Type	Scenario	VMT [mile/yr]
Mission Bay, Weekend Trips	Basketball Event Days	7,418,424
	Concert Event Days	13,600,444
	No Event Days	870,239
Mission Bay, Weekday Trips	Basketball Event Days	7,688,333
	Concert Event Days	11,532,500
	Convention Event Days	8,457,295
	No Event Days	6,891,904
Total VMT		56,459,139

Pollutants	Emissions Factor [lb/VMT]	Emissions [ton/yr]
Fugitive PM ₁₀	0.00063	17.84
Fugitive PM _{2.5}	0.00016	4.38

Road Dust Equation¹

$$E = k \cdot (sL)^{0.91} \cdot (W)^{1.02} \cdot (1-P/4N)$$

where:

E = annual average emission factor in the same units as *k*
k = particle size multiplier for particle size range and units of interest

*PM*₁₀ (lb/VMT)

0.0022

*PM*_{2.5} (lb/VMT)

0.00054

sL = road surface silt loading (grams per square meter) (g/m²)

0.1

W = average weight (tons) of all the vehicles traveling the road

2.4

P = number of "wet" days with at least 0.01 in of precipitation during the averaging period

64

N = number of days in the averaging period

365

Notes:

1. Road dust equation and parameters are based on CalEEMod defaults for the San Francisco Bay Area Air Basin.

References

California Air Resources Board (ARB). 2011. Emission FACtor Model (EMFAC2011). Available online at www.arb.ca.gov/msei/modeling.htm

Metropolitan Transportation Commission (MTC). 2008. Travel Forecasts Data Summary: Transportation 2035 Plan for Available online at http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf

Table 6.1-23

Mobile Source CAPs Emission Reduction

Oracle Arena and GSW Oakland HQ Vehicle Trips Calculation

Employee Commute/ Non-Commute Trips

Scenario	Total Employees ¹	Total Driving Employees ²	% SOV ³	% Carpool ³	Carpool Density [people/vehicle] ⁴	Trips/ Roundtrip	Total Vehicle Trips per Day	Average operating days per year ⁵	Total Vehicle Trips per Year
Oracle Arena Operations Employees	71	55	86%	14%	2	2	103	260	26,859
GSW Headquarters Employees	150	128	94%	6%	2	2	248	260	64,350

Notes:

1. Oracle Arena Operations employees assumed to be the same as the estimated number of employees at the proposed event center. Number of existing GSW employees at the Oakland headquarters is based on the Project Notice of Preparation dated 11/19/2014.
2. A 78.1% driving rate was assumed for the Oracle Arena employees according to the most recent Bay Area Census data (<http://www.bayareacensus.ca.gov/bayarea.htm>). GSW employees who drive based on a 85% driving rate according to Ben Draa, Senior Financial Analyst, GSW.
3. Oracle Arena employees SOV and carpool rates from Bay Area Census data. GSW Headquarters SOV and carpool rates from Ben Draa, Senior Financial Analyst,
4. A carpool density of two people per vehicle is assumed to be conservative.
5. Assumes 5 days per week for 52 weeks per year.

Spectator Trips

Scenario	Total Spectators Per Event ¹	Total Driving Spectators ²	% SOV ³	% Carpool ³	Carpool Density [people/vehicle] ³	Trips/ Roundtrip	Total Vehicle Trips per Event	Event Days per Year ⁴	Total Vehicle Trips per Year
Oracle Arena Game Spectators	18,250	16,250	20%	80%	3	2	15,167	47	712,833
Oracle Arena Non-game Event Spectators	9,125	9,125	20%	80%	3	2	8,517	42	357,700

Notes:

1. Average spectator count and transit riders from Ben Draa, Senior Financial Analyst, GSW.
2. Ben Draa, Senior Financial Analyst, GSW, estimated that 2,000 of the total spectators take public transit or taxis per event.
3. The carpool assumptions are conservative in that 20% of the driving spectators would drive alone, while the remaining 80% would carpool at a density of 3 people per vehicle.
4. Number of GSW games is based on the 2013-2014 season and number of non-game events is based on four-year averages (2010-2013).

Vendor and Event Staff Trips

Scenario	Total Event Staff Per Event ¹	Total Driving Staff ¹	% SOV ²	% Carpool ²	Carpool Density [people/vehicle] ³	Trips/ Roundtrip	Total Vehicle Trips per Event	Event Days per Year ⁴	Total Vehicle Trips per Year
Oracle Arena Game Event Staff	1,013	791	86%	14%	2	2	1,474	47	69,274
Oracle Arena Non-game Event Staff	645	504	86%	14%	2	2	939	42	39,419

Notes:

1. A 78.1% driving rate was assumed for the vendor and event staff according to the most recent Bay Area Census data (<http://www.bayareacensus.ca.gov/bayarea.htm>). GSW employees who drive based on a 85% driving rate according to Ben Draa, Senior Financial Analyst, GSW.
2. SOV and carpool rates from Bay Area Census data.
3. A carpool density of two people per vehicle is assumed to be conservative.
4. Number of GSW games is based on the 2013-2014 season and number of non-game events is based on four-year averages (2010-2013).

Table 6.1-24
Mobile Source CAPs Emission Reduction

Oracle Arena and GSW HQ Emission Reduction Calculations

Trip Type		Total Vehicle Trips per Year	Trip Reduction per Year ⁹	Trip Length [mile]	Total VMT [mile/year]	VMT Reduction [mile/year] ⁹
Employee Commute Trips ¹	Oracle Arena operations employees	26,859	0	9.5	255,163	0
	GSW Headquarters	64,350	64,350	9.5	611,325	611,325
Employee Non-Commute Trips ²	Oracle Arena operations employees	26,859	0	3	80,578	0
	GSW Headquarters	64,350	64,350	3	193,050	193,050
Spectator Trips ³	Oracle Arena game spectators	712,833	712,833	25	17,963,400	17,963,400
	Oracle Arena non-game event spectators	357,700	0	25	9,014,040	0
Vendor and Event Staff Trips ^{1,4}	Oracle Arena game vendors and event staff	69,274	69,274	9.5	658,103	658,103
	Oracle Arena non-game event vendors and event staff	39,419	0	9.5	374,479	0
Opposing Team Bus trips ^{5,6}	Oracle Arena Opposing Team Bus trips	132	132	17.5	2,310	2,310
Delivery Trips ^{7,8}	GSW Headquarters	4,160	4,160	7.3	30,368	30,368
Total Oracle Arena VMT [miles/year]					28,348,073	18,623,813
Total GSW Office VMT [miles/year]					834,743	834,743
Total VMT [miles/year]					29,182,816	19,458,556

Emission Factor ¹¹	Units	Pollutant	
		ROG	NO _x
Running Exhaust	[g/mile]	0.068	0.45
Idling Exhaust	[g/trip]	0.013	0.09
Starting Exhaust	[g/trip]	0.279	0.33
ROG Running Loss	[g/mile]	0.079	-
ROG Diurnal	[g/trip]	0.052	-
ROG Hot-Soak	[g/trip]	0.148	-
ROG Resting Loss	[g/trip]	0.044	-

**Table 6.1-25
Mobile Source CAPs Emission Reduction**

Trip Type		Emission Reduction [ton/year]			
		ROG	NO _x	PM ₁₀	PM _{2.5}
Employee Commute Trips	Oracle Arena operations employees	0	0	0	0
	GSW Headquarters	0.14	0.34	0.039	0.018
Employee Non-Commute Trips	Oracle Arena operations employees	0	0	0	0
	GSW Headquarters	0.069	0.13	0.012	0.0058
Spectator Trips	Oracle Arena game spectators	3.3	9.3	1.1	0.52
	Oracle Arena non-game event spectators	0	0	0	0
Vendor and Event Staff Trips	Oracle Arena game vendors and event staff	0.15	0.36	0.042	0.019
	Oracle Arena non-game event vendors and event staff	0	0	0	0
Opposing Team Bus trips	Oracle Arena Opposing Team Bus trips	4.5E-04	0.0012	1.5E-04	6.7E-05
Delivery Trips	GSW Headquarters	0.0074	0.017	0.0019	8.9E-04
Total		3.7	10	1.2	0.57

Notes:

1. CalEEMod Default Trip Length for Commercial-Worker trips in the San Francisco Bay Area Air Basin.
2. Non-commute trips are assumed to have a trip length of 3 miles.
3. Trip length is an estimation based on season ticket holder addresses. Season ticket holders account for approximately 60% of seating at Warrior games.
4. Annual vehicle trips based on number of vendors at each event and total number of event days per year.
5. Annual vehicle trips based on 1.5 bus trips per game, 2 trips per round trip and 44 events per year. Count of opposing team bus trips from Ben Draa, Senior Financial Analyst, GSW. Event days per year includes 3 preseason games and 41 regular-season games.
6. Trip length is the driving distance from Union Square, San Francisco, where the Opposing Team is assumed to stay, to Oracle Arena.
7. Annual vehicle trips based on a daily delivery count of 8 from Ben Draa, Senior Financial Analyst, GSW. Assume 5 days per week for 52 weeks per year.
8. CalEEMod Default Trip Length for Commercial-Nonwork trips in the San Francisco Bay Area Air Basin.
9. Represents reduction in regional VMT-related emissions due to relocation of Warriors games from Oakland to San Francisco only.
10. From EMFAC2011, calendar year 2017, San Francisco Bay Area. Emission factors are weighted by VMT for all vehicle categories.

Table 6.1-26 Mobile Source CAPs Emission Reduction

Reduction in Road Dust Emissions

Road Dust Equation¹

$$E = k \cdot (sL)^{0.91} \cdot (W)^{1.02} \cdot (1-P/4N)$$

where:

E = annual average emission factor in the same units as *k*

k = particle size multiplier for particle size range and units of interest

*PM*₁₀ (lb/VMT)

0.0022

*PM*_{2.5} (lb/VMT)

0.00054

sL = road surface silt loading (grams per square meter) (*g/m*²)

0.1

W = average weight (tons) of all the vehicles traveling the road

2.4

P = number of "wet" days with at least 0.01 in of precipitation during the averaging period

64

N number of days in the averaging period

365

Pollutants	Emissions Factor [lb/VMT]	VMT Reduction [mile/yr]	Emission Reduction [ton/yr]
Fugitive PM ₁₀	0.00063	19,458,556	6.1
Fugitive PM _{2.5}	0.00016		1.5

Notes:

1. Road dust equation and parameters are based on CalEEMod defaults for the San Francisco Bay Area Air Basin.

Generator Emissions Estimates

Project Emission Calculations

Table 6.1-27

Location	Size		Fuel Type	Operation ¹ (hrs/yr)	Emission Factors ^{2,3}					Emissions			
	[kW]	[hp]			NMHC	ROG	CO	NOx	PM	ROG	CO	NOx	PM
					[g/bhp-hr]					[ton/yr]			
Arena Standby Emergency	1,500	2,012	diesel	50	0.14	0.15	2.6	0.50	0.020	0.017	0.29	0.055	0.0022
Arena Standby Emergency	1,500	2,012	diesel	50	0.14	0.15	2.6	0.50	0.020	0.017	0.29	0.055	0.0022
Office Tower 1	750	1006	diesel	50	0.14	0.15	2.6	0.50	0.020	0.0083	0.14	0.028	0.0011
Office Tower 2	750	1006	diesel	50	0.14	0.15	2.6	0.50	0.020	0.0083	0.14	0.028	0.0011
Marketplace	500	671	diesel	50	0.14	0.15	2.2	0.30	0.015	0.0055	0.081	0.011	0.0006
Total Emissions:										0.055	0.95	0.18	0.0072

Notes:

1. Operation is conservatively assumed to be 50 hours per year, the maximum allowable by the Bay Area Air Quality Management District.
2. Critical Air Pollutants emission factors based on Tier 4 standards from the ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (ARB 2013). Emission factors for PM₁₀ and PM_{2.5} are conservatively based on the PM emission standard.
3. The emission factors for ROG were calculated from the NMHC emission factors using conversion factors for diesel engines (USEPA 1997) and assuming that VOC and ROG are equivalent (ARB 2009).

References:

- U.S. Environmental Protection Agency (USEPA). 1997. *Conversion Factors for Hydrocarbon Emission Components*. November. Available online at: <http://www.epa.gov/oms/models/nonrdmdl/nr-002.pdf>.
- California Air Resources Board (ARB). 2013. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stdls.xls.
- ARB. 2009. *Definitions of VOC and ROG*. January. Available online at: http://www.arb.ca.gov/ei/speciate/voc_rog_dfn_1_09.pdf

Boiler Emissions Estimates

Project Emission Calculations

Table 6.1-28

Quantity ¹	Fuel Type	Size Per Boiler ¹	Higher Heating Value ²	Fuel Consumption ³	Operation ⁴ (hrs/yr)	Emission Factors ^{5,6,7}						Emissions			
		Btu/hr	Btu/scf	scf/hr		CO	NOx	CO	NOx	ROG	PM	CO	NOx	ROG	PM
						ppmv (dry at 3% O ₂)	lb/MMBtu	lb/10 ⁶ scf		[ton/yr]					
4	Natural Gas	4,000,000	1,020	3,922	8,760	400	30	0.30	0.037	5.5	7.6	21	2.6	0.38	0.52

Notes:

- Quantity and Size based on Project Sponsor estimate and is consistent with the total estimated heating load.
- Higher heating value is the average natural gas heating value in AP-42 Section 1.4.
- Fuel consumption calculated from size and higher heating value.
- The boiler is assumed to operate for every hour of the year.
- CO and NOx emission factors in ppm from BAAQMD Regulation 9 Rule 7.
- CO and NOx emission factors converted from ppm to lb/MMBtu using the F-Factor method described in USEPA Method 19 for natural gas fuel (USEPA 2001).
- ROG and PM emission factors from AP-42 Section 1.4 Table 1.4-2.

References:

- BAAQMD. 2011. Regulation 9 Rule 7. Inorganic Gaseous Pollutants Nitrogen oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters.
- USEPA. 1995. AP 42, Volume I, Fifth Edition. §1.4. Natural Gas Combustion. Available online at: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>
- USEPA. 2001. Preferred and Alternative Methods for Estimating Air Emissions from Boilers. January. Available online at: <http://www.epa.gov/ttnchie1/eiip/techreport/volume02/ii02.pdf>.

Area Source Emissions Adjustment

Table 6.1-29

Default Consumer Product Emission Factor ¹	2.1E-05	lb/ROG/sqft/day
Updated Consumer Product Emission Factor ²	1.5E-05	lb/ROG/sqft/day
Default Consumer Products Emissions	7.6	tons/year
Updated Consumer Product Emissions	5.4	tons/year
Reduction in Consumer Product Emissions	2.2	tons/year
Default Area Source Emissions	8.7	tons/year
Updated Area Source Emissions	6.4	tons/year

Notes:

1. Default value from the California Emissions Estimator Model (CalEEMod®).
2. San Francisco-specific area source emission factor developed by San Francisco Environmental Planning (SFEP) for ROG from consumer products.

No Project Alternative Tables

No Project Alternative

Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Off-road Equipment Emissions	3.6	32	2.1	2.0
Truck and Vehicle emissions	3.3	17	0.26	0.24
Architectural Coating Emissions	30	0	0	0
Total	37	49	2.3	2.2
BAAQMD Threshold	54	54	82	54
Above Threshold?	No	No	No	No

No Project Alternative

Average Daily and Maximum Annual Operational Emissions

	Average Daily Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile	14	31	22	6.3
Area Sources	20	<0.01	<0.01	<0.01
Boilers	0.54	4.9	0.37	0.37
Standby Diesel Generators	0.30	1.0	0.039	0.039
Total	35	36	23	6.7
Threshold	54	54	82	54
Above Threshold?	No	No	No	No
	Maximum Annual Emissions (short tons/year)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile	2.6	5.6	4.0	1.2
Area Sources	3.6	<0.01	<0.01	<0.01
Boilers	0.10	0.89	0.068	0.068
Standby Diesel Generators	0.06	0.18	0.0072	0.0072
Total	6.4	6.7	4.1	1.2
Threshold	10	10	15	10
Above Threshold?	No	No	No	No

**Annual Average PM2.5 Concentrations at off-site Receptors
for the No Project Alternative**

	PM _{2.5} Concentration		
	(µg/m ³ , Annual Average)		
Source	UCSF Hearst Tower Receptor	UCSF Hospital Receptor	Uber/ARE Receptor
Construction			
Background at the maximally impacted receptor	8.5	8.6	8.4
Uncontrolled Construction Contribution	0.10	0.10	0.38
Cumulative Total (Uncontrolled)	8.6	8.7	8.7
Significance Threshold	10	10	10
Significant?	No	No	No
Operation			
Background at the maximally impacted receptor	8.5	8.6	8.7
Project Operations – Generators	0.055	0.055	0.055
Project Operations – Mobile	0.32	0.32	0.32
Cumulative Total (Uncontrolled)	8.9	9.0	9.1
Significance Threshold	10	10	10
Significant?	No	No	No

NOTE: The cumulative total concentrations may not sum precisely due to rounding of subtotals.

Lifetime Excess Cancer Risk at off-site Receptors for the No Project Alternative

Source	Excess Cancer Risk (in one million)			
	UCSF Hearst Tower Receptor		UCSF Hospital Receptor	Uber/ARE Receptor
	Child Resident	Adult Resident	Child Resident	Daycare Child
Background at the maximally impacted receptor	26	26	44	41
Uncontrolled Construction Contribution	12	0.61	8.3	22
Project Operations – Generators	30	30	30	30
Project Operations – Mobile	7.2	7.2	7.2	7.2
Cumulative Total	75	64	90	100
Significance Threshold	100	100	100	100
Significant ?	No	No	No	No

NOTE: The cumulative total risks may not sum precisely due to rounding of subtotals.

Table 6.2-1
Construction Particulate Matter Emissions
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Emissions	Units	Uncontrolled Scenario
Project construction PM _{2.5} emissions ¹	[lb/project]	1396
Project construction DPM emissions ¹	[lb/project]	892
Construction duration	[years]	1.5
Annual PM _{2.5} emissions	[lb/year]	960
Annual DPM emissions	[lb/year]	613
Average PM _{2.5} emissions	[g/s]	0.014
Average DPM emissions	[g/s]	0.009

Notes:

1. Includes emissions from off-road equipment and on-road sources.
2. Annual emissions are calculated by dividing the project construction emissions by the construction duration. Average DPM emissions are calculated by converting pounds per year to grams per second using standard conversions. Average PM_{2.5} emissions calculated by scaling average DPM emissions by the ratio of project construction PM_{2.5} to project construction DPM.

Abbreviations:

DPM: Diesel particulate matter
 lb: pound
 g: gram
 s: second

Table 6.2-2
Annual Average Daily Traffic from Project Operation
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Trip Type	Scenario	Days Per Year	Daily One-way Vehicle Trips¹
Mission Bay, Weekday Trips	No Event Days	260	5,510
Mission Bay, Weekend Trips	No Event Days	105	2,145
Annual One-way Vehicle Trips:			1,657,825
Annual Average Daily Traffic (AADT):²			4,542

Notes:

1. Based on traffic data from Adavant Consulting.
2. Annual one-way vehicle trips is calculated by multiplying total daily one-way vehicle trips by total days per year. Annual one-way vehicle trips is divided by 365 days per year to get AADT.

Abbreviations:

AADT: Annual average daily traffic

Table 6.2-3
Screening PM_{2.5} Concentrations and Cancer Risks from Operational Traffic
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Impact ¹	North-South Roadway Impact	East-West Roadway Impact	Total Impact from 4 Adjacent Roadways
PM _{2.5} Concentration (ug/m ³)	0.080	0.078	0.32
Lifetime Cancer Risk (in a million)	2.2	1.4	7.2

Notes:

1. Based on BAAQMD County Surface Street Screening Tables for San Francisco County. A distance of 10 feet from the roadway and an annual average daily traffic (AADT) volume of 10,000 vehicles per day (vpd) was conservatively assumed since the AADT shown in Table 7.2-2 is less than 10,000 vpd.

Abbreviations:

AADT: annual average daily traffic

BAAQMD: Bay Area Air Quality Management District

vpd: vehicles per day

References:

Bay Area Air Quality Management District (BAAQMD). 2011. Roadway Screening Analysis Tables. December.

Available online at :

<http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en>

Table 6.2-4
AERMOD Construction Screening Inputs and Outputs
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Parameter	Inputs and Outputs
Source	Construction
Source Type	Area
Emission Rate (g/s-m ²)	2.2E-05
Release Height (m)	5
Area (m ²)	45482
Receptor Height (m)	1.8
Urban/Rural (U/R)	U
Meteorological Station	Mission Bay 2008
Dispersion Factor (µg/m³ per g/s)	
Annual Average Dispersion Factor at Dormitory Receptor	10.4
Annual Average Dispersion Factor at Hospital Receptor	10.4
Concentration	
Uncontrolled	
PM _{2.5} Emission Rate (g/s)	0.014
Annual Maximum PM_{2.5} Conc at Dormitory Receptor (µg/m³)	0.14
Annual Maximum PM_{2.5} Conc at Hospital Receptor (µg/m³)	0.14
Diesel PM Emission Rate (g/s)	0.0088
Annual Maximum DPM Conc at Dormitory Receptor (µg/m³)	0.092
Annual Maximum DPM Conc at Hospital Receptor (µg/m³)	0.091

Abbreviations:

g: gram
m: meter
m²: square meter
m³: cubic meter
PM: particulate matter
s: second
µg: microgram

Table 6.2-5
Screening PM_{2.5} Concentration Results
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Concentration [$\mu\text{g}/\text{m}^3$]		
	Dormitory Receptor	Hospital Receptor	Daycare Receptor
Construction			
PM _{2.5} Concentration from Uncontrolled Construction Emissions	0.10	0.10	0.38
2014 Background PM _{2.5} Concentration ²	8.5	8.6	8.4
Total PM _{2.5} Concentration (Construction)	8.6	8.7	8.7
Cumulative Threshold ³	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Uncontrolled scenario)	No	No	No
Operational			
PM _{2.5} Concentration from Operational Traffic	0.32	0.32	0.32
PM _{2.5} Concentration from Emergency Diesel Generators ¹	0.055	0.055	0.055
2014 Background PM _{2.5} Concentration ²	8.5	8.6	8.7
Total PM _{2.5} Concentration (Operational)	8.9	9.0	9.1
Cumulative Threshold ³	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Operational)	No	No	No

Notes:

1. Back-calculated assuming a cancer risk of 10 in a million for each of the three generators (total of 30 in a million). The cancer risk of 10 in a million is the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, and exposure assumptions for a 70-year resident.
2. 2014 background risk from the Citywide HRA database for all receptors.
3. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HRA: Health Risk Assessment
 μg : microgram
 m^3 : cubic meter

Table 6.2-6
Exposure Parameters and Cancer Risk Adjustment Factors
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Exposure Parameter	Units	Construction			
		Child Resident	Adult Resident	Hospital Child	Daycare Child
Daily Breathing Rate (DBR) ¹	[L/kg-day]	581	302	581	581
Exposure Time (ET) ²	[hours/24 hours]	24	24	24	11
Exposure Frequency (EF) ³	[days/year]	350	350	365	253
Exposure Duration (ED) ⁴	[years]	1.5	1.5	1	0.67
Averaging Time (AT)	[days]	25,550	25,550	25,550	25,550
Intake Factor, Inhalation (IF _{inh})	[m ³ /kg-day]	0.012	0.0060	0.0083	0.0018
Cancer Risk Adjustment Factor ⁵	[-]	10	1	10	10
Modeling Adjustment Factor ⁶	[-]	N/A	N/A	N/A	3.15

Notes:

1. Daily breathing rate reflects default breathing rate from BAAQMD 2010.
2. Exposure time reflects default exposure time from BAAQMD 2010.
3. Exposure frequency reflects default exposure frequency from BAAQMD 2010.
4. Assumes all construction-related emissions will be emitted within the first 1.5 years. Operation of the daycare center is not expected to take place until mid- to late-2017; since Project construction will be largely completed by that time, an exposure duration of 8 months was used as a conservative estimate.
5. Based on BAAQMD 2010.
6. Construction emissions are conservatively assumed to occur concurrently with the operation of the daycare center. As such, a modeling adjustment factor of $(365/253) \times (24/11) = 3.15$ is applied for the daycare child receptor.

Calculation:

$$IF_{inh} = DBR * ET * EF * ED * CF / AT$$

$$CF = 0.001 \text{ (m}^3\text{/L)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District

L: liter

kg: kilogram

m³: cubic meter

References:

BAAQMD. 2010. BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.
http://baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx?la=en

Table 6.2-7
Screening Cancer Risk Results
for the No Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Units	Dormitory Receptor		Hospital Child Receptor	Daycare Child Receptor
		Child Resident	Adult Resident		
Diesel PM Cancer Potency Factor (CPF) ¹	[mg/kg-day] ⁻¹	1.1	1.1	1.1	1.1
Excess Cancer Risk from Uncontrolled Construction Emissions ²	[in a million]	12	0.61	8.3	22
Excess Cancer Risk from Operational Traffic Emissions ³	[in a million]	7.2	7.2	7.2	7.2
Excess Cancer Risk from Emergency Diesel Generators ⁴	[in a million]	30	30	30	30
2014 Background Risk ⁵	[in a million]	26	26	44	41
Total Excess Cancer Risk	[in a million]	74.9	63.8	89.6	99.7
Cumulative Threshold ⁶	[in a million]	100	100	100	100
Total Risk Exceeds Threshold?	-	No	No	No	No

Notes:

1. From Cal/EPA 2013.
2. Represent health impacts for a residential receptor at the dormitory, hospital, or daycare.
3. The screening values reflect a 70-year cancer risk with age sensitivity factors applied (BAAQMD 2012).
4. A cancer risk of 10 in a million, the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, is conservatively assumed.
5. 2014 background risk from the Citywide HRA database for all receptors.
6. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.

Calculation:

$$\text{Cancer Risk} = [\text{AnnualConc}] \times [\text{CF}] \times [\text{IF}_{\text{inh}}] \times [\text{CPF}] \times [\text{CRAF}] \times [\text{MAF}]$$

$$\text{CF} = 0.001 \text{ (mg/}\mu\text{g)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
 Cal/EPA: California Environmental Protection Agency
 CRAF: Cancer Risk Adjustment Factor
 HRA: Health Risk Assessment
 IF_{inh}: Intake Factor, Inhalation
 kg: kilogram
 mg: milligram
 PM: Particulate Matter
 μg: microgram

References:

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. Available online at:
<http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Bay Area Air Quality Management District (BAAQMD). 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available online at:
<http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Mission Bay Blocks 29-32 Alternative A
San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	1,056.00	1000sqft	10.27	1,056,000.00	0
Regional Shopping Center	31.70	1000sqft	0.73	31,700.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	4.6	Precipitation Freq (Days)	64
Climate Zone	5			Operational Year	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	349	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor of 349 for 2017 from
http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Land Use - Retail acreage is Caleemod default; Office acreage was adjusted to make total acreage equal to 11 acres, per NOP site description. Square footage from Jose's comment.

Construction Phase - For consistency with project runs, construction was assumed to begin in 2015. No demolition - no buildings currently onsite.

Architectural Coating - Coating VOC contents reduced to meet limits of BAAQMD Reg 8 Rule 3: Interior coating limit of 100 g/L. Exterior limit of 150 g/L.

Vehicle Trips - Trip rates from traffic study, allocated to each land use subtype using same percent allocations from Caleemod defaults.

Energy Use - Title 24 electricity and natural gas energy intensities have been adjusted for 2013 standards per CEC report:
<http://www.energy.ca.gov/2013publications/CEC-400-2013-008/CEC-400-2013-008.pdf>

Table Name	Column Name	Default Value	New Value
tblEnergyUse	T24E	5.01	3.92
tblEnergyUse	T24E	2.74	2.14
tblEnergyUse	T24NG	19.28	16.04
tblEnergyUse	T24NG	4.10	3.41
tblLandUse	LotAcreage	24.24	10.27
tblProjectCharacteristics	CO2IntensityFactor	641.35	349
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	2.37	1.24
tblVehicleTrips	ST_TR	49.97	26.23
tblVehicleTrips	SU_TR	0.98	1.24
tblVehicleTrips	SU_TR	25.24	26.23
tblVehicleTrips	WD_TR	11.01	4.67
tblVehicleTrips	WD_TR	42.94	18.22

2.0 Emissions Summary

2.2 Overall Operational
Uncontrolled 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	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206
Energy	0.0978	0.8890	0.7467	5.3300e-003		0.0676	0.0676		0.0676	0.0676	0.0000	3,161.0963	3,161.0963	0.2008	0.0555	3,182.5027
Mobile	2.6430	5.5930	25.0005	0.0571	3.9504	0.0858	4.0362	1.0713	0.0790	1.1502	0.0000	4,346.1903	4,346.1903	0.1796	0.0000	4,349.9625
Waste						0.0000	0.0000		0.0000	0.0000	206.1109	0.0000	206.1109	12.1808	0.0000	461.9079
Water						0.0000	0.0000		0.0000	0.0000	60.2893	227.3138	287.6031	6.2112	0.1501	464.5755
Total	7.5570	6.4820	25.7574	0.0624	3.9504	0.1534	4.1038	1.0713	0.1466	1.2178	266.4003	7,734.6198	8,001.0201	18.7725	0.2056	8,458.9691

2.2 Overall Operational

Controlled 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	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206
Energy	0.0978	0.8890	0.7467	5.3300e-003		0.0676	0.0676		0.0676	0.0676	0.0000	3,161.0963	3,161.0963	0.2008	0.0555	3,182.5027
Mobile	2.6430	5.5930	25.0005	0.0571	3.9504	0.0858	4.0362	1.0713	0.0790	1.1502	0.0000	4,346.1903	4,346.1903	0.1796	0.0000	4,349.9625
Waste						0.0000	0.0000		0.0000	0.0000	206.1109	0.0000	206.1109	12.1808	0.0000	461.9079
Water						0.0000	0.0000		0.0000	0.0000	60.2893	227.3138	287.6031	6.2101	0.1499	464.4794
Total	7.5570	6.4820	25.7574	0.0624	3.9504	0.1534	4.1038	1.0713	0.1466	1.2178	266.4003	7,734.6198	8,001.0201	18.7713	0.2053	8,458.8730

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	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	0.01	0.11	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/29/2015	2/11/2015	5	10	
2	Grading	Grading	2/12/2015	3/25/2015	5	30	
3	Building Construction	Building Construction	3/26/2015	5/18/2016	5	300	
4	Paving	Paving	5/19/2016	6/15/2016	5	20	
5	Architectural Coating	Architectural Coating	6/16/2016	7/13/2016	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,631,550; Non-Residential Outdoor: 543,850 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	348.00	178.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	70.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2015

Uncontrolled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0263	0.2845	0.2132	2.0000e-004		0.0154	0.0154		0.0142	0.0142	0.0000	18.6506	18.6506	5.5700e-003	0.0000	18.7675
Total	0.0263	0.2845	0.2132	2.0000e-004	0.0903	0.0154	0.1058	0.0497	0.0142	0.0639	0.0000	18.6506	18.6506	5.5700e-003	0.0000	18.7675

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	4.9000e-004	4.9400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.8427	0.8427	5.0000e-005	0.0000	0.8437
Total	3.6000e-004	4.9000e-004	4.9400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.8427	0.8427	5.0000e-005	0.0000	0.8437

3.2 Site Preparation - 2015

Controlled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0263	0.2845	0.2132	2.0000e-004		0.0154	0.0154		0.0142	0.0142	0.0000	18.6505	18.6505	5.5700e-003	0.0000	18.7675
Total	0.0263	0.2845	0.2132	2.0000e-004	0.0903	0.0154	0.1058	0.0497	0.0142	0.0639	0.0000	18.6505	18.6505	5.5700e-003	0.0000	18.7675

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	4.9000e-004	4.9400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.8427	0.8427	5.0000e-005	0.0000	0.8437
Total	3.6000e-004	4.9000e-004	4.9400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.8427	0.8427	5.0000e-005	0.0000	0.8437

3.3 Grading - 2015

Uncontrolled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1016	1.1857	0.7626	9.3000e-004		0.0570	0.0570		0.0525	0.0525	0.0000	88.2633	88.2633	0.0264	0.0000	88.8167
Total	0.1016	1.1857	0.7626	9.3000e-004	0.1301	0.0570	0.1871	0.0540	0.0525	0.1064	0.0000	88.2633	88.2633	0.0264	0.0000	88.8167

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1900e-003	1.6400e-003	0.0165	4.0000e-005	2.7200e-003	3.0000e-005	2.7500e-003	7.2000e-004	2.0000e-005	7.5000e-004	0.0000	2.8090	2.8090	1.6000e-004	0.0000	2.8123
Total	1.1900e-003	1.6400e-003	0.0165	4.0000e-005	2.7200e-003	3.0000e-005	2.7500e-003	7.2000e-004	2.0000e-005	7.5000e-004	0.0000	2.8090	2.8090	1.6000e-004	0.0000	2.8123

3.3 Grading - 2015

Controlled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1016	1.1857	0.7626	9.3000e-004		0.0570	0.0570		0.0525	0.0525	0.0000	88.2632	88.2632	0.0264	0.0000	88.8166
Total	0.1016	1.1857	0.7626	9.3000e-004	0.1301	0.0570	0.1871	0.0540	0.0525	0.1064	0.0000	88.2632	88.2632	0.0264	0.0000	88.8166

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1900e-003	1.6400e-003	0.0165	4.0000e-005	2.7200e-003	3.0000e-005	2.7500e-003	7.2000e-004	2.0000e-005	7.5000e-004	0.0000	2.8090	2.8090	1.6000e-004	0.0000	2.8123
Total	1.1900e-003	1.6400e-003	0.0165	4.0000e-005	2.7200e-003	3.0000e-005	2.7500e-003	7.2000e-004	2.0000e-005	7.5000e-004	0.0000	2.8090	2.8090	1.6000e-004	0.0000	2.8123

3.4 Building Construction - 2015**Uncontrolled Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3677	3.0180	1.8838	2.7000e-003		0.2127	0.2127		0.2000	0.2000	0.0000	245.2143	245.2143	0.0615	0.0000	246.5063
Total	0.3677	3.0180	1.8838	2.7000e-003		0.2127	0.2127		0.2000	0.2000	0.0000	245.2143	245.2143	0.0615	0.0000	246.5063

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2897	2.0203	3.5544	4.1200e-003	0.1143	0.0317	0.1460	0.0327	0.0291	0.0618	0.0000	375.6842	375.6842	3.3300e-003	0.0000	375.7540
Worker	0.1389	0.1916	1.9184	4.1500e-003	0.3173	3.0400e-003	0.3203	0.0844	2.8000e-003	0.0872	0.0000	327.4745	327.4745	0.0182	0.0000	327.8565
Total	0.4286	2.2119	5.4727	8.2700e-003	0.4315	0.0347	0.4662	0.1171	0.0319	0.1490	0.0000	703.1587	703.1587	0.0215	0.0000	703.6106

3.4 Building Construction - 2015

Controlled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3677	3.0180	1.8838	2.7000e-003		0.2127	0.2127		0.2000	0.2000	0.0000	245.2140	245.2140	0.0615	0.0000	246.5060
Total	0.3677	3.0180	1.8838	2.7000e-003		0.2127	0.2127		0.2000	0.2000	0.0000	245.2140	245.2140	0.0615	0.0000	246.5060

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2897	2.0203	3.5544	4.1200e-003	0.1143	0.0317	0.1460	0.0327	0.0291	0.0618	0.0000	375.6842	375.6842	3.3300e-003	0.0000	375.7540
Worker	0.1389	0.1916	1.9184	4.1500e-003	0.3173	3.0400e-003	0.3203	0.0844	2.8000e-003	0.0872	0.0000	327.4745	327.4745	0.0182	0.0000	327.8565
Total	0.4286	2.2119	5.4727	8.2700e-003	0.4315	0.0347	0.4662	0.1171	0.0319	0.1490	0.0000	703.1587	703.1587	0.0215	0.0000	703.6106

3.4 Building Construction - 2016**Uncontrolled Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1686	1.4111	0.9161	1.3300e-003		0.0974	0.0974		0.0915	0.0915	0.0000	119.8660	119.8660	0.0297	0.0000	120.4903
Total	0.1686	1.4111	0.9161	1.3300e-003		0.0974	0.0974		0.0915	0.0915	0.0000	119.8660	119.8660	0.0297	0.0000	120.4903

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1265	0.8695	1.6206	2.0300e-003	0.0563	0.0125	0.0688	0.0161	0.0115	0.0277	0.0000	183.0763	183.0763	1.4500e-003	0.0000	183.1067
Worker	0.0621	0.0852	0.8543	2.0400e-003	0.1563	1.4300e-003	0.1577	0.0416	1.3200e-003	0.0429	0.0000	155.7346	155.7346	8.2500e-003	0.0000	155.9079
Total	0.1886	0.9547	2.4749	4.0700e-003	0.2126	0.0140	0.2265	0.0577	0.0128	0.0705	0.0000	338.8109	338.8109	9.7000e-003	0.0000	339.0147

3.4 Building Construction - 2016**Controlled Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1686	1.4111	0.9161	1.3300e-003		0.0974	0.0974		0.0915	0.0915	0.0000	119.8659	119.8659	0.0297	0.0000	120.4902
Total	0.1686	1.4111	0.9161	1.3300e-003		0.0974	0.0974		0.0915	0.0915	0.0000	119.8659	119.8659	0.0297	0.0000	120.4902

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1265	0.8695	1.6206	2.0300e-003	0.0563	0.0125	0.0688	0.0161	0.0115	0.0277	0.0000	183.0763	183.0763	1.4500e-003	0.0000	183.1067
Worker	0.0621	0.0852	0.8543	2.0400e-003	0.1563	1.4300e-003	0.1577	0.0416	1.3200e-003	0.0429	0.0000	155.7346	155.7346	8.2500e-003	0.0000	155.9079
Total	0.1886	0.9547	2.4749	4.0700e-003	0.2126	0.0140	0.2265	0.0577	0.0128	0.0705	0.0000	338.8109	338.8109	9.7000e-003	0.0000	339.0147

3.5 Paving - 2016

Uncontrolled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0209	0.2239	0.1482	2.2000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0209	0.2239	0.1482	2.2000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	7.4000e-004	7.4400e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.3561	1.3561	7.0000e-005	0.0000	1.3576
Total	5.4000e-004	7.4000e-004	7.4400e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.3561	1.3561	7.0000e-005	0.0000	1.3576

3.5 Paving - 2016**Controlled Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0209	0.2239	0.1482	2.2000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0209	0.2239	0.1482	2.2000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	7.4000e-004	7.4400e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.3561	1.3561	7.0000e-005	0.0000	1.3576
Total	5.4000e-004	7.4000e-004	7.4400e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.3561	1.3561	7.0000e-005	0.0000	1.3576

3.6 Architectural Coating - 2016

Uncontrolled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	5.6717					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6800e-003	0.0237	0.0188	3.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596
Total	5.6754	0.0237	0.0188	3.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596

Uncontrolled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5200e-003	3.4600e-003	0.0347	8.0000e-005	6.3500e-003	6.0000e-005	6.4100e-003	1.6900e-003	5.0000e-005	1.7400e-003	0.0000	6.3285	6.3285	3.4000e-004	0.0000	6.3355
Total	2.5200e-003	3.4600e-003	0.0347	8.0000e-005	6.3500e-003	6.0000e-005	6.4100e-003	1.6900e-003	5.0000e-005	1.7400e-003	0.0000	6.3285	6.3285	3.4000e-004	0.0000	6.3355

3.6 Architectural Coating - 2016

Controlled Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	5.6717					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6800e-003	0.0237	0.0188	3.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596
Total	5.6754	0.0237	0.0188	3.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596

Controlled Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5200e-003	3.4600e-003	0.0347	8.0000e-005	6.3500e-003	6.0000e-005	6.4100e-003	1.6900e-003	5.0000e-005	1.7400e-003	0.0000	6.3285	6.3285	3.4000e-004	0.0000	6.3355
Total	2.5200e-003	3.4600e-003	0.0347	8.0000e-005	6.3500e-003	6.0000e-005	6.4100e-003	1.6900e-003	5.0000e-005	1.7400e-003	0.0000	6.3285	6.3285	3.4000e-004	0.0000	6.3355

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Controlled	2.6430	5.5930	25.0005	0.0571	3.9504	0.0858	4.0362	1.0713	0.0790	1.1502	0.0000	4,346.1903	4,346.1903	0.1796	0.0000	4,349.9625
Uncontrolled	2.6430	5.5930	25.0005	0.0571	3.9504	0.0858	4.0362	1.0713	0.0790	1.1502	0.0000	4,346.1903	4,346.1903	0.1796	0.0000	4,349.9625

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Uncontrolled	Controlled
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	4,931.52	1,309.44	1309.44	9,312,006	9,312,006
Regional Shopping Center	577.57	831.49	831.49	1,139,862	1,139,862
Total	5,509.09	2,140.93	2,140.93	10,451,868	10,451,868

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.627987	0.058543	0.149166	0.078755	0.026467	0.003331	0.026417	0.003903	0.003129	0.011009	0.010235	0.000550	0.000507

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					
Electricity Controlled						0.0000	0.0000		0.0000	0.0000	0.0000	2,193.3390	2,193.3390	0.1823	0.0377	2,208.8557
Electricity Uncontrolled						0.0000	0.0000		0.0000	0.0000	0.0000	2,193.3390	2,193.3390	0.1823	0.0377	2,208.8557
NaturalGas Controlled	0.0978	0.8890	0.7467	5.3300e-003		0.0676	0.0676		0.0676	0.0676	0.0000	967.7573	967.7573	0.0186	0.0177	973.6469
NaturalGas Uncontrolled	0.0978	0.8890	0.7467	5.3300e-003		0.0676	0.0676		0.0676	0.0676	0.0000	967.7573	967.7573	0.0186	0.0177	973.6469

5.2 Energy by Land Use - NaturalGas

Uncontrolled

	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					
General Office Building	1.80048e+007	0.0971	0.8826	0.7414	5.3000e-003		0.0671	0.0671		0.0671	0.0671	0.0000	960.8047	960.8047	0.0184	0.0176	966.6520
Regional Shopping Center	130287	7.0000e-004	6.3900e-003	5.3600e-003	4.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	6.9526	6.9526	1.3000e-004	1.3000e-004	6.9949
Total		0.0978	0.8890	0.7467	5.3400e-003		0.0676	0.0676		0.0676	0.0676	0.0000	967.7573	967.7573	0.0186	0.0177	973.6469

Controlled

	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					
General Office Building	1.80048e+007	0.0971	0.8826	0.7414	5.3000e-003		0.0671	0.0671		0.0671	0.0671	0.0000	960.8047	960.8047	0.0184	0.0176	966.6520
Regional Shopping Center	130287	7.0000e-004	6.3900e-003	5.3600e-003	4.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	6.9526	6.9526	1.3000e-004	1.3000e-004	6.9949
Total		0.0978	0.8890	0.7467	5.3400e-003		0.0676	0.0676		0.0676	0.0676	0.0000	967.7573	967.7573	0.0186	0.0177	973.6469

5.3 Energy by Land Use - Electricity

Uncontrolled

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	1.35062e+007	2,138.0883	0.1777	0.0368	2,153.2142
Regional Shopping Center	349017	55.2507	4.5900e-003	9.5000e-004	55.6416
Total		2,193.3390	0.1823	0.0377	2,208.8557

Controlled

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	1.35062e+007	2,138.0883	0.1777	0.0368	2,153.2142
Regional Shopping Center	349017	55.2507	4.5900e-003	9.5000e-004	55.6416
Total		2,193.3390	0.1823	0.0377	2,208.8557

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					
Controlled	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206
Uncontrolled	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206

6.2 Area by SubCategory

Uncontrolled

	ROG	NOx	CO	SO2	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	0.5672					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.2480					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206
Total	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206

6.2 Area by SubCategory

Controlled

	ROG	NOx	CO	SO2	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	0.5672					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.2480					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206
Total	4.8162	1.0000e-004	0.0102	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0194	0.0194	5.0000e-005	0.0000	0.0206

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Controlled	287.6031	6.2101	0.1499	464.4794
Uncontrolled	287.6031	6.2112	0.1501	464.5755

7.2 Water by Land Use

Uncontrolled

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	187.687 / 115.034	284.0495	6.1344	0.1483	458.8352
Regional Shopping Center	2.3481 / 1.43916	3.5537	0.0768	1.8500e-003	5.7404
Total		287.6031	6.2112	0.1501	464.5755

Controlled

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	187.687 / 115.034	284.0495	6.1333	0.1480	458.7402
Regional Shopping Center	2.3481 / 1.43916	3.5537	0.0767	1.8500e-003	5.7392
Total		287.6031	6.2101	0.1499	464.4794

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Controlled	206.1109	12.1808	0.0000	461.9079
Uncontrolled	206.1109	12.1808	0.0000	461.9079

8.2 Waste by Land Use

Uncontrolled

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	982.08	199.3534	11.7815	0.0000	446.7637
Regional Shopping Center	33.29	6.7576	0.3994	0.0000	15.1442
Total		206.1109	12.1808	0.0000	461.9079

8.2 Waste by Land Use

Controlled

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	982.08	199.3534	11.7815	0.0000	446.7637
Regional Shopping Center	33.29	6.7576	0.3994	0.0000	15.1442
Total		206.1109	12.1808	0.0000	461.9079

9.0 Operational Offroad

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

Area Source Emissions Adjustment

Default Consumer Product Emission Factor ¹	2.1E-05	lb/ROG/sqft/day
Updated Consumer Product Emission Factor ²	1.5E-05	lb/ROG/sqft/day
Default Consumer Products Emissions	4.2	tons/year
Updated Consumer Product Emissions	3.0	tons/year
Reduction in Consumer Product Emissions	1.2	tons/year
Default Area Source Emissions	4.8	tons/year
Updated Area Source Emissions	3.6	tons/year

Notes:

1. Default value from the California Emissions Estimator Model (CalEEMod®).
2. San Francisco-specific area source emission factor developed by San Francisco Environmental Planning (SFEP) for ROG from consumer products.

Reduced Density Alternative Tables

Reduced Intensity Alternative

Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Off-road Equipment Emissions	11	154	6.2	6.2
Truck and Vehicle emissions	7	48	0.8	0.7
Architectural Coating Emissions	31	0	0	0
Total	49	203	7.0	7.0
BAAQMD Threshold	54	54	82	54
Above Threshold?	No	Yes	No	No

Reduced Intensity Alternative

Controlled Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
With Tier 4 Off-road Equipment				
Off-road Equipment Emissions	2.2	21	0.33	0.33
Truck and Vehicle emissions	7	48	0.8	0.7
Architectural Coating Emissions	31	0	0	0
Total	40	69	1.1	1.1
BAAQMD Threshold	54	54	82	54
Above Threshold?	No	Yes	No	No
With Tier 2 + ARB NOx VDECS Off-road Equipment				
Off-road Equipment Emissions	0.46	82	0.51	0.51
Truck and Vehicle emissions	7	48	0.8	0.7
Architectural Coating Emissions	31	0	0	0
Total	38.6	130	1.3	1.2
BAAQMD Threshold	54	54	82	54
Above Threshold?	No	Yes	No	No

Reduced Intensity Alternative

Average Daily and Maximum Annual Operational Emissions

	Average Daily Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile	34	90	64	18
Standby Diesel Generators	0.30	0.97	0.04	0.04
Boilers	2.1	14	2.9	2.9
Area Sources	28	<0.01	<0.01	<0.01
Total	64	105	67	21
Threshold	54	54	82	54
Above Threshold?	Yes	Yes	No	No

	Maximum Annual Emissions (short tons/year)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile	6.2	16	12	3.3
Standby Diesel generators	0.055	0.18	0.0072	0.0072
Boilers	0.38	2.6	0.52	0.52
Area Sources	5.2	<0.01	<0.01	<0.01
Total	11.8	19	12.3	3.8
Threshold	10	10	15	10
Above Threshold?	Yes	Yes	No	No

Annual Average PM_{2.5} Concentrations at Off-site Receptors

For the Reduced Intensity Alternative

Source	PM _{2.5} Concentration (µg/m ³ , Annual Average)		
	UCSF Hearst Tower Receptor	UCSF Hospital Receptor	Uber/ARE Daycare Receptor
Construction			
Background at the maximally impacted receptor	8.5	8.6	8.4
Uncontrolled Construction Contribution	0.27	0.27	1.1
Controlled (Tier 2 + NOx VDECS) Construction Contribution	0.049	0.048	0.19
Cumulative Total (Uncontrolled/with Mitigation)	8.8/8.5	8.9/8.7	9.4/8.6
Significance Threshold	10	10	10
Significant?	No	No	No
Operation			
Background at the maximally impacted receptor	8.5	8.6	8.4
Project Operations – Generators	0.055	0.055	0.055
Project Operations – Mobile	0.32	0.32	0.32
Cumulative Total (Uncontrolled)	8.9	9.0	8.7
Significance Threshold	10	10	10
Significant?	No	No	No

NOTE: The cumulative total concentrations may not sum precisely due to rounding of subtotals.

**Lifetime Excess Cancer Risk at Off-site Receptors
For the Reduced Intensity Alternative**

Source	Excess Cancer Risk (in one million)			
	UCSF Hearst Tower Receptor		UCSF Hospital Receptor	Uber/ARE Daycare Receptor
	Child Resident	Adult Resident	Child Resident	Child Daycare
Background at the maximally impacted receptor	26	26	44	20
Uncontrolled Construction Contribution	48	2.5	25	65
Controlled (Tier 2 + NOx VDECS) Construction Contribution	8.5	0.44	4.4	11
Project Operations – Generators	30	30	30	30
Project Operations – Mobile	7.2	7.2	7.2	7.2
Cumulative Total (Uncontrolled/with Mitigation)	111/72	66/64	106/86	122/69
Significance Threshold	100	100	100	100
Significant (Uncontrolled/with Mitigation)?	Yes/No	No/No	Yes/No	Yes/No

NOTE: The cumulative total risks may not sum precisely due to rounding of subtotals.

Table 6.3-1
Toxicity-Weighted Construction Emissions
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Uncontrolled Project Emissions³ (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ⁴	3.0E-04	3,626	1.1	99.8%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions ²	1.81E-06	1,263	0.0023	0.21%
TACs from Speciated Gasoline TOG due to Evaporative Losses ²	1.07E-07	1,861	0.0002	0.02%

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Controlled Tier 4 Project Emissions³ (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ⁴	3.0E-04	548	0.16	98.5%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions ²	1.81E-06	1,263	0.0023	1.4%
TACs from Speciated Gasoline TOG Evaporative Losses ²	1.07E-07	1,861	0.0002	0.1%

Notes:

1. From Cal/EPA 2013.
2. From BAAQMD 2012.
3. Emissions estimates are subject to change before publication of draft Environmental Impact Report.
4. Includes DPM emissions from off-road equipment and on-road sources. Emissions in the controlled scenario reflect the use of Tier 4 off-road equipment.

Abbreviations:

PM: particulate matter

lb: pound

g: gram

s: second

TOG: Total Organic Gas

µg: microgram

References:

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

<http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Table 6.3-2
Construction Particulate Matter Emissions
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Emissions	Units	Uncontrolled Scenario	Controlled Tier 4 Scenario	Controlled Tier 2 + ARB NOx VDECS Scenario
Project construction PM _{2.5} emissions ¹	[lb/project]	3,629	551	648
Project construction DPM emissions ¹	[lb/project]	3,626	548	645
Construction duration	[years]	2	2	2
Average PM _{2.5} emissions ²	[g/s]	0.026	0.004	0.005
Average DPM emissions ²	[g/s]	0.026	0.004	0.005

Notes:

1. Includes emissions from off-road equipment and on-road sources. Emissions in the controlled scenario reflect the use of Tier 4 or Tier 2 + ARB NOx VDECS off-road equipment.

2. Annual emissions are calculated by dividing the project construction emissions by the construction duration. Average DPM and PM_{2.5} emissions are calculated by converting pounds per year to grams per second using standard conversions.

Abbreviations:

DPM: Diesel particulate matter

lb: pound

g: gram

s: second

Table 6.3-3
Annual Average Daily Traffic from Project Operation
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Trip Type	Scenario	Days Per Year	Daily One-way Vehicle Trips¹
Mission Bay, Weekday Trips	Basketball Event Days	30	11,692
	Concert and Family Show Event Days ²	45	11,692
	Convention Event and Other Event Days ³	61	7,024
	No Event Days	125	4,258
Mission Bay, Weekend Trips	Basketball Event Days	30	10,893
	Concert and Family Show Event Days ²	55	10,893
	No Event Days	19	3,556
Annual One-way Vehicle Trips:			2,831,083
Annual Average Daily Traffic (AADT):⁴			7,756

Notes:

1. Based on traffic data from Adavant Consulting.
2. Trips associated with concert and family show event days are conservatively assumed to be equal to basketball event days as presented in the traffic study.
3. Trips associated with convention and other event days are conservatively assumed to be equal to convention event days as presented in the traffic study.

Abbreviations:

AADT: Annual average daily traffic

Table 6.3-4
Screening PM_{2.5} Concentrations and Cancer Risks from Operational Traffic
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Impact ¹	North-South Roadway Impact	East-West Roadway Impact	Total Impact from 4 Adjacent Roadways
PM _{2.5} Concentration (ug/m ³)	0.080	0.078	0.32
Lifetime Cancer Risk (in a million)	2.2	1.4	7.2

Notes:

1. Based on BAAQMD County Surface Street Screening Tables for San Francisco County. A distance of 10 feet from the roadway and an annual average daily traffic (AADT) volume of 10,000 vehicles per day (vpd) was conservatively assumed since the AADT shown in Table 2 is less than 10,000 vpd.

References:

Bay Area Air Quality Management District (BAAQMD). 2011. Roadway Screening Analysis Tables. December. Available online at :
<http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en>

Table 6.3-5
AERMOD Construction Screening Inputs and Outputs
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Parameter	Inputs and Outputs		
Source	Construction		
Source Type	Area		
Emission Rate (g/s-m ²)	2.2E-05		
Release Height (m)	5		
Area (m ²)	45482		
Receptor Height (m)	1.8		
Urban/Rural (U/R)	U		
Meteorological Station	Mission Bay 2008		
Dispersion Factor (µg/m³ per g/s)			
Annual Average Dispersion Factor at Dormitory Receptor	10.4		
Annual Average Dispersion Factor at Hospital Receptor	10.4		
Annual Average Dispersion Factor at Daycare Child Receptor	41		
Concentration	Uncontrolled	Tier 4 Controlled	Tier 2 + ARB NOx VDECS Controlled
PM _{2.5} Emission Rate (g/s)	0.026	0.0040	0.0047
Annual Maximum PM _{2.5} Conc at Dormitory Receptor (µg/m ³)	0.27	0.041	0.049
Annual Maximum PM _{2.5} Conc at Hospital Receptor (µg/m ³)	0.27	0.041	0.048
Annual Maximum PM _{2.5} Conc at Daycare Child Receptor (µg/m ³)	1.1	0.16	0.19
Diesel PM Emission Rate (g/s)	0.026	0.0039	0.0046
Annual Maximum DPM Conc at Dormitory Receptor (µg/m ³)	0.27	0.041	0.048
Annual Maximum DPM Conc at Hospital Receptor (µg/m ³)	0.27	0.041	0.048
Annual Maximum DPM Conc at Hospital Receptor (µg/m ³)	1.06	0.16	0.19

Abbreviations:

g: gram
m: meter
m²: square meter
m³: cubic meter
PM: particulate matter
s: second
µg: microgram

**Table 6.3-6
Screening PM_{2.5} Concentration Results
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California**

Scenario	Concentration [$\mu\text{g}/\text{m}^3$]		
	Dormitory Receptor	Hospital Receptor	Daycare Receptor
Construction			
PM _{2.5} Concentration from Uncontrolled Construction Emissions	0.27	0.27	1.1
PM _{2.5} Concentration from Tier 4 Controlled Construction Emissions	0.041	0.041	0.16
PM _{2.5} Concentration from Tier 2 + ARB NOx VDECS Controlled Construction Emissions	0.049	0.048	0.19
2014 Background PM _{2.5} Concentration ¹	8.5	8.6	8.4
Total PM _{2.5} Concentration (Construction, Uncontrolled scenario)	8.8	8.9	9.4
Total PM _{2.5} Concentration (Construction, Tier 4 Controlled scenario)	8.5	8.7	8.5
Total PM _{2.5} Concentration (Construction, Tier 2 + ARB NOx VDECS Controlled scenario)	8.5	8.7	8.6
Cumulative Threshold ²	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Uncontrolled scenario)	No	No	No
Total PM _{2.5} Concentration Exceeds Threshold? (Tier 4 Controlled scenario)	No	No	No
Total PM _{2.5} Concentration Exceeds Threshold? (Tier 2 + ARB NOx VDECS Controlled scenario)	No	No	No
Operational			
PM _{2.5} Concentration from Operational Traffic	0.32	0.32	0.32
PM _{2.5} Concentration from Emergency Diesel Generators ²	0.055	0.055	0.055
2014 Background PM _{2.5} Concentration ¹	8.5	8.6	8.4
Total PM _{2.5} Concentration (Operational)	8.9	9.0	8.7
Cumulative Threshold ²	10	10	10
Total PM _{2.5} Concentration Exceeds Threshold? (Operational)	No	No	No

Notes:

1. 2014 background risk from the Citywide HRA database for all receptors.
2. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.
3. Back-calculated assuming a cancer risk of 10 in a million for each of the three generators (total of 30 in a million). The cancer risk of 10 in a million is the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, and exposure assumptions for a 70-year resident.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HRA: Health Risk Assessment
 μg : microgram
 m^3 : cubic meter

Table 6.3-7
Exposure Parameters and Cancer Risk Adjustment Factors
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Exposure Parameter	Units	Construction			
		Child Resident	Adult Resident	Hospital Child	Daycare Child
Daily Breathing Rate (DBR) ¹	[L/kg-day]	581	302	581	581
Exposure Time (ET) ²	[hours/24 hours]	24	24	24	11
Exposure Frequency (EF) ³	[days/year]	350	350	365	253
Exposure Duration (ED) ⁴	[years]	2	2	1	0.67
Averaging Time (AT)	[days]	25,550	25,550	25,550	25,550
Intake Factor, Inhalation (IF _{inh})	[m ³ /kg-day]	0.016	0.0083	0.0083	0.0018
Cancer Risk Adjustment Factor ⁵	[-]	10	1	10	10
Modeling Adjustment Factor ⁶	[-]	N/A	N/A	N/A	3.15

Notes:

1. Daily breathing rate reflects default breathing rate from BAAQMD 2010.
2. Exposure time reflects default exposure time from BAAQMD 2010.
3. Exposure frequency reflects default exposure frequency from BAAQMD 2010.
4. Assumes all construction-related emissions will be emitted within the first two years. Operation of the daycare center is not expected to take place until mid- to late-2017; since Project construction will be largely completed by that time, an exposure duration of 8 months was used as a conservative estimate.
5. Based on BAAQMD 2010.
6. Construction emissions are conservatively assumed to occur concurrently with the operation of the daycare center. As such, a modeling adjustment factor of $(365/253) \times (24/11) = 3.15$ is applied for the daycare child receptor.

Calculation:

$$IF_{inh} = DBR * ET * EF * ED * CF / AT$$

$$CF = 0.001 \text{ (m}^3\text{/L)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District

L: liter

kg: kilogram

m³: cubic meter

References:

BAAQMD. 2010. BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.
http://baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx?la=en

**Table 6.3-8
Screening Cancer Risk Results
for the Reduced Intensity Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California**

Scenario	Units	Dormitory Receptor		Hospital Child Receptor	Daycare Child Receptor
		Child Resident	Adult Resident		
Diesel PM Cancer Potency Factor (CPF) ¹	[mg/kg-day] ⁻¹	1.1	1.1	1.1	1.1
Excess Cancer Risk from Uncontrolled Construction Emissions ²	[in a million]	48	2.5	25	65
Excess Cancer Risk from Tier 4 Controlled Construction Emissions ²	[in a million]	7.2	0.37	3.7	10
Excess Cancer Risk from Tier 2 + ARB NOx VDECS Controlled Construction Emissions ²	[in a million]	8.5	0.44	4.4	11
Excess Cancer Risk from Operational Traffic Emissions ³	[in a million]	7.2	7.2	7.2	7.2
Excess Cancer Risk from Emergency Diesel Generators ⁴	[in a million]	30	30	30	30
2014 Background Risk ⁵	[in a million]	26	26	44	20
Total Excess Cancer Risk (Uncontrolled Scenario)	[in a million]	111	66	106	122
Total Excess Cancer Risk (Tier 4 Controlled Scenario)	[in a million]	70	64	85	67
Total Excess Cancer Risk (Tier 2 + ARB NOx VDECS) Controlled Scenario)	[in a million]	72	64	86	69
Cumulative Threshold	[in a million]	100	100	100	100
Total Risk Exceeds Threshold? (Uncontrolled Scenario)	-	Yes	No	Yes	Yes
Total Risk Exceeds Threshold? (Tier 4 Controlled Scenario)	-	No	No	No	No
Total Risk Exceeds Threshold? (Tier 2 + ARB NOx VDECS Controlled Scenario)	-	No	No	No	No

Notes:

1. From Cal/EPA 2013.
2. Represent health impacts for a residential receptor at the dormitory, hospital, or daycare.
3. The screening values reflect a 70-year cancer risk with age sensitivity factors applied (BAAQMD 2012).
4. A cancer risk of 10 in a million, the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, is conservatively assumed.
5. 2014 background risk from the Citywide HRA database for all receptors.
6. Cumulative threshold is the threshold for creating an Air Pollutant Exposure Zone (APEZ), as defined by the San Francisco Planning Department, Environmental Planning.

Calculation:

$$\text{Cancer Risk} = [\text{AnnualConc}] \times [\text{CF}] \times [\text{IF}_{\text{inh}}] \times [\text{CPF}] \times [\text{CRAF}]$$

$$\text{CF} = 0.001 \text{ (mg/}\mu\text{g)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
 Cal/EPA: California Environmental Protection Agency
 CRAF: Cancer Risk Adjustment Factor
 HRA: Health Risk Assessment
 IF_{inh}: Intake Factor, Inhalation
 kg: kilogram
 mg: milligram
 PM: Particulate Matter
 μg: microgram

References:

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. Available online at: <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Bay Area Air Quality Management District (BAAQMD). 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available online at: <http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Project Construction Trip Estimates

Phase	Duration [months]	Average Number of Daily Construction Trucks ¹	Average Number of Daily Construction Workers ¹	Number of Work Days	Total One-Way Trips		
					Hauling Trips	Vendor Trips	Worker Trips
Entire Site							
Demolition (Entire Site)	1	8	10	22	352	-	440
Excavation and Shoring (Entire Site)	3	300	25	66	39,600	-	3,300
Arena							
Foundation & Below Grade Construction (Piles & Concrete)	6	20	100	131	-	5,240	26,200
Base Building	16	25	200	348	-	17,400	139,200
Exterior Finishing	10	25	50	218	-	10,900	21,800
Interior Finishing	18.5	30	150	402	-	24,120	120,600
Garage/Podium							
Foundation & Below Grade Construction (Piles & Concrete)	6	20	50	131	-	5,240	13,100
Base Building	9	20	50	196	-	7,840	19,600
NW Tower²							
Base Building	8	15	40	174	-	3,132	8,352
Exterior Finishing	5	2	10	109	-	262	1,308
Interior Finishing	12	10	100	261	-	3,132	31,320
SW Tower²							
Base Building	8	15	40	174	-	3,132	8,352
Exterior Finishing	5	2	10	109	-	262	1,308
Interior Finishing	12	10	100	261	-	3,132	31,320
Entire Site							
Street Improvements	5	10	40	109	-	2,180	8,720
Total Construction Trips					39,952	85,971	434,920

Notes:

1. Proposed number of construction trucks and workers provided by Project Sponsor in a table titled "Summary of Construction Phases and Duration, and Daily Construction Trucks and Workers by Phase," dated 11/25/2014.
2. The number of trips associated with NW Tower and SW Tower were reduced by 40% to reflect the 40% reduction in square footage for non-arena land uses in the Reduced Intensity Alternative.

Onroad Equipment Activities, Emission Factors and Emissions

								Running Exhaust and Running Losses Emission Factor (g/mile)				
Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	ROG Exhaust	ROG Running Loss	NOx Exhaust	PM ₁₀ Exhaust	PM _{2.5} Exhaust
Mission Bay	2015	Worker	LDA	GAS	50%	434,920	12.4	0.039	0.067	0.12	0.0023	0.0021
	2015	Worker	LDT1	GAS	25%	434,920	12.4	0.079	0.22	0.27	0.0043	0.0040
	2015	Worker	LDT2	GAS	25%	434,920	12.4	0.041	0.10	0.21	0.0022	0.0020
	2015	Vendor	T6	DSL	50%	85,971	7.3	0.22	0	4.6	0.12	0.11
	2015	Vendor	T7	DSL	50%	85,971	7.3	0.29	0	7.4	0.12	0.11
	2015	Hauling	T7	DSL	100%	39,952	20	0.29	0	7.4	0.12	0.11

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

								Running Exhaust and Running Losses Emissions (lb)				
Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	ROG Exhaust	ROG Running Loss	NOx Exhaust	PM ₁₀ Exhaust	PM _{2.5} Exhaust
Mission Bay	2015	Worker	LDA	GAS	50%	434,920	12.4	233	396	708	14	12.47
	2015	Worker	LDT1	GAS	25%	434,920	12.4	234	658	789	13	11.88
	2015	Worker	LDT2	GAS	25%	434,920	12.4	122	311	615	6.6	6.07
	2015	Vendor	T6	DSL	50%	85,971	7.3	154	0	3,201	84	77.56
	2015	Vendor	T7	DSL	50%	85,971	7.3	201	0	5,093	81	74.33
	2015	Hauling	T7	DSL	100%	39,952	20	512	0	12,969	206	189.28

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Idling Emission Factor (g/hr-vehicle)				Idling Exhaust Emissions (lb) [5 min per one-way trip for mass emissions]			
								ROG	NOx	PM ₁₀	PM _{2.5}	ROG	NOx	PM ₁₀	PM _{2.5}
Mission Bay	2015	Worker	LDA	GAS	50%	434,920	12.4	0	0	0	0	0	0	0	0.00
	2015	Worker	LDT1	GAS	25%	434,920	12.4	0	0	0	0	0	0	0	0.00
	2015	Worker	LDT2	GAS	25%	434,920	12.4	0	0	0	0	0	0	0	0.00
	2015	Vendor	T6	DSL	50%	85,971	7.3	2.0	80	0.36	0.33	16	630	2.8	2.59
	2015	Vendor	T7	DSL	50%	85,971	7.3	6.4	66	0.31	0.28	50	523	2.4	2.22
	2015	Hauling	T7	DSL	100%	39,952	20	6.4	66	0.31	0.28	47	486	2.2	2.06

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Starting Exhaust Emission Factor (g/one-way trip)				Starting Exhaust Emissions (lb) [Once per one-way trip for mass emissions]			
								ROG	NOx	PM ₁₀	PM _{2.5}	ROG	NOx	PM ₁₀	PM _{2.5}
Mission Bay	2015	Worker	LDA	GAS	50%	434,920	12.4	0.22	0.18	0.0030	0.0027	105	85	1.4	1.30
	2015	Worker	LDT1	GAS	25%	434,920	12.4	0.43	0.31	0.0046	0.0042	102	73	1.1	1.01
	2015	Worker	LDT2	GAS	25%	434,920	12.4	0.28	0.34	0.0027	0.0025	66	82	0.65	0.60
	2015	Vendor	T6	DSL	50%	85,971	7.3	0	0	0	0	0	0	0	0.00
	2015	Vendor	T7	DSL	50%	85,971	7.3	0	0	0	0	0	0	0	0.00
	2015	Hauling	T7	DSL	100%	39,952	20	0	0	0	0	0	0	0	0.00

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Onroad Equipment Activities, Emission Factors and Emissions

Site	Year	Trip Type ¹	Vehicle Type ¹	Fuel	% of Fleet ¹	Total One-way Trips	One-way Trip Length	Evaporative ROG Emission Factor (g/one-way trip)			Evaporative ROG Emissions (lb)		
								Diurnal	Hot-Soak	Resting Loss	Diurnal	Hot-Soak	Resting Loss
Mission Bay	2015	Worker	LDA	GAS	50%	434,920	12.4	0.046	0.15	0.041	22	73	20
	2015	Worker	LDT1	GAS	25%	434,920	12.4	0.10	0.28	0.083	25	68	20
	2015	Worker	LDT2	GAS	25%	434,920	12.4	0.050	0.16	0.047	12	39	11
	2015	Vendor	T6	DSL	50%	85,971	7.3	0	0	0	0	0	0
	2015	Vendor	T7	DSL	50%	85,971	7.3	0	0	0	0	0	0
	2015	Hauling	T7	DSL	100%	39,952	20	0	0	0	0	0	0

Notes:

1. CalEEMod default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (MHDT) and heavy heavy-duty trucks (HHDT) for vendor trips, and all HHDT for hauling trips.

Reduction in Offroad Construction Equipment Emissions

	Emissions (pounds)			
	ROG	NOx	PM ₁₀	PM _{2.5}
Uncontrolled				
Offroad Equipment Building Construction Emissions	4,617	60,008	2,567	2,567
Offroad Equipment Building Construction Emissions Reduction ¹	843	10,958	469	469
With Tier 4 Off-road Equipment				
Offroad Equipment Building Construction Emissions	871	4,616	113	113
Offroad Equipment Building Construction Emissions Reduction ¹	159	843	21	21
With Tier 2 + ARB NOx VDECS Off-road Equipment				
Offroad Equipment Building Construction Emissions	186	33,002	210	210
Offroad Equipment Building Construction Emissions Reduction ¹	34	6,026	38	38

Notes:

1. This represents the reduction in offroad equipment emissions in the Building Construction phase due to lower square footage associated with non-arena land uses. A scaling factor of 0.18, which represents the reduction in total square footage of the Project, was applied to determine the emission reduction. The construction emission summary table reflects this reduction in construction equipment emissions.

Construction Area Emissions Estimates (Reduced Intensity Alternative)

Venue	Architectural Coatings					
	Floor Area ¹	Building Surface Area ²	Reapplication Rate	Indoor Paint VOC EF ³	Outdoor Paint VOC EF ³	Architectural Coating VOC emissions ⁴
	[ft ²]	[ft ²]		[g/L]	[g/L]	[lb/yr]
Event Center	750,000	1,500,000	100%	100	150	7,823
GSW Office Space	25,000	50,000				261
Office Space	348,000	696,000				3,630
Retail Space	75,000	150,000				782
Parking and Loading	375,000	750,000				3,911

Notes:

1. Square footage for office and retail space reflects a 40% reduction. Parking and loading square footage was scaled by the number of anticipated parking spots in the Reduced Intensity Alternative (750).
2. Consistent with CalEEMod, residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area.
3. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.
4. Uses CalEEMod assumptions of 1 gallon of paint covers 180 square feet.

Area Sources	Total Emissions [ton/yr]				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Architectural Coatings	8.20	--	--	--	--
Total Project Emissions:	8.20	0.00	0.00	0.00	0.00

Mobile Source CAP Emissions Estimates (Reduced Intensity Alternative)

Project CAPs Emission Factors

Emission Factor ¹	Units	Pollutant				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Running Exhaust	[g/mile]	0.068	1.5	0.45	0.0066	0.0060
Idling Exhaust	[g/trip]	0.013	0.1	0.09	0.0003	0.0003
Starting Exhaust	[g/trip]	0.279	3.5	0.33	0.0030	0.0028
PM Brake Wear	[g/mile]	-	-	-	0.0420	0.0180
PM Tire Wear	[g/mile]	-	-	-	0.0088	0.0022
ROG Running Loss	[g/mile]	0.079	-	-	-	-
ROG Diurnal	[g/trip]	0.052	-	-	-	-
ROG Hot-Soak	[g/trip]	0.148	-	-	-	-
ROG Resting Loss	[g/trip]	0.044	-	-	-	-

Notes:

1. From EMFAC2011, calendar year 2017, San Francisco Bay Area. Emission factors are weighted by VMT for all vehicle categories.

Mobile Source CAP Emissions Estimates (Reduced Intensity Alternative)

Project CAPs Emission Calculations

Trip Type	Scenario ¹	Daily One-way Vehicle Trips ²			Days Per Year ³	Weighted Trip Length [mile] ⁴	Emissions				
		Arena	Retail	Office			ROG	CO	NO _x	PM ₁₀	PM _{2.5}
							[ton/yr]				
Mission Bay, Weekend Trips	Basketball Event Days	8,715	1,864	314	30	21.7	1.3	13	3.7	0.45	0.21
	Concert and Family Show Event Days	8,715	1,864	314	55	21.7	2.5	24	6.8	0.82	0.38
	No Event Days	55	3,187	314	19	7.9	0.13	1.2	0.30	0.034	0.016
Mission Bay, Weekday Trips	Basketball Event Days	8,589	1,536	1,567	30	20.6	1.4	14	3.8	0.46	0.21
	Concert and Family Show Event Days	8,589	1,536	1,567	45	20.6	2.1	20	5.7	0.69	0.32
	Other Event Days	3,921	1,536	1,567	61	17.5	1.5	14	4.0	0.48	0.22
	No Event Days	55	2,636	1,567	125	8.0	1.0	9	2.4	0.27	0.12
Total Emissions:							9.8	97	26.6	3.20	1.47

Notes:

- "Other event days" refer to convention events. Scenario naming is consistent with Project Traffic Study.
- Daily vehicle trips provided by Adavant Consulting. Office use includes GSW offices.
- The maximum number of home games (60) in a season was conservatively assumed. Furthermore, it is assumed that half of the games will take place on weekends. Vehicle generation associated with all concert and family show events is approximated by concert trips, while the other 61 events are assumed to be convention events on weekdays.
- Trip length for each scenario is weighted by the number of trips in each land use category. Arena vehicle trips are assumed to have a trip length of 25.05 miles/trip based on season ticket holder addresses. Season ticket holders account for approximately 60% seating at Warrior games. Vehicle trips from retail and office space are assumed to have a trip length of 11.98 miles/trip, based on 2006 average commute trip length in the Bay Area (MTC 2008).

Mobile Source CAP Emissions Estimates (Reduced Intensity Alternative)

Road Dust Calculations

Total Annual VMT

Trip Type	Scenario	VMT [mile/yr]
Mission Bay, Weekend Trips	Basketball Event Days	7,088,632
	Concert and Family Show Event Days	12,995,825
	No Event Days	533,873
Mission Bay, Weekday Trips	Basketball Event Days	7,220,378
	Concert and Family Show Event Days	10,830,567
	Other Event Days	7,505,786
	No Event Days	4,246,568
Total VMT		50,421,631

Pollutants	Emissions Factor [lb/VMT]	Emissions [ton/yr]
Fugitive PM ₁₀	0.00063	15.94
Fugitive PM _{2.5}	0.00016	3.91

Road Dust Equation¹

$$E = k \cdot (sL)^{0.91} \cdot (W)^{1.02} \cdot (1-P/4N)$$

where:

E = annual average emission factor in the same units as *k*

k = particle size multiplier for particle size range and units of interest

*PM*₁₀ (lb/VMT)

0.0022

*PM*_{2.5} (lb/VMT)

0.00054

sL = road surface silt loading (grams per square meter) (g/m²)

0.1

W = average weight (tons) of all the vehicles traveling the road

2.4

P = number of "wet" days with at least 0.01 in of precipitation during averaging period

64

N = number of days in the averaging period

365

Notes:

1. Road dust equation and parameters are based on CalEEMod defaults for the San Francisco Bay Area Air Basin.

References

California Air Resources Board (ARB). 2011. Emission FACtor Model (EMFAC2011).

Available online at www.arb.ca.gov/msei/modeling.htm

Metropolitan Transportation Commission (MTC). 2008. Travel Forecasts Data Summary: Transportation 2035 Plan for the

Available online at http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf

Area Source Emissions Adjustment

Default Consumer Product Emission Factor ¹	2.1E-05	lb/ROG/sqft/day
Updated Consumer Product Emission Factor ²	1.5E-05	lb/ROG/sqft/day
Default Consumer Products Emissions	6.1	tons/year
Updated Consumer Product Emissions	4.3	tons/year
Reduction in Consumer Product Emissions	1.8	tons/year
Default Area Source Emissions	7.0	tons/year
Updated Area Source Emissions	5.2	tons/year

Notes:

1. Default value from the California Emissions Estimator Model (CalEEMod®).
2. San Francisco-specific area source emission factor developed by San Francisco Environmental Planning (SFEP) for ROG from consumer products.

Off-Site Alternative Tables

Piers 30-32 + Seawall Lot 330 Project Alternative

Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Offroad Equipment Emissions	14	204	7.6	7.6
Construction Trip Emissions	5.1	30	0.51	0.47
Marine Vessel Emissions	6.9	60	3.4	3.4
Architectural Coating Emissions	29	0	0	0
Total	55	295	12	11

Controlled Average Daily Construction-related Emissions

	Average Daily Construction Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
With Tier 3 + Diesel Particulate Filter Off-road Equipment				
Offroad Equipment Emissions	0.88	157	1.1	1.1
Construction Trip Emissions	5.1	30	0.51	0.47
Marine Vessel Emissions	2.1	11	0.25	0.25
Architectural Coating Emissions	29	0	0	0
Total	37	199	1.9	1.8

Piers 30-32 and Seawall Lot 330 Project Alternative

Average Daily and Maximum Annual Operational Emissions

	Average Daily Emissions (pounds/day)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile (Alternative - GSW trips)	12	17	4.9	2.2
Marine	1.1	7.4	0.28	0.28
Generators	0.26	0.81	0.033	0.033
Boilers	3.3	23	4.6	4.6
Area Source	29	0.10	0.042	0.042
Total	46	48	10	7.1
	Maximum Annual Emissions (short tons/year)			
	ROG	NOx	PM10	PM2.5
Emission Source				
Mobile (Alternative - GSW trips)	2.2	3.2	0.89	0.40
Marine	0.20	1.3	0.051	0.051
Generators	0.047	0.15	0.0060	0.0060
Boilers	0.60	4.1	0.83	0.83
Area Source	5.3	0.018	0.0076	0.0076
Total	8.3	8.8	1.8	1.3

**Annual Average PM_{2.5} Concentrations at off-site Receptors
for the Off-site Alternative**

	PM _{2.5} Concentration	
	(µg/m ³ , Annual Average)	
Source	Residential Receptor with Highest Project Impact	Residential Receptor with Highest Background Impact
Construction		
Background at the maximally impacted receptor	9.1	10
Uncontrolled Construction Contribution	1.8	0.13
Controlled (Tier 3 + VDECS) Construction Contribution	0.29	0.021
Total Cumulative PM _{2.5} Concentration (Uncontrolled/Controlled)	11/9.4	10/10
Project Total (Uncontrolled/Controlled)	1.8/0.29	0.13/0.021
Project Contribution Significance Threshold	0.2	0.2
Significant? (Uncontrolled/Controlled)	Yes/Yes	No/No
Operation		
Background at the maximally impacted receptor	9.1	10
Project Operations – Generators	0.055	0.055
Project Operations – Mobile	0.32	0.32
Project Operations - Water Taxis	0.081	0.042
Total Cumulative PM _{2.5} Concentration	9.6	10
Project Total	0.45	0.41
Significance Threshold	0.2	0.2
Significant?	Yes	Yes

NOTE: The cumulative total concentrations may not sum precisely due to rounding of subtotals.

**Lifetime Excess Cancer Risk at Off-site Receptors
for the Off-site Alternative**

	Excess Cancer Risk (in one million)	
	Residential Receptor with Highest Project Impact	Residential Receptor with Highest Background Impact
Background at the maximally impacted receptor	113	560
Uncontrolled Construction Contribution	285	17
Controlled (Tier 3 + VDECS) Construction Contribution	44	2.7
Project Operations – Generators	30	30
Project Operations – Mobile	7.2	7.2
Project Operations - Water Taxis	44	23
Cumulative Cancer Risk (Uncontrolled/with Mitigation)	479/238	637/622
Project Total (Uncontrolled/with Mitigation)	366/125	77/62
Significance Threshold	7	7
Significant (Uncontrolled/with Mitigation)?	Yes/Yes	Yes/Yes

NOTE: The cumulative total risks may not sum precisely due to rounding of subtotals.

Table 6.4-1
Toxicity-Weighted Construction Emissions
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Uncontrolled Project Emissions (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ²	3.0E-04	4,916	1.5	99.9%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions	1.81E-06	1,001	0.0018	0.12%
TACs from Speciated Gasoline TOG due to Evaporative Losses	1.07E-07	1,610	0.0002	0.01%

Chemical	Unit Risk Factor¹ (ug/m³)⁻¹	Controlled Project Emissions (lb/project)	Weighted (lb/project)- (m³/μg)	Percent Contribution to Risk
Diesel PM ³	3.0E-04	951	0.29	99.3%
TACs from Speciated Gasoline TOG due to Tailpipe Emissions ²	1.81E-06	1,001	0.0018	0.6%
TACs from Speciated Gasoline TOG Evaporative Losses ²	1.07E-07	1,610	0.0002	0.1%

Notes:

1. From Cal/EPA 2013 and BAAQMD 2012
2. Includes DPM emissions from off-road equipment and on-road sources. Emissions in the controlled scenario reflect the use of Tier 3 off-road equipment with diesel particulate filters.

Abbreviations:

PM: particulate matter

lb: pound

g: gram

s: second

TOG: Total Organic Gas

µg: microgram

References:

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

<http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Table 6.4-2
Construction Particulate Matter Emissions
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Year	Phase ID	Phase	Project Equipment	Source Group ¹	DPM Emission Rate (g/s) - Uncontrolled	DPM Emission Rate (g/s) - Controlled ²	PM _{2.5} Emission Rate (g/s) - Uncontrolled	PM _{2.5} Emission Rate (g/s) - Controlled ²
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	CONPIERS	6.1E-04	1.3E-04	6.1E-04	1.3E-04
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	CONPIERS	3.4E-04	5.0E-05	3.4E-04	5.0E-05
1	0	Indicator Pile Program	Large Forklifts	CONPIERS	1.5E-04	1.2E-05	1.5E-04	1.2E-05
1	0	Indicator Pile Program	Mobile Cranes	CONPIERS	3.4E-04	5.0E-05	3.4E-04	5.0E-05
1	0	Marine	Marine Emissions	MARINE	0.030	0.0022	0.030	0.0022
1	0	Road	Piers 30-32 Haul Roads	ROAD	2.5E-04	2.5E-04	3.4E-04	3.4E-04
1	0	Road	SWL330 Haul Roads	ROAD	4.1E-05	4.1E-05	5.9E-05	5.9E-05
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	CONPIERS	0.0075	0.0016	0.0075	0.0016
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	CONPIERS	0.0032	4.8E-04	0.0032	4.8E-04
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	CONPIERS	0.0055	8.1E-04	0.0055	8.1E-04
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	CONPIERS	0	0	0	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	CONPIERS	0.0011	9.9E-05	0.0011	9.9E-05
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	CONPIERS	0.0027	4.0E-04	0.0027	4.0E-04
1	1	Pile Installation & Deck Reconstruction	Saw cutters	CONPIERS	0	0	0	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	CONPIERS	8.7E-04	7.4E-05	8.7E-04	7.4E-05
1	2	Building Construction (including arena)	Concrete Boom Pumps	CONPIERS	9.3E-04	1.4E-04	9.3E-04	1.4E-04
1	2	Building Construction (including arena)	Crawler Cranes	CONPIERS	0.0016	2.3E-04	0.0016	2.3E-04
1	2	Building Construction (including arena)	Cutting/chopping saws	CONPIERS	0	0	0	0
1	2	Building Construction (including arena)	Drywall stud impact guns	CONPIERS	0	0	0	0
1	2	Building Construction (including arena)	Grandall-type Forklifts	CONPIERS	0.0034	2.9E-04	0.0034	2.9E-04
1	2	Building Construction (including arena)	Mobile Cranes	CONPIERS	0.0022	3.2E-04	0.0022	3.2E-04
1	2	Building Construction (including arena)	Street Sweeper	CONPIERS	5.7E-04	4.8E-05	5.7E-04	4.8E-05
1	2	Building Construction (including arena)	Tile cutting saws	CONPIERS	0	0	0	0
1	3	Demolition	CAT 300 series excavator	CONSWL	6.9E-05	1.9E-05	6.9E-05	1.9E-05
1	3	Demolition	Street Sweeper	CONSWL	1.9E-04	1.6E-05	1.9E-04	1.6E-05
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	CONSWL	0.0025	5.2E-04	0.0025	5.2E-04
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	CONSWL	0.0011	1.7E-04	0.0011	1.7E-04
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	CONSWL	0.0017	2.7E-04	0.0017	2.7E-04
1	4	Shoring (Pile-driving)	Cutting and chopping saws	CONSWL	0	0	0	0
1	4	Shoring	Drill Rig	CONSWL	0.0011	2.3E-04	0.0011	2.3E-04
1	4	Shoring	Grout-mixing plant	CONSWL	8.6E-05	1.4E-05	8.6E-05	1.4E-05
1	4	Shoring (Pile-driving)	Large Forklifts	CONSWL	3.5E-04	3.2E-05	3.5E-04	3.2E-05
1	4	Shoring (Pile-driving)	Mobile Cranes	CONSWL	8.7E-04	1.3E-04	8.7E-04	1.3E-04
1	4	Shoring (Pile-driving)	Saw cutters	CONSWL	0	0	0	0
1	4	Shoring	Small Excavator	CONSWL	2.1E-04	5.7E-05	2.1E-04	5.7E-05
1	4	Shoring (Pile-driving)	Street Sweeper	CONSWL	2.9E-04	2.4E-05	2.9E-04	2.4E-05
1	4	Shoring	Support Crane	CONSWL	3.7E-04	5.7E-05	3.7E-04	5.7E-05
1	5	Mass Excavation	CAT 600 Excavator	CONSWL	2.1E-04	5.7E-05	2.1E-04	5.7E-05
1	5	Mass Excavation	D6 or equivalent dozer	CONSWL	5.8E-04	3.5E-05	5.8E-04	3.5E-05
1	6	Building Construction	Concrete Boom Pumps	CONSWL	6.1E-04	9.9E-05	6.1E-04	9.9E-05
1	6	Building Construction	Gradall-type Forklifts	CONSWL	2.2E-04	2.0E-05	2.2E-04	2.0E-05
1	6	Building Construction	Manlifts	CONSWL	1.9E-04	1.8E-05	1.9E-04	1.8E-05
1	6	Building Construction	Tower cranes	CONSWL	5.0E-04	7.6E-05	5.0E-04	7.6E-05

Year	Phase ID	Phase	Project Equipment	Source Group ¹	DPM Emission Rate (g/s) - Uncontrolled	DPM Emission Rate (g/s) - Controlled ²	PM _{2.5} Emission Rate (g/s) - Uncontrolled	PM _{2.5} Emission Rate (g/s) - Controlled ²
2	0	Road	Piers 30-32 Haul Roads	ROAD	3.0E-04	3.0E-04	4.2E-04	4.2E-04
2	0	Road	SWL330 Haul Roads	ROAD	8.0E-05	8.0E-05	1.2E-04	1.2E-04
2	2	Building Construction (including arena)	Concrete Boom Pumps	CONPIERS	0.0014	2.1E-04	0.0014	2.1E-04
2	2	Building Construction (including arena)	Crawler Cranes	CONPIERS	0.0014	2.0E-04	0.0014	2.0E-04
2	2	Building Construction (including arena)	Cutting/chopping saws	CONPIERS	0	0	0	0
2	2	Building Construction (including arena)	Drywall stud impact guns	CONPIERS	0	0	0	0
2	2	Building Construction (including arena)	Grandall-type Forklifts	CONPIERS	0.0045	3.9E-04	0.0045	3.9E-04
2	2	Building Construction (including arena)	Mobile Cranes	CONPIERS	0.0032	4.8E-04	0.0032	4.8E-04
2	2	Building Construction (including arena)	Street Sweeper	CONPIERS	8.5E-04	7.2E-05	8.5E-04	7.2E-05
2	2	Building Construction (including arena)	Tile cutting saws	CONPIERS	0	0	0	0
2	6	Building Construction	Concrete Boom Pumps	CONSWL	0.0036	5.9E-04	0.0036	5.9E-04
2	6	Building Construction	Gradall-type Forklifts	CONSWL	0.0013	1.2E-04	0.0013	1.2E-04
2	6	Building Construction	Manlifts	CONSWL	0.0011	1.1E-04	0.0011	1.1E-04
2	6	Building Construction	Tower cranes	CONSWL	0.0030	4.5E-04	0.0030	4.5E-04
3	0	Road	Piers 30-32 Haul Roads	ROAD	5.1E-05	5.1E-05	6.9E-05	6.9E-05
3	0	Road	SWL330 Haul Roads	ROAD	3.3E-05	3.3E-05	4.8E-05	4.8E-05
3	2	Building Construction (including arena)	Concrete Boom Pumps	CONPIERS	2.3E-04	3.5E-05	2.3E-04	3.5E-05
3	2	Building Construction (including arena)	Grandall-type Forklifts	CONPIERS	7.5E-04	6.5E-05	7.5E-04	6.5E-05
3	2	Building Construction (including arena)	Mobile Cranes	CONPIERS	5.4E-04	8.0E-05	5.4E-04	8.0E-05
3	2	Building Construction (including arena)	Street Sweeper	CONPIERS	1.4E-04	1.2E-05	1.4E-04	1.2E-05
3	6	Building Construction	Concrete Boom Pumps	CONSWL	9.1E-04	1.5E-04	9.1E-04	1.5E-04
3	6	Building Construction	Gradall-type Forklifts	CONSWL	3.4E-04	3.0E-05	3.4E-04	3.0E-05
3	6	Building Construction	Manlifts	CONSWL	2.8E-04	2.7E-05	2.8E-04	2.7E-05
3	6	Building Construction	Tower cranes	CONSWL	7.4E-04	1.1E-04	7.4E-04	1.1E-04
3	7	Paving	Other Material Handling Equipment	CONSWL	9.0E-06	1.8E-06	9.0E-06	1.8E-06
3	7	Paving	Pavers	CONSWL	5.2E-05	9.4E-06	5.2E-05	9.4E-06
3	7	Paving	Paving Equipment	CONSWL	4.0E-05	8.4E-06	4.0E-05	8.4E-06
3	7	Paving	Rollers	CONSWL	1.1E-04	1.5E-05	1.1E-04	1.5E-05
3	7	Paving	Tractors/Loaders/Backhoes	CONSWL	5.8E-05	8.9E-06	5.8E-05	8.9E-06
3	8	Architectural Coating	Other Construction Equipment	CONSWL	5.6E-05	6.0E-06	5.6E-05	6.0E-06

Notes:

- The four source groups are:
 - CONPIERS: Offroad construction equipment at Piers 30-32
 - CONSWL: Offroad construction equipment at Seawall Lot 330
 - ROAD: Onroad construction trips
 - MARINE: Construction marine vessels
- The controlled scenario reflects the use of Tier 3 offroad construction equipment with diesel particulate filters.

Abbreviations:

DPM: diesel particulate matter
g: gram
s: second

Table 6.4-3
Annual Average Daily Traffic from Project Operation
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Trip Type	Scenario	Days Per Year	Daily One-way Vehicle Trips¹
Weekday Trips	Basketball Event Days	30	7,215
	Concert Event Days ²	45	6,533
	Convention Event Days	61	4,400
	No Event Days	125	2,705
Weekend Trips	Basketball Event Days	30	7,838
	Concert Event Days ²	55	6,533
	No Event Days	19	2,998
Annual One-way Vehicle Trips:			1,768,377
Annual Average Daily Traffic (AADT):			4,845

Notes:

1. Based on traffic data from Adavant Consulting.
2. Trips conservatively assumed to be equal to basketball event days.

Table 6.4-4
Screening PM_{2.5} Concentrations and Cancer Risks from Operational Traffic
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Impact ¹	North-South Roadway Impact	East-West Roadway Impact	Total Impact from 4 Adjacent Roadways
PM _{2.5} Concentration (µg/m ³)	0.080	0.078	0.32
Lifetime Cancer Risk (in a million)	2.2	1.4	7.2

Notes:

1. Based on BAAQMD County Surface Street Screening Tables for San Francisco County. A distance of 10 feet from the roadway and an annual average daily traffic (AADT) volume of 10,000 vehicles per day (vpd) was conservatively assumed since the AADT shown in Table 7.2-2 is less than 10,000 vpd.

References:

Bay Area Air Quality Management District (BAAQMD). 2011. Roadway Screening Analysis Tables. December. Available online at :
<http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en>

Table 6.4-5
SCREEN3 Construction Screening Inputs and Outputs
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Parameter	Inputs and Outputs
Source	Water Taxis
Source Type	Area
Emission Rate (g/s-m ²)	0.00167
Release Height (m)	6
Length of larger side (m)	40
Length of smaller side (m)	15
Area (m ²)	600
Receptor Height (m)	1.8
Urban/Rural (U/R)	U
Met Choice	1 - Full Met
Distance from receptor with highest Project impact (m)	160
Distance from receptor with highest background impact (m)	240
Dispersion Factor (µg/m³ per g/s)	
1-hour dispersion factor at receptor with highest Project impact	1,374
Annual Average Dispersion Factor at receptor with highest Project impact¹	137
1-hour dispersion factor at receptor with highest background impact	708
Annual Average Dispersion Factor at receptor with highest background impact¹	71
Concentration (µg/m³)	Uncontrolled
DPM/PM _{2.5} Emission Rate ² (g/s)	5.9E-04
Annual Maximum DPM/PM_{2.5} Conc at receptor with highest Project impact	0.08
Annual Maximum DPM/PM_{2.5} Conc at receptor with highest background impact	0.04

Notes:

1. A scaling ratio of 0.1 is applied to convert the 1-hour dispersion factor to annual dispersion factor per BAAQMD Permit Modeling Guidance.

2. 40% of the mass emissions were conservatively assumed to be emitted at the dock.

Abbreviations:

DPM: diesel particulate matter
g: gram
m: meter
m²: square meter
m³: cubic meter
s: second
µg: microgram

References:

Bay Area Air Quality Management District (BAAQMD). 2007. Permit Modeling Guidance. June.
http://baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/pmt_modeling_guidance.ashx?la=en
SCREEN3. http://www.epa.gov/ttn/scram/dispersion_screening.htm#screen3

Table 6.4-6
AERMOD Construction Modeling Results
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Receptor	UTMx (m)	UTMy (m)	Cancer Risk Increase (in one million)		Maximum Annual PM _{2.5} Concentration (µg/m ³)	
			Uncontrolled	Controlled	Uncontrolled	Controlled
Residential receptor with highest Project impacts	553,820	4,182,280	285	44	1.8	0.29
Residential receptor with highest background impacts	553,720	4,182,500	17	2.7	0.13	0.021

Abbreviations:

m: meter

m³: cubic meter

PM: particulate matter

UTM: Universal Transverse Mercator

µg: microgram

Table 6.4-7
Screening PM_{2.5} Concentration Results
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Concentration [$\mu\text{g}/\text{m}^3$]	Concentration [$\mu\text{g}/\text{m}^3$]
	Residential Receptor with Highest Project Impact	Residential Receptor with Highest Background Impact
Construction		
2014 Background PM _{2.5} Concentration ¹	9.1	10.1
PM _{2.5} Concentration from Uncontrolled Construction Emissions	1.8	0.13
PM _{2.5} Concentration from Controlled Construction Emissions	0.29	0.021
Significance Threshold ²	0.2	0.2
Project PM _{2.5} Concentration Exceeds Threshold? (Uncontrolled scenario)	Yes	No
Project PM _{2.5} Concentration Exceeds Threshold? (Controlled scenario)	Yes	No
Operational		
2014 Background PM _{2.5} Concentration ¹	9.1	10.1
PM _{2.5} Concentration from Operational Traffic	0.32	0.32
PM _{2.5} Concentration from Emergency Diesel Generators ³	0.055	0.055
PM _{2.5} Concentration from Water Taxis	0.081	0.042
Total Project PM _{2.5} Concentration (Operational)	0.45	0.41
Significance Threshold ²	0.2	0.2
Total Project PM _{2.5} Concentration Exceeds Threshold? (Operational)	Yes	Yes

Notes:

1. From the Citywide HRA database.
2. Significance threshold of 0.2 $\mu\text{g}/\text{m}^3$ is applicable since the alternative is in an Air Pollutant Exposure Zone.
3. Back-calculated assuming a cancer risk of 10 in a million for each of the three generators (total of 30 in a million). The cancer risk of 10 in a million is the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, and exposure assumptions for a 70-year resident.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HRA: Health Risk Assessment
 μg : microgram
 m^3 : cubic meter

Table 6.4-8
Exposure Parameters and Cancer Risk Adjustment Factors
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Exposure Parameter	Units	Adult Resident			
		Construction Year Year 1	Construction Year Year 2	Construction Year Year 3	Water Taxis Operation
Daily Breathing Rate (DBR) ¹	[L/kg-day]	581	581	581	302
Exposure Time (ET) ²	[hours/24 hours]	24	24	24	24
Exposure Frequency (EF) ³	[days/year]	350	350	350	350
Exposure Duration (ED) ⁴	[years]	1	1	1	70
Averaging Time (AT)	[days]	25,550	25,550	25,550	25,550
Intake Factor, Inhalation (IF _{inh})	[m ³ /kg-day]	0.0080	0.0080	0.0080	0.29
Cancer Risk Adjustment Factor ⁵	[-]	10	10	4.75	1.7

Notes:

1. Daily breathing rate reflects default breathing rate from BAAQMD 2010.
2. Exposure time reflects default exposure time from BAAQMD 2010.
3. Exposure frequency reflects default exposure frequency from BAAQMD 2010.
4. Construction-related emissions will be emitted over 3 years. For operation, the exposure duration is 70 years for a resident.
5. Based on BAAQMD 2010.

Calculation:

$$IF_{inh} = DBR * ET * EF * ED * CF / AT$$

$$CF = 0.001 \text{ (m}^3\text{/L)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District

L: liter

kg: kilogram

m³: cubic meter

References:

BAAQMD. 2010. BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.
http://baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx?la=en

Table 6.4-9
Screening Cancer Risk Results
for the Piers 30-32 + Seawall Lot 330 Project Alternative
GSW Mission Bay Multi-Purpose Event Center & Ancillary Development
San Francisco, California

Scenario	Units	Residential Receptor with Highest Project Impact	Residential Receptor with Highest Background Impact
Diesel PM Cancer Potency Factor (CPF) ¹	[mg/kg-day] ⁻¹	1.1	1.1
2014 Background Risk ²	[in a million]	113	560
Excess Cancer Risk from Uncontrolled Construction Emissions ³	[in a million]	285	17
Excess Cancer Risk from Controlled Construction Emissions ³	[in a million]	44	2.7
Excess Cancer Risk from Operational Traffic Emissions ⁴	[in a million]	7.2	7.2
Excess Cancer Risk from Emergency Diesel Generators ⁵	[in a million]	30	30
Excess Cancer Risk from Water Taxis ⁶	[in a million]	44	23
Total Project Excess Cancer Risk (Uncontrolled Scenario)	[in a million]	366	77
Total Project Excess Cancer Risk (Controlled Scenario)	[in a million]	125	62
Significance Threshold ⁷	[in a million]	7	7
Total Risk Exceeds Threshold? (Uncontrolled Scenario)	-	Yes	Yes
Total Risk Exceeds Threshold? (Controlled Scenario)	-	Yes	Yes

Notes:

1. From Cal/EPA 2013.
2. From the Citywide HRA database for the residential receptor.
3. Represent health impacts at the residential receptor with highest Project impacts and highest background impacts.
4. The screening values reflect a 70-year cancer risk with age sensitivity factors applied (BAAQMD 2012).
5. A cancer risk of 10 in a million, the maximum allowable Project cancer risk from toxic air contaminants in the BAAQMD, is conservatively assumed.
6. The cancer risk from water taxis operation is based on screening values and exposure parameters associated with a 70-year resident.
7. Significance threshold of 7 in a million is applicable since the alternative is in an Air Pollutant Exposure Zone.

Calculation:

$$\text{Cancer Risk} = [\text{AnnualConc}] \times [\text{CF}] \times [\text{IF}_{\text{inh}}] \times [\text{CPF}] \times [\text{CRAF}]$$

$$\text{CF} = 0.001 \text{ (mg/}\mu\text{g)}$$

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
 Cal/EPA: California Environmental Protection Agency
 CRAF: Cancer Risk Adjustment Factor
 HRA: Health Risk Assessment
 IF_{inh}: Intake Factor, Inhalation
 kg: kilogram
 mg: milligram
 PM: Particulate Matter
 μg: microgram

References:

Cal/EPA. 2013. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. August. Available online at: <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

Bay Area Air Quality Management District (BAAQMD). 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available online at: <http://baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

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Piers 30-32 and SWL 330 Construction Equipment List

Phase ID	Phase	Project Equipment	OFFROAD Equipment	HP	OFFROAD HP Bin	Tier HP Bin	LF	Quantity	Total Hours	Calendar Year	Construction Year	Fuel
0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	530	750	600	0.2881	1	456	2015	1	Diesel
0	Indicator Pile Program	Mobile Cranes	Cranes	530	750	600	0.2881	1	456	2015	1	Diesel
0	Indicator Pile Program	Large Forklifts	Forklifts	93	120	100	0.201	1	456	2015	1	Diesel
0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1200	9999	9999	0.5025	1	304	2015	1	Diesel
1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	530	750	600	0.2881	4	7300	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	530	750	600	0.2881	2	3650	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	3346	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	93	120	100	0.201	2	3650	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	0	50	11	0.4154	2	3650	2016	1	Electric
1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	0	50	11	0.4154	2	3650	2016	1	Electric
1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	782	2016	1	Diesel
2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	521	2016	1	Diesel
2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	973	2016	1	Diesel
2	Building Construction (including arena)	Crawler Cranes	Cranes	530	750	600	0.2881	2	2129	2016	1	Diesel
2	Building Construction (including arena)	Mobile Cranes	Cranes	530	750	600	0.2881	4	2920	2016	1	Diesel
2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	93	120	100	0.201	8	10950	2016	1	Diesel
2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	0	50	11	0.4154	15	11406	2016	1	Electric
2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	0	50	11	0.4154	10	4563	2016	1	Electric
2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	0	50	11	0.4154	25	19010	2016	1	Electric
2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	782	2016	2	Diesel
2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	1460	2016	2	Diesel
2	Building Construction (including arena)	Crawler Cranes	Cranes	530	750	600	0.2881	2	1825	2016	2	Diesel
2	Building Construction (including arena)	Mobile Cranes	Cranes	530	750	600	0.2881	4	4380	2016	2	Diesel
2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	93	120	100	0.201	8	14600	2016	2	Diesel
2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	0	50	11	0.4154	15	20531	2016	2	Electric
2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	0	50	11	0.4154	10	13688	2016	2	Electric
2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	0	50	11	0.4154	25	30417	2016	2	Electric
2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	130	2016	3	Diesel
2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	243	2016	3	Diesel
2	Building Construction (including arena)	Mobile Cranes	Cranes	530	750	600	0.2881	4	730	2016	3	Diesel
2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	93	120	100	0.201	8	2433	2016	3	Diesel
3	Demolition	CAT 300 series excavator	Excavators	404	500	600	0.3819	1	173.81	2017	1	Diesel
3	Demolition	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	173.81	2017	1	Diesel
4	Shoring	Drill Rig	Bore/Drill Rigs	1205	9999	9999	0.5025	1	521.429	2017	1	Diesel
4	Shoring	Support Crane	Cranes	530	750	600	0.2881	1	521.429	2017	1	Diesel
4	Shoring	Grout-mixing plant	Other Material Handling Equipment	24	50	25	0.3953	1	521.429	2017	1	Diesel
4	Shoring	Small Excavator	Excavators	404	500	600	0.3819	1	521.429	2017	1	Diesel

Piers 30-32 and SWL 330 Construction Equipment List

Phase ID	Phase	Project Equipment	OFFROAD Equipment	HP	OFFROAD HP Bin	Tier HP Bin	LF	Quantity	Total Hours	Calendar Year	Construction Year	Fuel
5	Mass Excavation	CAT 600 Excavator	Excavators	404	500	600	0.3819	1	521.429	2017	1	Diesel
5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	235	250	300	0.3953	1	521.429	2017	1	Diesel
6	Building Construction	Tower cranes	Cranes	530	750	600	0.2881	2	695.238	2017	1	Diesel
6	Building Construction	Gradall-type Forklifts	Forklifts	230	250	300	0.201	2	608.333	2017	1	Diesel
6	Building Construction	Manlifts	Forklifts	51	120	75	0.201	4	1216.67	2017	1	Diesel
6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	695.238	2017	1	Diesel
6	Building Construction	Tower cranes	Cranes	530	750	600	0.2881	2	4171	2017	2	Diesel
6	Building Construction	Gradall-type Forklifts	Forklifts	230	250	300	0.201	2	3650	2017	2	Diesel
6	Building Construction	Manlifts	Forklifts	51	120	75	0.201	4	7300	2017	2	Diesel
6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	4171.43	2017	2	Diesel
6	Building Construction	Tower cranes	Cranes	530	750	600	0.2881	2	1043	2017	3	Diesel
6	Building Construction	Gradall-type Forklifts	Forklifts	230	250	300	0.201	2	912.5	2017	3	Diesel
6	Building Construction	Manlifts	Forklifts	51	120	75	0.201	4	1825	2017	3	Diesel
6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	1042.86	2017	3	Diesel
7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	9	50	11	0.3953	1	174	2018	3	Diesel
7	Paving	Pavers	Pavers	125	175	175	0.4154	1	174	2018	3	Diesel
7	Paving	Paving Equipment	Paving Equipment	130	175	175	0.3551	1	174	2018	3	Diesel
7	Paving	Rollers	Rollers	80	120	100	0.3752	2	348	2018	3	Diesel
7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	97	120	100	0.3685	1	174	2018	3	Diesel
8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	78	120	100	0.4154	1	130.357	2018	3	Diesel
1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1200	9999	9999	0.5025	2	3650	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	530	750	600	0.2881	4	112	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	530	750	600	0.2881	2	56	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	51	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	93	120	100	0.201	2	56	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	0	50	11	0.4154	2	56	2016	1	Electric
1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	0	50	11	0.4154	2	56	2016	1	Electric
1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	12	2016	1	Diesel
1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1200	9999	9999	0.5025	2	56	2016	1	Diesel
4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	530	750	600	0.2881	4	2433	2017	1	Diesel
4	Shoring (Pile-driving)	Mobile Cranes	Cranes	530	750	600	0.2881	2	1217	2017	1	Diesel
4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	480	500	600	0.4154	2	1217	2017	1	Diesel
4	Shoring (Pile-driving)	Large Forklifts	Forklifts	93	120	100	0.201	2	1217	2017	1	Diesel
4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	0	50	11	0.4154	2	1217	2017	1	Electric
4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	0	50	11	0.4154	2	1217	2017	1	Electric
4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	285	500	300	0.4556	1	261	2017	1	Diesel
4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1200	9999	9999	0.5025	2	1217	2017	1	Diesel

Piers 30-32 and SWL 330 Uncontrolled Offroad Equipment Activities and Emissions

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	1,724	lb	Nox	OFFROAD	0
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	42	lb	PM	OFFROAD	0
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	72	lb	ROG	OFFROAD	0
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	662	lb	Nox	OFFROAD	0
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	23	lb	PM	OFFROAD	0
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	44	lb	ROG	OFFROAD	0
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	124	lb	Nox	OFFROAD	0
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	10	lb	PM	OFFROAD	0
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	14	lb	ROG	OFFROAD	0
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	662	lb	Nox	OFFROAD	0
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	23	lb	PM	OFFROAD	0
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	44	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	319	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	7.9	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	14	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	20,761	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	513	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	891	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	92	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	3.4	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	6.9	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	6,015	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	222	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	452	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	163	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	5.8	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	11	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	10,601	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	376	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	718	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	14	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	1.2	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	1.7	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	936	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	78	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	109	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	81	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	2.9	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	5.5	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	5,300	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	188	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	359	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	21	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	0.91	lb	PM	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	1.6	lb	ROG	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	1,360	lb	Nox	OFFROAD	0
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	59	lb	PM	OFFROAD	0

Piers 30-32 and SWL 330 Uncontrolled Offroad Equipment Activities and Emissions

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	106	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	1,750	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	64	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	132	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	3,092	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	110	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	209	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	2,808	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	235	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	326	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	4,240	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	150	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	287	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	906	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	40	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	71	lb	ROG	OFFROAD	0
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	148	lb	Nox	OFFROAD	0
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	4.8	lb	PM	OFFROAD	0
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	12	lb	ROG	OFFROAD	0
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	303	lb	Nox	OFFROAD	0
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	13	lb	PM	OFFROAD	0
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	24	lb	ROG	OFFROAD	0
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	2,986	lb	Nox	OFFROAD	0
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	74	lb	PM	OFFROAD	0
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	131	lb	ROG	OFFROAD	0
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	61	lb	Nox	OFFROAD	0
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	6.0	lb	PM	OFFROAD	0
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	18	lb	ROG	OFFROAD	0
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	445	lb	Nox	OFFROAD	0
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	14	lb	PM	OFFROAD	0
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	35	lb	ROG	OFFROAD	0
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	730	lb	Nox	OFFROAD	0
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	26	lb	PM	OFFROAD	0
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	50	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	6,939	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	173	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	304	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	2,020	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	74	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	155	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	3,406	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	120	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	235	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	292	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	24	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	34	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	1,703	lb	Nox	OFFROAD	0

Piers 30-32 and SWL 330 Uncontrolled Offroad Equipment Activities and Emissions

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	60	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	117	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	ROG	OFFROAD	0
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	454	lb	Nox	OFFROAD	0
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	20	lb	PM	OFFROAD	0
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	36	lb	ROG	OFFROAD	0
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	445	lb	Nox	OFFROAD	0
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	14	lb	PM	OFFROAD	0
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	35	lb	ROG	OFFROAD	0
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	819	lb	Nox	OFFROAD	0
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	40	lb	PM	OFFROAD	0
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	75	lb	ROG	OFFROAD	0
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	1,154	lb	Nox	OFFROAD	0
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	42	lb	PM	OFFROAD	0
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	89	lb	ROG	OFFROAD	0
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	357	lb	Nox	OFFROAD	0
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	16	lb	PM	OFFROAD	0
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	31	lb	ROG	OFFROAD	0
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	160	lb	Nox	OFFROAD	0
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	13	lb	PM	OFFROAD	0
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	18	lb	ROG	OFFROAD	0
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	973	lb	Nox	OFFROAD	0
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	34	lb	PM	OFFROAD	0
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	67	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	2,625	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	97	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	197	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	2,650	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	94	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	180	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	3,744	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	313	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	435	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	6,361	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	225	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	431	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	1,360	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	59	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	106	lb	ROG	OFFROAD	0
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	Nox	OFFROAD	0
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	PM	OFFROAD	0
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	ROG	OFFROAD	0
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	6,926	lb	Nox	OFFROAD	0
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	253	lb	PM	OFFROAD	0
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	531	lb	ROG	OFFROAD	0
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	2,139	lb	Nox	OFFROAD	0
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	94	lb	PM	OFFROAD	0
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	184	lb	ROG	OFFROAD	0
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	960	lb	Nox	OFFROAD	0
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	79	lb	PM	OFFROAD	0
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	111	lb	ROG	OFFROAD	0

Piers 30-32 and SWL 330 Uncontrolled Offroad Equipment Activities and Emissions

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Uncontrolled	DPF Uncontrolled
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	5,839	lb	Nox	OFFROAD	0
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	207	lb	PM	OFFROAD	0
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	403	lb	ROG	OFFROAD	0
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	437	lb	Nox	OFFROAD	0
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	16	lb	PM	OFFROAD	0
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	33	lb	ROG	OFFROAD	0
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	624	lb	Nox	OFFROAD	0
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	52	lb	PM	OFFROAD	0
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	72	lb	ROG	OFFROAD	0
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	1,060	lb	Nox	OFFROAD	0
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	38	lb	PM	OFFROAD	0
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	72	lb	ROG	OFFROAD	0
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	227	lb	Nox	OFFROAD	0
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	10	lb	PM	OFFROAD	0
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	18	lb	ROG	OFFROAD	0
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	1,731	lb	Nox	OFFROAD	0
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	63	lb	PM	OFFROAD	0
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	133	lb	ROG	OFFROAD	0
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	535	lb	Nox	OFFROAD	0
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	23	lb	PM	OFFROAD	0
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	46	lb	ROG	OFFROAD	0
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	240	lb	Nox	OFFROAD	0
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	20	lb	PM	OFFROAD	0
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	28	lb	ROG	OFFROAD	0
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	1,460	lb	Nox	OFFROAD	0
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	52	lb	PM	OFFROAD	0
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	101	lb	ROG	OFFROAD	0
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	7.1	lb	Nox	OFFROAD	0
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	0.62	lb	PM	OFFROAD	0
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	1.8	lb	ROG	OFFROAD	0
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	75	lb	Nox	OFFROAD	0
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	3.6	lb	PM	OFFROAD	0
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	6.7	lb	ROG	OFFROAD	0
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	56	lb	Nox	OFFROAD	0
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	2.7	lb	PM	OFFROAD	0
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	5.0	lb	ROG	OFFROAD	0
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	107	lb	Nox	OFFROAD	0
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	7.4	lb	PM	OFFROAD	0
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	11	lb	ROG	OFFROAD	0
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	57	lb	Nox	OFFROAD	0
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	4.0	lb	PM	OFFROAD	0
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	5.8	lb	ROG	OFFROAD	0
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	51	lb	Nox	OFFROAD	0
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	3.9	lb	PM	OFFROAD	0
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	5.6	lb	ROG	OFFROAD	0

Piers 30-32 and SWL 330 Controlled Offroad Equipment Activities and Emissions (Tier 3 + DPF)

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	37	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	7,004	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	7,300	530	750	600	Diesel	55	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	56	0	50	11	Electric	0	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Cutting and chopping saws	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	0.041	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	7.7	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	56	93	120	100	Diesel	0.10	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	2.7	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	500	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Large Forklifts	Forklifts	3,650	93	120	100	Diesel	6.8	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	0.29	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	54	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	56	530	750	600	Diesel	0.42	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	19	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	3,502	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Mobile Cranes	Cranes	3,650	530	750	600	Diesel	28	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	56	0	50	11	Electric	0	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Saw cutters	Other Construction Equipment	3,650	0	50	11	Electric	0	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	0.052	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	10	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	12	285	500	300	Diesel	0.077	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	3.4	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	638	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	5.0	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	6.5	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	1,219	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	973	480	500	600	Diesel	10	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	11	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	2,043	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Crawler Cranes	Cranes	2,129	530	750	600	Diesel	16	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	11,406	0	50	11	Electric	0	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	19,010	0	50	11	Electric	0	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	8.0	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	1,500	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	10,950	93	120	100	Diesel	20	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	15	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	2,801	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Mobile Cranes	Cranes	2,920	530	750	600	Diesel	22	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	2.3	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	425	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	521	285	500	300	Diesel	3.4	lb	PM	Tier 3	1
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	HC	Tier 3	1
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	4,563	0	50	11	Electric	0	lb	PM	Tier 3	1
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	0.90	lb	HC	Tier 3	1
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	168	lb	Nox	Tier 3	1
1	3	Demolition	CAT 300 series excavator	Excavators	174	404	500	600	Diesel	1.3	lb	PM	Tier 3	1

Piers 30-32 and SWL 330 Controlled Offroad Equipment Activities and Emissions (Tier 3 + DPF)

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	0.76	lb	HC	Tier 3	1
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	142	lb	Nox	Tier 3	1
1	3	Demolition	Street Sweeper	Sweepers/Scrubbers	174	285	500	300	Diesel	1.1	lb	PM	Tier 3	1
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	17	lb	HC	Tier 3	1
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	3,174	lb	Nox	Tier 3	1
1	4	Shoring	Drill Rig	Bore/Drill Rigs	521	1205	9999	9999	Diesel	16	lb	PM	Tier 3	1
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	0.31	lb	HC	Tier 3	1
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	58	lb	Nox	Tier 3	1
1	4	Shoring	Grout-mixing plant	Other Material Handling Equipment	521	24	50	25	Diesel	1.0	lb	PM	Tier 3	1
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	2.7	lb	HC	Tier 3	1
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	505	lb	Nox	Tier 3	1
1	4	Shoring	Small Excavator	Excavators	521	404	500	600	Diesel	4.0	lb	PM	Tier 3	1
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	2.7	lb	HC	Tier 3	1
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	500	lb	Nox	Tier 3	1
1	4	Shoring	Support Crane	Cranes	521	530	750	600	Diesel	3.9	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	39	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	7,375	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	1,217	1200	9999	9999	Diesel	36	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	8.2	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	1,524	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Concrete Boom Pumps	Other Construction Equipment	1,217	480	500	600	Diesel	12	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	12	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	2,335	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	2,433	530	750	600	Diesel	18	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Cutting and chopping saws	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	0.89	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	167	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Large Forklifts	Forklifts	1,217	93	120	100	Diesel	2.3	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	6.2	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	1,167	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Mobile Cranes	Cranes	1,217	530	750	600	Diesel	9.2	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Saw cutters	Other Construction Equipment	1,217	0	50	11	Electric	0	lb	PM	Tier 3	1
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	1.1	lb	HC	Tier 3	1
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	213	lb	Nox	Tier 3	1
1	4	Shoring (Pile-driving)	Street Sweeper	Sweepers/Scrubbers	261	285	500	300	Diesel	1.7	lb	PM	Tier 3	1
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	2.7	lb	HC	Tier 3	1
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	505	lb	Nox	Tier 3	1
1	5	Mass Excavation	CAT 600 Excavator	Excavators	521	404	500	600	Diesel	4.0	lb	PM	Tier 3	1
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	10	lb	HC	Tier 3	1
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	1,844	lb	Nox	Tier 3	1
1	0	Indicator Pile Program	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	304	1200	9999	9999	Diesel	9.1	lb	PM	Tier 3	1
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	2.3	lb	HC	Tier 3	1
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	438	lb	Nox	Tier 3	1
1	0	Indicator Pile Program	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	456	530	750	600	Diesel	3.5	lb	PM	Tier 3	1
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	0.33	lb	HC	Tier 3	1
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	63	lb	Nox	Tier 3	1
1	0	Indicator Pile Program	Large Forklifts	Forklifts	456	93	120	100	Diesel	0.85	lb	PM	Tier 3	1
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	2.3	lb	HC	Tier 3	1
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	438	lb	Nox	Tier 3	1
1	0	Indicator Pile Program	Mobile Cranes	Cranes	456	530	750	600	Diesel	3.5	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	1.8	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	340	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	56	1200	9999	9999	Diesel	1.7	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	118	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	22,126	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	APE 600 Tandem Vibratory Hammer	Bore/Drill Rigs	3,650	1200	9999	9999	Diesel	109	lb	PM	Tier 3	1

Piers 30-32 and SWL 330 Controlled Offroad Equipment Activities and Emissions (Tier 3 + DPF)

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	0.34	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	64	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	51	480	500	600	Diesel	0.51	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	22	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	4,192	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Concrete Boom Pumps	Other Construction Equipment	3,346	480	500	600	Diesel	33	lb	PM	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	0.58	lb	HC	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	108	lb	Nox	Tier 3	1
1	1	Pile Installation & Deck Reconstruction	Crawler Cranes (24 & 48 pile set and hammer)	Cranes	112	530	750	600	Diesel	0.85	lb	PM	Tier 3	1
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	1.6	lb	HC	Tier 3	1
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	304	lb	Nox	Tier 3	1
1	5	Mass Excavation	D6 or equivalent dozer	Rubber Tired Dozers	521	235	250	300	Diesel	2.4	lb	PM	Tier 3	1
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	4.7	lb	HC	Tier 3	1
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	871	lb	Nox	Tier 3	1
1	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	695	480	500	600	Diesel	6.9	lb	PM	Tier 3	1
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	0.95	lb	HC	Tier 3	1
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	177	lb	Nox	Tier 3	1
1	6	Building Construction	Gradall-type Forklifts	Forklifts	608	230	250	300	Diesel	1.4	lb	PM	Tier 3	1
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	0.78	lb	HC	Tier 3	1
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	146	lb	Nox	Tier 3	1
1	6	Building Construction	Manlifts	Forklifts	1,217	51	120	75	Diesel	1.2	lb	PM	Tier 3	1
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	3.6	lb	HC	Tier 3	1
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	667	lb	Nox	Tier 3	1
1	6	Building Construction	Tower cranes	Cranes	695	530	750	600	Diesel	5.3	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	10	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	1,829	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	1,460	480	500	600	Diesel	14	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	9.4	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	1,751	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Crawler Cranes	Cranes	1,825	530	750	600	Diesel	14	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Cutting/chopping saws	Other Construction Equipment	20,531	0	50	11	Electric	0	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Drywall stud impact guns	Other Construction Equipment	30,417	0	50	11	Electric	0	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	11	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	2,001	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	14,600	93	120	100	Diesel	27	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	22	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	4,202	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Mobile Cranes	Cranes	4,380	530	750	600	Diesel	33	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	3.4	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	638	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	782	285	500	300	Diesel	5.0	lb	PM	Tier 3	1
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	HC	Tier 3	1
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	Nox	Tier 3	1
2	2	Building Construction (including arena)	Tile cutting saws	Other Construction Equipment	13,688	0	50	11	Electric	0	lb	PM	Tier 3	1
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	28	lb	HC	Tier 3	1
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	5,226	lb	Nox	Tier 3	1
2	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	4,171	480	500	600	Diesel	41	lb	PM	Tier 3	1
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	5.7	lb	HC	Tier 3	1
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	1,060	lb	Nox	Tier 3	1
2	6	Building Construction	Gradall-type Forklifts	Forklifts	3,650	230	250	300	Diesel	8.4	lb	PM	Tier 3	1
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	4.7	lb	HC	Tier 3	1
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	878	lb	Nox	Tier 3	1
2	6	Building Construction	Manlifts	Forklifts	7,300	51	120	75	Diesel	7.4	lb	PM	Tier 3	1
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	21	lb	HC	Tier 3	1
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	4,002	lb	Nox	Tier 3	1
2	6	Building Construction	Tower cranes	Cranes	4,171	530	750	600	Diesel	32	lb	PM	Tier 3	1

Piers 30-32 and SWL 330 Controlled Offroad Equipment Activities and Emissions (Tier 3 + DPF)

Construction Year	Phase ID	Phase	Project Equipment	OFFROAD Equipment	Total Hours	HP	OFFROAD HP Bin	Tier HP Bin	Fuel	Emissions	Units	Pollutant	Engine Tier Controlled	DPF Controlled
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	1.6	lb	HC	Tier 3	1
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	305	lb	Nox	Tier 3	1
3	2	Building Construction (including arena)	Concrete Boom Pumps	Other Construction Equipment	243	480	500	600	Diesel	2.4	lb	PM	Tier 3	1
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	1.8	lb	HC	Tier 3	1
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	333	lb	Nox	Tier 3	1
3	2	Building Construction (including arena)	Grandall-type Forklifts	Forklifts	2,433	93	120	100	Diesel	4.5	lb	PM	Tier 3	1
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	3.7	lb	HC	Tier 3	1
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	700	lb	Nox	Tier 3	1
3	2	Building Construction (including arena)	Mobile Cranes	Cranes	730	530	750	600	Diesel	5.5	lb	PM	Tier 3	1
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	0.57	lb	HC	Tier 3	1
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	106	lb	Nox	Tier 3	1
3	2	Building Construction (including arena)	Street Sweeper	Sweepers/Scrubbers	130	285	500	300	Diesel	0.84	lb	PM	Tier 3	1
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	7.0	lb	HC	Tier 3	1
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	1,307	lb	Nox	Tier 3	1
3	6	Building Construction	Concrete Boom Pumps	Other Construction Equipment	1,043	480	500	600	Diesel	10	lb	PM	Tier 3	1
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	1.4	lb	HC	Tier 3	1
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	265	lb	Nox	Tier 3	1
3	6	Building Construction	Gradall-type Forklifts	Forklifts	913	230	250	300	Diesel	2.1	lb	PM	Tier 3	1
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	1.2	lb	HC	Tier 3	1
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	219	lb	Nox	Tier 3	1
3	6	Building Construction	Manlifts	Forklifts	1,825	51	120	75	Diesel	1.9	lb	PM	Tier 3	1
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	5.4	lb	HC	Tier 3	1
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	1,001	lb	Nox	Tier 3	1
3	6	Building Construction	Tower cranes	Cranes	1,043	530	750	600	Diesel	7.9	lb	PM	Tier 3	1
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	0.039	lb	HC	Tier 3	1
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	7.3	lb	Nox	Tier 3	1
3	7	Paving	Other Material Handling Equipment	Other Material Handling Equipment	174	9	50	11	Diesel	0.12	lb	PM	Tier 3	1
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	0.30	lb	HC	Tier 3	1
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	57	lb	Nox	Tier 3	1
3	7	Paving	Pavers	Pavers	174	125	175	175	Diesel	0.66	lb	PM	Tier 3	1
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	0.27	lb	HC	Tier 3	1
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	50	lb	Nox	Tier 3	1
3	7	Paving	Paving Equipment	Paving Equipment	174	130	175	175	Diesel	0.58	lb	PM	Tier 3	1
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	0.41	lb	HC	Tier 3	1
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	76	lb	Nox	Tier 3	1
3	7	Paving	Rollers	Rollers	348	80	120	100	Diesel	1.0	lb	PM	Tier 3	1
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	0.24	lb	HC	Tier 3	1
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	46	lb	Nox	Tier 3	1
3	7	Paving	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	174	97	120	100	Diesel	0.62	lb	PM	Tier 3	1
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	0.17	lb	HC	Tier 3	1
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	31	lb	Nox	Tier 3	1
3	8	Architectural Coating	Other Construction Equipment	Other Construction Equipment	130	78	120	100	Diesel	0.42	lb	PM	Tier 3	1

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

										Running Exhaust and Running Losses Emission Factor (g/mile)					
Site	Phase	Year	Trip Type	Vehicle Type	Fuel	% of Fleet	Days	One-way Trips per day	One-way Trip Length	ROG Exhaust	ROG Running Loss	TOG Exhaust	TOG Running Loss	NOx Exhaust	CO ₂ Exhaust (Pavley I + LCFS)
Piers 30-32	Pile Installation	2016	Worker	LDA	GAS	50%	261	160	12.4	0.033	0.061	0.048	0.061	0.107	306
	Pile Installation	2016	Worker	LDT1	GAS	25%	261	160	12.4	0.069	0.212	0.095	0.212	0.244	368
	Pile Installation	2016	Worker	LDT2	GAS	25%	261	160	12.4	0.035	0.099	0.055	0.099	0.184	444
	Pile Installation	2016	Vendor	T6	DSL	50%	261	20	7.3	0.195	0.000	0.222	0.000	3.933	1141
	Pile Installation	2016	Vendor	T7	DSL	50%	261	20	7.3	0.251	0.000	0.286	0.000	6.294	1690
	Pile Installation	2016	Hauling	T7	DSL	100%	261	0	20	0.251	0.000	0.286	0.000	6.294	1690
	Building Construction	2016	Worker	LDA	GAS	50%	500	200	12.4	0.033	0.061	0.048	0.061	0.107	306
	Building Construction	2016	Worker	LDT1	GAS	25%	500	200	12.4	0.069	0.212	0.095	0.212	0.244	368
	Building Construction	2016	Worker	LDT2	GAS	25%	500	200	12.4	0.035	0.099	0.055	0.099	0.184	444
	Building Construction	2016	Vendor	T6	DSL	50%	500	40	7.3	0.195	0.000	0.222	0.000	3.933	1141
	Building Construction	2016	Vendor	T7	DSL	50%	500	40	7.3	0.251	0.000	0.286	0.000	6.294	1690
	Building Construction	2016	Hauling	T7	DSL	100%	500	0	20	0.251	0.000	0.286	0.000	6.294	1690
	Arena Foundation/ Utilities	2016	Worker	LDA	GAS	50%	500	200	12.4	0.033	0.061	0.048	0.061	0.107	306
	Arena Foundation/ Utilities	2016	Worker	LDT1	GAS	25%	500	200	12.4	0.069	0.212	0.095	0.212	0.244	368
	Arena Foundation/ Utilities	2016	Worker	LDT2	GAS	25%	500	200	12.4	0.035	0.099	0.055	0.099	0.184	444
	Arena Foundation/ Utilities	2016	Vendor	T6	DSL	50%	500	60	7.3	0.195	0.000	0.222	0.000	3.933	1141
	Arena Foundation/ Utilities	2016	Vendor	T7	DSL	50%	500	60	7.3	0.251	0.000	0.286	0.000	6.294	1690
	Arena Foundation/ Utilities	2016	Hauling	T7	DSL	100%	500	0	20	0.251	0.000	0.286	0.000	6.294	1690
	Arena Building Construction	2016	Worker	LDA	GAS	50%	500	200	12.4	0.033	0.061	0.048	0.061	0.107	306
	Arena Building Construction	2016	Worker	LDT1	GAS	25%	500	200	12.4	0.069	0.212	0.095	0.212	0.244	368
	Arena Building Construction	2016	Worker	LDT2	GAS	25%	500	200	12.4	0.035	0.099	0.055	0.099	0.184	444
	Arena Building Construction	2016	Vendor	T6	DSL	50%	500	160	7.3	0.195	0.000	0.222	0.000	3.933	1141
	Arena Building Construction	2016	Vendor	T7	DSL	50%	500	160	7.3	0.251	0.000	0.286	0.000	6.294	1690
	Arena Building Construction	2016	Hauling	T7	DSL	100%	500	0	20	0.251	0.000	0.286	0.000	6.294	1690

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Fuel	% of Fleet	Days	One-way Trips per day	One-way Trip Length	Running Exhaust and Running Losses Emission Factor (g/mile)					
										ROG Exhaust	ROG Running Loss	TOG Exhaust	TOG Running Loss	NOx Exhaust	CO ₂ Exhaust (Pavley I + LCFS)
SWL330	Demolition	2017	Worker	LDA	GAS	50%	22	5	12.4	0.027	0.055	0.041	0.055	0.096	293
	Demolition	2017	Worker	LDT1	GAS	25%	22	5	12.4	0.060	0.203	0.084	0.203	0.224	355
	Demolition	2017	Worker	LDT2	GAS	25%	22	5	12.4	0.031	0.094	0.049	0.094	0.165	429
	Demolition	2017	Vendor	T6	DSL	50%	22	40	7.3	0.176	0.000	0.201	0.000	3.409	1121
	Demolition	2017	Vendor	T7	DSL	50%	22	40	7.3	0.240	0.000	0.274	0.000	5.613	1661
	Demolition	2017	Hauling	T7	DSL	100%	22	0	20	0.240	0.000	0.274	0.000	5.613	1661
	Shoring	2017	Worker	LDA	GAS	50%	65	10	12.4	0.027	0.055	0.041	0.055	0.096	293
	Shoring	2017	Worker	LDT1	GAS	25%	65	10	12.4	0.060	0.203	0.084	0.203	0.224	355
	Shoring	2017	Worker	LDT2	GAS	25%	65	10	12.4	0.031	0.094	0.049	0.094	0.165	429
	Shoring	2017	Vendor	T6	DSL	50%	65	40	7.3	0.176	0.000	0.201	0.000	3.409	1121
	Shoring	2017	Vendor	T7	DSL	50%	65	40	7.3	0.240	0.000	0.274	0.000	5.613	1661
	Shoring	2017	Hauling	T7	DSL	100%	65	0	20	0.240	0.000	0.274	0.000	5.613	1661
	Mass Excavation	2017	Worker	LDA	GAS	50%	65	5	12.4	0.027	0.055	0.041	0.055	0.096	293
	Mass Excavation	2017	Worker	LDT1	GAS	25%	65	5	12.4	0.060	0.203	0.084	0.203	0.224	355
	Mass Excavation	2017	Worker	LDT2	GAS	25%	65	5	12.4	0.031	0.094	0.049	0.094	0.165	429
	Mass Excavation	2017	Vendor	T6	DSL	50%	65	40	7.3	0.176	0.000	0.201	0.000	3.409	1121
	Mass Excavation	2017	Vendor	T7	DSL	50%	65	40	7.3	0.240	0.000	0.274	0.000	5.613	1661
	Mass Excavation	2017	Hauling	T7	DSL	100%	65	18	20	0.240	0.000	0.274	0.000	5.613	1661
	Building Construction	2017	Worker	LDA	GAS	50%	369	300	12.4	0.027	0.055	0.041	0.055	0.096	293
	Building Construction	2017	Worker	LDT1	GAS	25%	369	300	12.4	0.060	0.203	0.084	0.203	0.224	355
	Building Construction	2017	Worker	LDT2	GAS	25%	369	300	12.4	0.031	0.094	0.049	0.094	0.165	429
	Building Construction	2017	Vendor	T6	DSL	50%	369	80	7.3	0.176	0.000	0.201	0.000	3.409	1121
	Building Construction	2017	Vendor	T7	DSL	50%	369	80	7.3	0.240	0.000	0.274	0.000	5.613	1661
	Building Construction	2017	Hauling	T7	DSL	100%	369	0	20	0.240	0.000	0.274	0.000	5.613	1661
	Paving	2018	Worker	LDA	GAS	50%	22	15	12.4	0.022	0.050	0.035	0.050	0.088	281
	Paving	2018	Worker	LDT1	GAS	25%	22	15	12.4	0.052	0.195	0.075	0.195	0.208	342
	Paving	2018	Worker	LDT2	GAS	25%	22	15	12.4	0.027	0.090	0.044	0.090	0.148	415
	Paving	2018	Vendor	T6	DSL	50%	22	80	7.3	0.163	0.000	0.186	0.000	2.983	1102
	Paving	2018	Vendor	T7	DSL	50%	22	80	7.3	0.241	0.000	0.274	0.000	5.074	1632
	Paving	2018	Hauling	T7	DSL	100%	22	0	20	0.241	0.000	0.274	0.000	5.074	1632
	Architectural Coating	2018	Worker	LDA	GAS	50%	22	60	12.4	0.022	0.050	0.035	0.050	0.088	281
	Architectural Coating	2018	Worker	LDT1	GAS	25%	22	60	12.4	0.052	0.195	0.075	0.195	0.208	342
Architectural Coating	2018	Worker	LDT2	GAS	25%	22	60	12.4	0.027	0.090	0.044	0.090	0.148	415	
Architectural Coating	2018	Vendor	T6	DSL	50%	22	80	7.3	0.163	0.000	0.186	0.000	2.983	1102	
Architectural Coating	2018	Vendor	T7	DSL	50%	22	80	7.3	0.241	0.000	0.274	0.000	5.074	1632	
Architectural Coating	2018	Hauling	T7	DSL	100%	22	0	20	0.241	0.000	0.274	0.000	5.074	1632	

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

					Running Exhaust and Running Losses Emissions (lb)											
Site	Phase	Year	Trip Type	Vehicle Type	ROG Exhaust	ROG Running Loss	TOG Exhaust	TOG Running Loss	NOx Exhaust	CO ₂ Exhaust (Pavley I + LCFS)	PM ₁₀ Exhaust	PM ₁₀ Tire Wear	PM ₁₀ Brake Wear	PM _{2.5} Exhaust	PM _{2.5} Tire Wear	PM _{2.5} Brake Wear
Piers 30-32	Pile Installation	2016	Worker	LDA	19	35	27	35	61	174687	1.3	4.6	21.0	1.2	1.1	9.0
	Pile Installation	2016	Worker	LDT1	20	61	27	61	70	105025	1.2	2.3	10.5	1.1	0.6	4.5
	Pile Installation	2016	Worker	LDT2	10	28	16	28	52	126737	0.6	2.3	10.5	0.6	0.6	4.5
	Pile Installation	2016	Vendor	T6	8	0	9	0	165	47917	4.4	0.5	5.5	4.0	0.1	2.3
	Pile Installation	2016	Vendor	T7	11	0	12	0	264	71005	3.7	1.5	2.5	3.4	0.4	1.1
	Pile Installation	2016	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Building Construction	2016	Worker	LDA	45	83	65	83	146	418313	3.0	10.9	50.2	2.8	2.7	21.5
	Building Construction	2016	Worker	LDT1	47	145	65	145	167	251497	2.8	5.5	25.1	2.6	1.4	10.8
	Building Construction	2016	Worker	LDT2	24	68	37	68	126	303490	1.5	5.5	25.1	1.4	1.4	10.8
	Building Construction	2016	Vendor	T6	31	0	36	0	633	183589	16.8	1.9	21.0	15.4	0.5	9.0
	Building Construction	2016	Vendor	T7	40	0	46	0	1013	272049	14.2	5.7	9.7	13.1	1.4	4.2
	Building Construction	2016	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDA	45	83	65	83	146	418313	3.0	10.9	50.2	2.8	2.7	21.5
	Arena Foundation/ Utilities	2016	Worker	LDT1	47	145	65	145	167	251497	2.8	5.5	25.1	2.6	1.4	10.8
	Arena Foundation/ Utilities	2016	Worker	LDT2	24	68	37	68	126	303490	1.5	5.5	25.1	1.4	1.4	10.8
	Arena Foundation/ Utilities	2016	Vendor	T6	47	0	54	0	950	275384	25.2	2.9	31.5	23.2	0.7	13.5
	Arena Foundation/ Utilities	2016	Vendor	T7	61	0	69	0	1519	408074	21.3	8.5	14.6	19.6	2.1	6.2
	Arena Foundation/ Utilities	2016	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Arena Building Construction	2016	Worker	LDA	45	83	65	83	146	418313	3.0	10.9	50.2	2.8	2.7	21.5
	Arena Building Construction	2016	Worker	LDT1	47	145	65	145	167	251497	2.8	5.5	25.1	2.6	1.4	10.8
	Arena Building Construction	2016	Worker	LDT2	24	68	37	68	126	303490	1.5	5.5	25.1	1.4	1.4	10.8
	Arena Building Construction	2016	Vendor	T6	126	0	143	0	2532	734358	67.2	7.7	83.9	61.8	1.9	36.0
	Arena Building Construction	2016	Vendor	T7	162	0	184	0	4051	1088196	56.7	22.7	38.8	52.2	5.7	16.6
	Arena Building Construction	2016	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Running Exhaust and Running Losses Emissions (lb)											
					ROG Exhaust	ROG Running Loss	TOG Exhaust	TOG Running Loss	NOx Exhaust	CO ₂ Exhaust (Pavley I + LCFS)	PM ₁₀ Exhaust	PM ₁₀ Tire Wear	PM ₁₀ Brake Wear	PM _{2.5} Exhaust	PM _{2.5} Tire Wear	PM _{2.5} Brake Wear
SWL330	Demolition	2017	Worker	LDA	0	0	0	0	0	441	0.0	0.0	0.1	0.0	0.0	0.0
	Demolition	2017	Worker	LDT1	0	0	0	0	0	267	0.0	0.0	0.0	0.0	0.0	0.0
	Demolition	2017	Worker	LDT2	0	0	0	0	0	322	0.0	0.0	0.0	0.0	0.0	0.0
	Demolition	2017	Vendor	T6	1	0	1	0	24	7941	0.6	0.1	0.9	0.6	0.0	0.4
	Demolition	2017	Vendor	T7	2	0	2	0	40	11763	0.6	0.2	0.4	0.5	0.1	0.2
	Demolition	2017	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Shoring	2017	Worker	LDA	0	0	0	0	1	2603	0.0	0.1	0.3	0.0	0.0	0.1
	Shoring	2017	Worker	LDT1	0	1	0	1	1	1576	0.0	0.0	0.2	0.0	0.0	0.1
	Shoring	2017	Worker	LDT2	0	0	0	0	1	1905	0.0	0.0	0.2	0.0	0.0	0.1
	Shoring	2017	Vendor	T6	4	0	4	0	71	23462	1.9	0.3	2.7	1.7	0.1	1.2
	Shoring	2017	Vendor	T7	5	0	6	0	117	34754	1.6	0.7	1.3	1.5	0.2	0.5
	Shoring	2017	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Mass Excavation	2017	Worker	LDA	0	0	0	0	0	1302	0.0	0.0	0.2	0.0	0.0	0.1
	Mass Excavation	2017	Worker	LDT1	0	0	0	0	0	788	0.0	0.0	0.1	0.0	0.0	0.0
	Mass Excavation	2017	Worker	LDT2	0	0	0	0	0	953	0.0	0.0	0.1	0.0	0.0	0.0
	Mass Excavation	2017	Vendor	T6	4	0	4	0	71	23462	1.9	0.3	2.7	1.7	0.1	1.2
	Mass Excavation	2017	Vendor	T7	5	0	6	0	117	34754	1.6	0.7	1.3	1.5	0.2	0.5
	Mass Excavation	2017	Hauling	T7	12	0	14	0	287	84816	4.0	1.8	3.1	3.7	0.4	1.3
	Building Construction	2017	Worker	LDA	41	83	61	83	146	443343	3.2	12.1	55.6	3.0	3.0	23.8
	Building Construction	2017	Worker	LDT1	45	153	64	153	170	268343	3.0	6.1	27.8	2.7	1.5	11.9
	Building Construction	2017	Worker	LDT2	24	71	37	71	125	324510	1.6	6.1	27.8	1.5	1.5	11.9
	Building Construction	2017	Vendor	T6	42	0	48	0	810	266389	21.1	2.9	31.0	19.4	0.7	13.3
	Building Construction	2017	Vendor	T7	57	0	65	0	1333	394593	18.5	8.4	14.3	17.0	2.1	6.1
	Building Construction	2017	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	2018	Worker	LDA	0	0	0	0	0	1267	0.0	0.0	0.2	0.0	0.0	0.1
	Paving	2018	Worker	LDT1	0	0	0	0	0	772	0.0	0.0	0.1	0.0	0.0	0.0
	Paving	2018	Worker	LDT2	0	0	0	0	0	936	0.0	0.0	0.1	0.0	0.0	0.0
	Paving	2018	Vendor	T6	2	0	3	0	42	15612	1.1	0.2	1.8	1.0	0.0	0.8
	Paving	2018	Vendor	T7	3	0	4	0	72	23117	1.1	0.5	0.9	1.0	0.1	0.4
	Paving	2018	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	Architectural Coating	2018	Worker	LDA	0	1	1	1	2	5067	0.0	0.1	0.7	0.0	0.0	0.3
	Architectural Coating	2018	Worker	LDT1	0	2	1	2	2	3089	0.0	0.1	0.3	0.0	0.0	0.1
Architectural Coating	2018	Worker	LDT2	0	1	0	1	1	3742	0.0	0.1	0.3	0.0	0.0	0.1	
Architectural Coating	2018	Vendor	T6	2	0	3	0	42	15612	1.1	0.2	1.8	1.0	0.0	0.8	
Architectural Coating	2018	Vendor	T7	3	0	4	0	72	23117	1.1	0.5	0.9	1.0	0.1	0.4	
Architectural Coating	2018	Hauling	T7	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Idling Emission Factor (g/hr-vehicle)						Idling Exhaust Emissions (lb) [5 min per one-way trip for mass emissions]					
					ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}	ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}
Piers 30-32	Pile Installation	2016	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Pile Installation	2016	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Pile Installation	2016	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Pile Installation	2016	Vendor	T6	1.980	2.254	74.741	7273.007	0.294	0.270	0.9	1.1	35.8	3487	0.1	0.1
	Pile Installation	2016	Vendor	T7	5.984	6.812	60.057	6800.808	0.162	0.149	2.9	3.3	28.8	3261	0.1	0.1
	Pile Installation	2016	Hauling	T7	5.984	6.812	60.057	6800.808	0.162	0.149	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Vendor	T6	1.980	2.254	74.741	7273.007	0.294	0.270	3.6	4.1	137.3	13362	0.5	0.5
	Building Construction	2016	Vendor	T7	5.984	6.812	60.057	6800.808	0.162	0.149	11.0	12.5	110.3	12494	0.3	0.3
	Building Construction	2016	Hauling	T7	5.984	6.812	60.057	6800.808	0.162	0.149	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Vendor	T6	1.980	2.254	74.741	7273.007	0.294	0.270	5.5	6.2	206.0	20043	0.8	0.7
	Arena Foundation/ Utilities	2016	Vendor	T7	5.984	6.812	60.057	6800.808	0.162	0.149	16.5	18.8	165.5	18742	0.4	0.4
	Arena Foundation/ Utilities	2016	Hauling	T7	5.984	6.812	60.057	6800.808	0.162	0.149	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Vendor	T6	1.980	2.254	74.741	7273.007	0.294	0.270	14.5	16.6	549.3	53447	2.2	2.0
	Arena Building Construction	2016	Vendor	T7	5.984	6.812	60.057	6800.808	0.162	0.149	44.0	50.1	441.3	49977	1.2	1.1
Arena Building Construction	2016	Hauling	T7	5.984	6.812	60.057	6800.808	0.162	0.149	0.0	0.0	0.0	0	0.0	0.0	

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Idling Emission Factor (g/hr-vehicle)						Idling Exhaust Emissions (lb) [5 min per one-way trip for mass emissions]					
					ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}	ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}
SWL330	Demolition	2017	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Demolition	2017	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Demolition	2017	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Demolition	2017	Vendor	T6	1.943	2.212	70.315	7185.677	0.246	0.226	0.2	0.2	5.7	581	0.0	0.0
	Demolition	2017	Vendor	T7	6.124	6.971	56.063	6694.892	0.135	0.124	0.5	0.6	4.5	541	0.0	0.0
	Demolition	2017	Hauling	T7	6.124	6.971	56.063	6694.892	0.135	0.124	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Vendor	T6	1.943	2.212	70.315	7185.677	0.246	0.226	0.5	0.5	16.8	1716	0.1	0.1
	Shoring	2017	Vendor	T7	6.124	6.971	56.063	6694.892	0.135	0.124	1.5	1.7	13.4	1599	0.0	0.0
	Shoring	2017	Hauling	T7	6.124	6.971	56.063	6694.892	0.135	0.124	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Vendor	T6	1.943	2.212	70.315	7185.677	0.246	0.226	0.5	0.5	16.8	1716	0.1	0.1
	Mass Excavation	2017	Vendor	T7	6.124	6.971	56.063	6694.892	0.135	0.124	1.5	1.7	13.4	1599	0.0	0.0
	Mass Excavation	2017	Hauling	T7	6.124	6.971	56.063	6694.892	0.135	0.124	1.3	1.5	11.9	1424	0.0	0.0
	Building Construction	2017	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Vendor	T6	1.943	2.212	70.315	7185.677	0.246	0.226	5.3	6.0	190.7	19485	0.7	0.6
	Building Construction	2017	Vendor	T7	6.124	6.971	56.063	6694.892	0.135	0.124	16.6	18.9	152.0	18154	0.4	0.3
	Building Construction	2017	Hauling	T7	6.124	6.971	56.063	6694.892	0.135	0.124	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Vendor	T6	1.945	2.214	66.245	7088.706	0.216	0.198	0.3	0.4	10.7	1146	0.0	0.0
	Paving	2018	Vendor	T7	6.349	7.227	53.038	6587.025	0.131	0.121	1.0	1.2	8.6	1065	0.0	0.0
	Paving	2018	Hauling	T7	6.349	7.227	53.038	6587.025	0.131	0.121	0.0	0.0	0.0	0	0.0	0.0
	Architectural Coating	2018	Worker	LDA	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Architectural Coating	2018	Worker	LDT1	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
Architectural Coating	2018	Worker	LDT2	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0	
Architectural Coating	2018	Vendor	T6	1.945	2.214	66.245	7088.706	0.216	0.198	0.3	0.4	10.7	1146	0.0	0.0	
Architectural Coating	2018	Vendor	T7	6.349	7.227	53.038	6587.025	0.131	0.121	1.0	1.2	8.6	1065	0.0	0.0	
Architectural Coating	2018	Hauling	T7	6.349	7.227	53.038	6587.025	0.131	0.121	0.0	0.0	0.0	0	0.0	0.0	

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Starting Exhaust Emission Factor (g/one-way trip)						Starting Exhaust Emissions (lb) [Once per one-way trip for mass emissions]					
					ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}	ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}
Piers 30-32	Pile Installation	2016	Worker	LDA	0.188	0.201	0.153	62.302	0.003	0.003	8.6	9.2	7.1	2868	0.1	0.1
	Pile Installation	2016	Worker	LDT1	0.387	0.414	0.282	73.683	0.004	0.004	8.9	9.5	6.5	1696	0.1	0.1
	Pile Installation	2016	Worker	LDT2	0.245	0.261	0.302	88.854	0.003	0.003	5.6	6.0	7.0	2045	0.1	0.1
	Pile Installation	2016	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Pile Installation	2016	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Pile Installation	2016	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Worker	LDA	0.188	0.201	0.153	62.302	0.003	0.003	20.7	22.1	16.9	6868	0.3	0.3
	Building Construction	2016	Worker	LDT1	0.387	0.414	0.282	73.683	0.004	0.004	21.4	22.8	15.5	4061	0.2	0.2
	Building Construction	2016	Worker	LDT2	0.245	0.261	0.302	88.854	0.003	0.003	13.5	14.4	16.7	4897	0.2	0.1
	Building Construction	2016	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2016	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDA	0.188	0.201	0.153	62.302	0.003	0.003	20.7	22.1	16.9	6868	0.3	0.3
	Arena Foundation/ Utilities	2016	Worker	LDT1	0.387	0.414	0.282	73.683	0.004	0.004	21.4	22.8	15.5	4061	0.2	0.2
	Arena Foundation/ Utilities	2016	Worker	LDT2	0.245	0.261	0.302	88.854	0.003	0.003	13.5	14.4	16.7	4897	0.2	0.1
	Arena Foundation/ Utilities	2016	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Foundation/ Utilities	2016	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Worker	LDA	0.188	0.201	0.153	62.302	0.003	0.003	20.7	22.1	16.9	6868	0.3	0.3
	Arena Building Construction	2016	Worker	LDT1	0.387	0.414	0.282	73.683	0.004	0.004	21.4	22.8	15.5	4061	0.2	0.2
	Arena Building Construction	2016	Worker	LDT2	0.245	0.261	0.302	88.854	0.003	0.003	13.5	14.4	16.7	4897	0.2	0.1
	Arena Building Construction	2016	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Arena Building Construction	2016	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Starting Exhaust Emission Factor (g/one-way trip)						Starting Exhaust Emissions (lb) [Once per one-way trip for mass emissions]					
					ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}	ROG	TOG	NOx	CO ₂ (Pavley I + LCFS)	PM ₁₀	PM _{2.5}
SWL330	Demolition	2017	Worker	LDA	0.161	0.172	0.134	59.771	0.003	0.003	0.0	0.0	0.0	7	0.0	0.0
	Demolition	2017	Worker	LDT1	0.353	0.377	0.260	71.213	0.004	0.004	0.0	0.0	0.0	4	0.0	0.0
	Demolition	2017	Worker	LDT2	0.218	0.232	0.267	86.052	0.003	0.003	0.0	0.0	0.0	5	0.0	0.0
	Demolition	2017	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Demolition	2017	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Demolition	2017	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Worker	LDA	0.161	0.172	0.134	59.771	0.003	0.003	0.1	0.1	0.1	43	0.0	0.0
	Shoring	2017	Worker	LDT1	0.353	0.377	0.260	71.213	0.004	0.004	0.1	0.1	0.1	26	0.0	0.0
	Shoring	2017	Worker	LDT2	0.218	0.232	0.267	86.052	0.003	0.003	0.1	0.1	0.1	31	0.0	0.0
	Shoring	2017	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Shoring	2017	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Worker	LDA	0.161	0.172	0.134	59.771	0.003	0.003	0.1	0.1	0.0	21	0.0	0.0
	Mass Excavation	2017	Worker	LDT1	0.353	0.377	0.260	71.213	0.004	0.004	0.1	0.1	0.0	13	0.0	0.0
	Mass Excavation	2017	Worker	LDT2	0.218	0.232	0.267	86.052	0.003	0.003	0.0	0.0	0.0	15	0.0	0.0
	Mass Excavation	2017	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Mass Excavation	2017	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Worker	LDA	0.161	0.172	0.134	59.771	0.003	0.003	19.6	21.0	16.3	7294	0.4	0.3
	Building Construction	2017	Worker	LDT1	0.353	0.377	0.260	71.213	0.004	0.004	21.5	23.0	15.9	4345	0.3	0.2
	Building Construction	2017	Worker	LDT2	0.218	0.232	0.267	86.052	0.003	0.003	13.3	14.2	16.3	5250	0.2	0.2
	Building Construction	2017	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Building Construction	2017	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Worker	LDA	0.139	0.149	0.117	57.344	0.003	0.003	0.1	0.1	0.0	21	0.0	0.0
	Paving	2018	Worker	LDT1	0.323	0.345	0.240	68.869	0.004	0.004	0.1	0.1	0.0	13	0.0	0.0
	Paving	2018	Worker	LDT2	0.194	0.207	0.237	83.351	0.003	0.003	0.0	0.0	0.0	15	0.0	0.0
	Paving	2018	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
	Paving	2018	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0
Architectural Coating	2018	Worker	LDA	0.139	0.149	0.117	57.344	0.003	0.003	0.2	0.2	0.2	83	0.0	0.0	
Architectural Coating	2018	Worker	LDT1	0.323	0.345	0.240	68.869	0.004	0.004	0.2	0.3	0.2	50	0.0	0.0	
Architectural Coating	2018	Worker	LDT2	0.194	0.207	0.237	83.351	0.003	0.003	0.1	0.2	0.2	61	0.0	0.0	
Architectural Coating	2018	Vendor	T6	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0	
Architectural Coating	2018	Vendor	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0	
Architectural Coating	2018	Hauling	T7	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0	0.0	0.0	

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Evaporative ROG Emission Factor (g/one-way trip)			Evaporative ROG Emissions (lb)		
					Diurnal	Hot-Soak	Resting Loss	Diurnal	Hot-Soak	Resting Loss
Piers 30-32	Pile Installation	2016	Worker	LDA	0.042	0.139	0.038	1.9	6.4	1.8
	Pile Installation	2016	Worker	LDT1	0.099	0.278	0.082	2.3	6.4	1.9
	Pile Installation	2016	Worker	LDT2	0.048	0.156	0.047	1.1	3.6	1.1
	Pile Installation	2016	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Pile Installation	2016	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Pile Installation	2016	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2016	Worker	LDA	0.042	0.139	0.038	4.6	15.3	4.2
	Building Construction	2016	Worker	LDT1	0.099	0.278	0.082	5.5	15.3	4.5
	Building Construction	2016	Worker	LDT2	0.048	0.156	0.047	2.7	8.6	2.6
	Building Construction	2016	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2016	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2016	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Foundation/ Utilities	2016	Worker	LDA	0.042	0.139	0.038	4.6	15.3	4.2
	Arena Foundation/ Utilities	2016	Worker	LDT1	0.099	0.278	0.082	5.5	15.3	4.5
	Arena Foundation/ Utilities	2016	Worker	LDT2	0.048	0.156	0.047	2.7	8.6	2.6
	Arena Foundation/ Utilities	2016	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Foundation/ Utilities	2016	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Foundation/ Utilities	2016	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Building Construction	2016	Worker	LDA	0.042	0.139	0.038	4.6	15.3	4.2
	Arena Building Construction	2016	Worker	LDT1	0.099	0.278	0.082	5.5	15.3	4.5
	Arena Building Construction	2016	Worker	LDT2	0.048	0.156	0.047	2.7	8.6	2.6
	Arena Building Construction	2016	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Building Construction	2016	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Arena Building Construction	2016	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0

Piers 30-32 and SWL 330 Controlled and Uncontrolled Onroad Equipment Activities, Emission Factors and Emissions

Site	Phase	Year	Trip Type	Vehicle Type	Evaporative ROG Emission Factor (g/one-way trip)			Evaporative ROG Emissions (lb)		
					Diurnal	Hot-Soak	Resting Loss	Diurnal	Hot-Soak	Resting Loss
SWL330	Demolition	2017	Worker	LDA	0.038	0.127	0.036	0.0	0.0	0.0
	Demolition	2017	Worker	LDT1	0.097	0.271	0.082	0.0	0.0	0.0
	Demolition	2017	Worker	LDT2	0.047	0.151	0.047	0.0	0.0	0.0
	Demolition	2017	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Demolition	2017	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Demolition	2017	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Shoring	2017	Worker	LDA	0.038	0.127	0.036	0.0	0.1	0.0
	Shoring	2017	Worker	LDT1	0.097	0.271	0.082	0.0	0.1	0.0
	Shoring	2017	Worker	LDT2	0.047	0.151	0.047	0.0	0.1	0.0
	Shoring	2017	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Shoring	2017	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Shoring	2017	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Mass Excavation	2017	Worker	LDA	0.038	0.127	0.036	0.0	0.0	0.0
	Mass Excavation	2017	Worker	LDT1	0.097	0.271	0.082	0.0	0.0	0.0
	Mass Excavation	2017	Worker	LDT2	0.047	0.151	0.047	0.0	0.0	0.0
	Mass Excavation	2017	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Mass Excavation	2017	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Mass Excavation	2017	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2017	Worker	LDA	0.038	0.127	0.036	4.6	15.5	4.3
	Building Construction	2017	Worker	LDT1	0.097	0.271	0.082	5.9	16.5	5.0
	Building Construction	2017	Worker	LDT2	0.047	0.151	0.047	2.8	9.2	2.8
	Building Construction	2017	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2017	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Building Construction	2017	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Paving	2018	Worker	LDA	0.034	0.116	0.033	0.0	0.0	0.0
	Paving	2018	Worker	LDT1	0.094	0.264	0.081	0.0	0.0	0.0
	Paving	2018	Worker	LDT2	0.045	0.146	0.046	0.0	0.0	0.0
	Paving	2018	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0
	Paving	2018	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Paving	2018	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0
	Architectural Coating	2018	Worker	LDA	0.034	0.116	0.033	0.0	0.2	0.0
	Architectural Coating	2018	Worker	LDT1	0.094	0.264	0.081	0.1	0.2	0.1
Architectural Coating	2018	Worker	LDT2	0.045	0.146	0.046	0.0	0.1	0.0	
Architectural Coating	2018	Vendor	T6	0.000	0.000	0.000	0.0	0.0	0.0	
Architectural Coating	2018	Vendor	T7	0.000	0.000	0.000	0.0	0.0	0.0	
Architectural Coating	2018	Hauling	T7	0.000	0.000	0.000	0.0	0.0	0.0	

Marine Sources Construction CAPs Emissions Estimates (Uncontrolled)

Vessel Characteristics

Vessel Type	Number of Vessels	Main Engine					Auxiliary Engine				
		Individual Engine Power ¹	Number of Engines ¹	Engine Age ²	Load Factor ³	Project Operating Hours Per Vessel ⁴	Individual Engine Power ¹	Number of Engines ¹	Engine Age ²	Load Factor ³	Project Operating Hours Per Vessel ⁴
		- [hp]	-	-	-	- [hr]	- [hp]	-	-	-	- [hr]
Barge Tugboat	1	2,000	2	46	0.50	120	100	2	28	0.31	120
Support Tugboat	1	400	2	46	0.50	521	100	2	28	0.31	521
Small Boats ⁵	2	250	2	46	0.45	521	100	1	28	0.43	521

CAPs Emission Factors⁶

Vessel Type	Main Engine Zero Hour Emission Factors [g/hp-hr]				Main Engine Fuel Correction Factor				Main Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Barge Tugboat	1.26	3.07	16.52	0.70	1	1	0.930	0.720	0.44	0.25	0.21	0.67
Support Tugboat	1.26	3.07	16.52	0.70	1	1	0.930	0.720	0.44	0.25	0.21	0.67
Small Boats	1.32	3.21	16.52	0.73	1	1	0.930	0.720	0.44	0.25	0.21	0.67

Vessel Type	Auxiliary Engine Zero Hour Emission Factors [g/hp-hr]				Auxiliary Engine Fuel Correction Factor				Auxiliary Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Barge Tugboat	1.71	4.94	13.00	0.71	1	1	0.930	0.720	0.28	0.16	0.14	0.44
Support Tugboat	1.71	4.94	13.00	0.71	1	1	0.930	0.720	0.28	0.16	0.14	0.44
Small Boats	1.71	4.94	13.00	0.71	1	1	0.930	0.720	0.28	0.16	0.14	0.44

CAPs Emission Calculations

Vessel Type	Main Engine Age	Main Engine Useful Life	Main Engine Emissions [ton] ⁷				Auxiliary Engine Age	Auxiliary Engine Useful Life	Auxiliary Engine Emissions [ton] ⁷			
	[yr]	[yr]	ROG	CO	NO _x	PM	[yr]	[yr]	ROG	CO	NO _x	PM
Barge Tugboat	46	21	0.65	1.26	5.93	0.33	28	23	0.02	0.05	0.12	0.006
Support Tugboat	46	21	0.57	1.09	5.16	0.29	28	23	0.08	0.21	0.50	0.028
Small Boats	46	21	0.67	1.29	5.80	0.34	28	23	0.11	0.29	0.70	0.039

Vessel Type	Total Engine Emissions [ton]				
	ROG	CO	NO _x	PM ₁₀ ⁸	PM _{2.5} ⁸
Barge Tugboat	0.67	1.30	6.05	0.34	0.34
Support Tugboat	0.65	1.30	5.66	0.31	0.31
Small Boats	0.78	1.58	6.50	0.37	0.37
Total Emissions:	2.11	4.18	18.21	1.03	1.03

Piers 30-32 and SWL 330 Uncontrolled Marine Equipment Activities, Emission Factors and Emissions

Notes:

1. Main engine numbers and horsepower of the barge tugboat and support tugboat are estimated values based on correspondence with Kurt Ricci, construction project director at Webcor. Other parameters are typical values based on Initial Statement of Reasons (ISOR) for Proposed Regulation for Commercial Harbor Craft (ARB 2007).
2. The oldest engine model year in the Commercial Harbor Craft database was selected to represent the uncontrolled scenario (ARB 2012).
3. Engine load factors based on average values in Emissions Estimation Methodology for Commercial Harbor Craft (ARB 2012).
4. Operating hours of tugboat engines based on correspondence with Kurt Ricci, construction project director at Webcor. Small boats are assumed to operate two hours per construction day.
5. Small boats required for pile repair and strengthening operations under the pier are assumed to be work boats with average vessel characteristics.
6. CAP emission factors, fuel correction factors, and engine deterioration factors based on Emissions Estimation Methodology for Commercial Harbor Craft (ARB 2012).
7. Marine vessel CAP emissions are calculated according to the following equation:

$$\text{Emissions} = \text{EF}_0 \times \text{F} \times (1 + \text{D} \times \text{A}/\text{UL}) \times \text{HP} \times \text{LF} \times \text{Hr}$$

where

EF_0 is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);

F is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;

D is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;

A is the age of the engine when the emissions are estimated;

UL is the vessel type and engine use specific engine useful life;

HP is rated horsepower of the engine;

LF is the vessel type and engine use specific engine load factor; and

Hr is the number of annual operating hours of the engine.

8. It was conservatively assumed that all PM is PM_{10} and $\text{PM}_{2.5}$.

References

California Air Resources Board (ARB). 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California.

Available online at <http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.

ARB. 2007. Technical Support Document: Initial Statement of Reasons for Proposed Rulemaking. Proposed Regulation for Commercial Harbor Craft.

Available online at <http://www.arb.ca.gov/regact/2007/chc07/tsd.pdf>

Marine Sources Construction CAPs Emissions Estimates (Controlled)

Vessel Characteristics

Vessel Type	Number of Vessels	Main Engine					Auxiliary Engine				
		Individual Engine Power ¹	Number of Engines ¹	Engine Age ²	Load Factor ³	Project Operating Hours Per Vessel ⁴	Individual Engine Power ¹	Number of Engines ¹	Engine Age ²	Load Factor ³	Project Operating Hours Per Vessel ⁴
		- [hp]	-	-	-	- [hr]	- [hp]	-	-	-	- [hr]
Barge Tugboat	1	2,000	2	1	0.50	120	100	2	1	0.31	120
Support Tugboat	1	400	2	1	0.50	521	100	2	1	0.31	521
Small Boats ⁵	2	250	2	1	0.45	521	100	1	1	0.43	521

CAPs Emission Factors⁶

Vessel Type	Main Engine Zero Hour Emission Factors [g/hp-hr]				Main Engine Fuel Correction Factor				Main Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Barge Tugboat	0.68	3.73	4.37	0.10	1	1	0.948	0.852	0.44	0.25	0.21	0.67
Support Tugboat	0.68	3.73	3.99	0.08	1	1	0.948	0.852	0.44	0.25	0.21	0.67
Small Boats	0.68	3.73	3.99	0.08	1	1	0.948	0.852	0.44	0.25	0.21	0.67

Vessel Type	Auxiliary Engine Zero Hour Emission Factors [g/hp-hr]				Auxiliary Engine Fuel Correction Factor				Auxiliary Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Barge Tugboat	1.18	3.73	5.32	0.22	1	1	0.948	0.852	0.28	0.16	0.14	0.44
Support Tugboat	1.18	3.73	5.32	0.22	1	1	0.948	0.852	0.28	0.16	0.14	0.44
Small Boats	1.18	3.73	5.32	0.22	1	1	0.948	0.852	0.28	0.16	0.14	0.44

CAPs Emission Calculations

Vessel Type	Main Engine Age	Main Engine Useful Life	Main Engine Emissions [ton] ⁷				Auxiliary Engine Age	Auxiliary Engine Useful Life	Auxiliary Engine Emissions [ton] ⁷			
	[yr]	[yr]	ROG	CO	NO _x	PM	[yr]	[yr]	ROG	CO	NO _x	PM
Barge Tugboat	1	21	0.18	1.00	1.11	0.02	1	23	0.01	0.03	0.04	0.002
Support Tugboat	1	21	0.16	0.87	0.88	0.02	1	23	0.04	0.13	0.18	0.007
Small Boats	1	21	0.18	0.98	0.99	0.02	1	23	0.06	0.19	0.25	0.009

Vessel Type	Total Engine Emissions [ton]				
	ROG	CO	NO _x	PM ₁₀ ⁸	PM _{2.5} ⁸
Barge Tugboat	0.19	1.03	1.15	0.02	0.02
Support Tugboat	0.20	1.00	1.06	0.02	0.02
Small Boats	0.24	1.16	1.24	0.03	0.03
Total Emissions:	0.63	3.19	3.45	0.08	0.08

Piers 30-32 and SWL 330 Controlled Marine Equipment Activities, Emission Factors and Emissions

Notes:

1. Main engine numbers and horsepower of the barge tugboat and support tugboat are estimated values based on correspondence with Kurt Ricci, construction project director at Webcor. Other parameters are typical values based on Initial Statement of Reasons (ISOR) for Proposed Regulation for Commercial Harbor Craft (ARB 2007).
2. The engine age was conservatively assumed to be 1 to represent the age at the end of the pile installation phase.
3. Engine load factors based on average values in Emissions Estimation Methodology for Commercial Harbor Craft (ARB 2012).
4. Operating hours of tugboat engines based on correspondence with Kurt Ricci, construction project director at Webcor. Small boats are assumed to operate two hours per construction day.
5. Small boats required for pile repair and strengthening operations under the pier are assumed to be work boats with average vessel characteristics.
6. CAP emission factors, fuel correction factors, and engine deterioration factors based on Emissions Estimation Methodology for Commercial Harbor Craft (ARB 2012).
7. Marine vessel CAP emissions are calculated according to the following equation:

$$\text{Emissions} = EF_0 \times F \times (1 + D \times A/UL) \times HP \times LF \times Hr$$

where

EF_0 is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);

F is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;

D is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;

A is the age of the engine when the emissions are estimated;

UL is the vessel type and engine use specific engine useful life;

HP is rated horsepower of the engine;

LF is the vessel type and engine use specific engine load factor; and

Hr is the number of annual operating hours of the engine.

8. It was conservatively assumed that all PM is PM_{10} and $PM_{2.5}$.

References

California Air Resources Board (ARB). 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California.

Available online at <http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.

ARB. 2007. Technical Support Document: Initial Statement of Reasons for Proposed Rulemaking. Proposed Regulation for Commercial Harbor Craft.

Available online at <http://www.arb.ca.gov/regact/2007/chc07/tsd.pdf>

Construction Area Emissions Estimates for Piers 30-32 + Seawall 330 Project Alternative

Venue	Floor Area (ft ²)	Building Surface Area ¹ (ft ²)	Architectural Coatings			
			Reapplication Rate	Indoor Paint VOC EF ²	Outdoor Paint VOC EF ²	Architectural Coating VOC emissions ³ lb/yr
				(g/L)	(g/L)	
Piers 30- 32 Event Center, including GSW offices	720,890	1,441,780	100%	100	150	7,519
Piers 30-32 Retail Buildings	103,172	206,344				1,076
Piers 30-32 Parking Garage	234,411	468,822				2,445
SWL330 Residences	208,844	563,879				2,941
SWL330 Retail Buildings	29,854	59,708				311
SWL330 Hotel	178,406	356,812				1,861
SWL330 Shared Space	11,447	22,894				119
SWL330 Parking Garage	106,339	212,678				1,109

Notes:

1. Residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Assumptions used in CalEEMod, and based on SCAQMD's 1993 CEQA guide.
2. Based on California paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors.
3. Assuming 1 gallon of paint covers 180 square feet, consistent with CalEEMod methodology

Area Sources	Total Emissions [ton/yr]				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Architectural Coatings	8.69	--	--	--	--
Total Project Emissions:	8.69	0.00	0.00	0.00	0.00

Mobile Source CAPs Emissions Estimates

Piers 30-32 + Seawall Lot 330 Project Alternative CAPs Emission Factors

Emission Factor ¹	Units	Pollutant				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Running Exhaust	[g/mile]	0.072	1.4	0.38	0.0065	0.0060
Idling Exhaust	[g/trip]	0.0047	0.033	0.031	1.1E-04	1.0E-04
Starting Exhaust	[g/trip]	0.24	3.0	0.27	0.0030	0.0028
PM Brake Wear	[g/mile]	-	-	-	0.048	0.021
PM Tire Wear	[g/mile]	-	-	-	0.0082	0.0021
ROG Running Loss	[g/mile]	0.076	-	-	-	-
ROG Diurnal	[g/trip]	0.045	-	-	-	-
ROG Hot-Soak	[g/trip]	0.14	-	-	-	-
ROG Resting Loss	[g/trip]	0.041	-	-	-	-

Notes:

1. From EMFAC2011, calendar year 2018, San Francisco County. Emission factors are weighted by VMT for all vehicle categories.

Piers 30-32 + Seawall Lot 330 Project Alternative CAPs Emission Calculations

Trip Type	Scenario	Daily One-way Vehicle Trips ¹	Days Per Year ²	Weighted Trip Length [mile] ³	Emissions				
					ROG	CO	NO _x	PM ₁₀	PM _{2.5}
					[ton/yr]				
Piers 30-32 + SWL330, Weekend Trips	Basketball Event Days	7,838	30	20.9	0.92	8.55	2.13	0.34	0.16
	Concert Event Days	6,533	55	20.1	1.36	12.58	3.13	0.50	0.23
	No Event Days	2,999	19	8.0	0.10	0.91	0.21	0.03	0.01
Piers 30-32 + SWL330, Weekday Trips	Basketball Event Days	7,215	30	20.9	0.84	7.84	1.95	0.31	0.14
	Concert Event Days	6,533	45	20.1	1.11	10.29	2.56	0.41	0.19
	Convention Event Days	4,400	61	18.1	0.93	8.54	2.11	0.34	0.15
	No Event Days	2,705	125	8.1	0.62	5.45	1.26	0.19	0.09
Total Emissions:					6	54	13.3	2.1	1.0

Notes:

- Daily vehicle trips provided by Advant Consulting.
- The maximum number of home games (60) in a season was conservatively assumed. Furthermore, it is assumed that half of the games will take place on weekends. Vehicle generation associated with all concert and family show events is approximated by concert trips, while the other 61 events are assumed to be convention events on weekdays.
- Trip length for Piers 30-32 is an estimation based on season ticket holder addresses. Season ticket holders account for approximately 60% seating at Warrior games. Trip length for SWL330 is assumed to be average commute trip length in the Bay Area (MTC 2008).

References

California Air Resources Board (ARB). 2011. Emission Factor Model (EMFAC2011). Available online at www.arb.ca.gov/msei/modeling.htm

Metropolitan Transportation Commission (MTC). 2008. Travel Forecasts Data Summary: Transportation 2035 Plan for the Bay Area. Available online at http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf

Road Dust Calculations

Total Annual VMT

Trip Type	Scenario	VMT [mile/yr]
Piers 30-32 + SWL330, Weekend Trips	Basketball Event Days	4,924,634
	Concert Event Days	7,219,719
	No Event Days	457,694
Piers 30-32 + SWL330, Weekday Trips	Basketball Event Days	4,514,372
	Concert Event Days	5,907,043
	Convention Event Days	4,851,740
Total VMT		30,617,010

Pollutants	Emissions Factor [lb/VMT]	Emissions [ton/yr]
Fugitive PM ₁₀	0.00063	9.676
Fugitive PM _{2.5}	0.00016	2.3751

Road Dust Equation¹

$$E = k \cdot (sL)^{0.91} \cdot (W)^{1.02} \cdot (1-P/4N)$$

where:

- E = annual average emission factor in the same units as k
- k = particle size multiplier for particle size range and units of interest
 - PM₁₀ (lb/VMT) 0.0022
 - PM_{2.5} (lb/VMT) 0.00054
- sL = road surface silt loading (grams per square meter) (g/m²) 0.1
- W = average weight (tons) of all the vehicles traveling the road 2.4
- P = number of "wet" days with at least 0.01 in of precipitation during the averaging period 64
- N = number of days in the averaging period 365

Notes:

1. Road dust equation and parameters are based on CalEEMod defaults for the San Francisco Bay Area Air Basin.

References

California Air Resources Board (ARB). 2011. Emission Factor Model (EMFAC2011). Available online at www.arb.ca.gov/msei/modeling.htm

Metropolitan Transportation Commission (MTC). 2008. Travel Forecasts Data Summary: Transportation 2035 Plan for the Bay Area. Available online at http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf

Marine Sources CAPs Emissions Estimates

Piers 30-32 + Seawall Lot 330 Project Alternative Emission Calculations

Vessel Characteristics

Vessel Type	Number of Vessels	Main Engine					Auxiliary Engine				
		Individual Engine Power ¹	Number of Engines ¹	Engine Model Year ¹	Load Factor ²	Annual Operating Hours Per Vessel ³	Individual Engine Power ¹	Number of Engines ¹	Engine Model Year ¹	Load Factor ²	Annual Operating Hours Per Vessel ³
		- [hp]	-	-	-	- [hr/yr]	- [hp]	-	-	-	- [hr/yr]
Water Taxis	2	1,000	2	2007	0.42	120	80	1	2007	0.43	120

CAPs Emission Factors

Vessel Type	Main Engine Zero Hour Emission Factors [g/hp-hr] ⁴				Main Engine Fuel Correction Factor				Main Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Water Taxis	0.68	3.73	5.53	0.20	1	1	0.948	0.800	0.44	0.25	0.21	0.67

Vessel Type	Auxiliary Engine Zero Hour Emission Factors [g/hp-hr] ⁴				Auxiliary Engine Fuel Correction Factor				Auxiliary Engine Deterioration Factor			
	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM	ROG	CO	NO _x	PM
Water Taxis	1.18	3.73	5.32	0.30	1	1	0.948	0.800	0.28	0.16	0.14	0.44

CAPs Emission Calculations

Vessel Type	Main Engine Age	Main Engine Useful Life	Main Engine Emissions [ton/yr] ⁶				Auxiliary Engine Age	Auxiliary Engine Useful Life	Auxiliary Engine Emissions [ton/yr] ⁶			
	[yr]	[yr]	ROG	CO	NO _x	PM	[yr]	[yr]	ROG	CO	NO _x	PM
Water Taxis	11	20	0.19	0.94	1.30	0.05	11	20	0.01	0.04	0.05	0.003

Vessel Type	Total Engine Emissions [ton/yr]				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5} ⁷
Water Taxis	0.20	0.98	1.3	0.051	0.051
Total Project Emissions:	0.20	1.0	1.3	0.051	0.051

Marine Sources CAPs Emissions Estimates

Notes:

1. Water taxi information based on current and expected future vessel characteristics (communication with Tideline Marine Group).
2. Engine load factors based on average values in Emissions Estimation Methodology for Commercial Harbor Craft (ARB 2012).
3. Based on Project sponsor information.
4. CAP Emission Factors (EFs) for all water taxis based on the California CHC Emissions Estimation Database. BAAQMD (2004) policy and diesel engine conversion factors (USEPA) were used to calculate the NOx and ROG emission factors from the combined emission factors. It is also assumed that VOC and ROG are equivalent (ARB 2009).
5. CAP EFs based on standards from the ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (ARB 2013).
6. CAPs emissions from marine engines are calculated according to the following equation:

$$\text{Emissions} = \text{EF}_0 \times \text{F} \times (1 + \text{D} \times \text{A}/\text{UL}) \times \text{HP} \times \text{LF} \times \text{Hr}$$

where

EF₀ is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);

F is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;

D is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;

A is the age of the engine when the emissions are estimated;

UL is the vessel type and engine use specific engine useful life;

HP is rated horsepower of the engine;

LF is the vessel type and engine use specific engine load factor; and

Hr is the number of annual operating hours of the engine.

7. PM_{2.5} is conservatively assumed to be equal to total PM.

References

Bay Area Air Quality Management District (BAAQMD). 2004. Policy: CARB Emission Factors for CI Diesel Engines – Percent HC in Relation to NMHC + NOx. Available online at <http://www.baaqmd.gov/Divisions/Engineering/Authority-to-Construct-Permit-to-Operate/Policy-and-Procedure-Manual/Emission-Factors.aspx>

California Air Resources Board (ARB). 2012. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California. Available online at <http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.

ARB. 2009. Definitions of VOC and ROG. January. Available online at: http://www.arb.ca.gov/ei/speciate/voc_rog_dfn_1_09.pdf

ARB. 2007. Technical Support Document: Initial Statement of Reasons for Proposed Rulemaking. Proposed Regulation for Commercial Harbor Craft. Available online at <http://www.arb.ca.gov/regact/2007/chc07/tsd.pdf>

ARB. 2013. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Std.xls.

U.S. Environmental Protection Agency (USEPA). 1997. Conversion Factors for Hydrocarbon Emission Components. November. Available online at: <http://www.epa.gov/oms/models/nonrdmdl/nr-002.pdf>.

Generator Emissions Estimates

Piers 30-32 + Seawall Lot 330 Project Alternative Emission Calculations

Location	Size (kW)		Fuel Type	Operation ¹ (hrs/yr)	Emission Factors ^{2,3}					Emissions			
	[kW]	[hp]			NMHC	ROG	CO	NOx	PM	ROG	CO	Nox	PM
	[g/bhp-hr]					[ton/yr]							
Piers 30 - 32													
Standby Emergency	1500	2012	diesel	50	0.14	0.15	2.6	0.5	0.02	0.017	0.29	0.055	0.002
Standby Emergency	1500	2012	diesel	50	0.14	0.15	2.6	0.5	0.02	0.017	0.29	0.055	0.002
Seawall Lot 330													
Residential	600	805	diesel	50	0.14	0.15	2.6	0.5	0.02	0.007	0.12	0.022	0.001
Hotel	500	671	diesel	50	0.14	0.15	2.2	0.3	0.015	0.006	0.08	0.011	0.001
Restaurant	150	201	diesel	50	0.14	0.15	2.2	0.3	0.015	0.002	0.02	0.003	0.000
Total Emissions:										0.047	0.80	0.15	0.006

Notes:

1. Operation is conservatively assumed to be 50 hours per year, the maximum allowable by the Bay Area Air Quality Management District.
2. Critical Air Pollutants emission factors based on Tier 4 standards from the ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (ARB 2013). Emission factors for PM₁₀ and PM_{2.5} are conservatively based on the PM emission standard.
3. The emission factors for ROG were calculated from the NMHC emission factors using conversion factors for diesel engines (USEPA 1997) and assuming that VOC and ROG are equivalent (ARB 2009).

References:

U.S. Environmental Protection Agency (USEPA). 1997. *Conversion Factors for Hydrocarbon Emission Components*. November. Available online at: <http://www.epa.gov/oms/models/nonrdmdl/nr-002.pdf>.

California Air Resources Board (ARB). 2013. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Std.xls.

ARB. 2009. *Definitions of VOC and ROG*. January. Available online at: http://www.arb.ca.gov/ei/speciate/voc_rog_dfn_1_09.pdf

Boiler Emissions Estimates

Piers 30-32 + Seawall Lot 330 Project Alternative Emission Calculations

Location	Quantity ¹	Fuel Type	Size ¹	Higher Heating Value ²	Fuel Consumption ³	Operation ⁴ (hrs/yr)	Emission Factors ^{5,6,7}						Emissions					
							CO		NOx		CO	NOx	ROG	PM	CO	NOx	ROG	PM
							ppmv (dry at 3% O ₂)		lb/MMBtu		lb/10 ⁶ scf		[ton/yr]					
Piers 30-32	4	Natural Gas	4,000,000	1,020	3,922	8,760	400	30	0.30	0.037	5.5	7.6	21	2.6	0.38	0.52		
SWL330, Residential	6	Natural Gas	500,000	1,020	490	8,760	400	30	0.30	0.037	5.5	7.6	4	0.5	0.07	0.10		
SWL330, Hotel	3	Natural Gas	1,500,000	1,020	1,471	8,760	400	30	0.30	0.037	5.5	7.6	6	0.7	0.11	0.15		
SWL330, Retail	1	Natural Gas	2,000,000	1,020	1,961	8,760	400	30	0.30	0.037	5.5	7.6	3	0.3	0.05	0.07		
Total													34	4.1	0.60	0.83		

Notes:

- Quantity and Size based on estimates provided by the Project Sponsor.
- Higher heating value is the average natural gas heating value in AP-42 Section 1.4.
- Fuel consumption calculated from size and higher heating value.
- The boiler is assumed to operate for every hour of the year.
- CO and NOx emission factors in ppm from BAAQMD Regulation 9 Rule 7.
- CO and NOx emission factors converted from ppm to lb/MMBtu using the F-Factor method described in USEPA Method 19 for natural gas fuel (USEPA 2001).
- ROG and PM emission factors from AP-42 Section 1.4 Table 1.4-2.

Abbreviations:

Btu - British Thermal Unit
CO - carbon monoxide
hr - hour
lb - pound
MMBtu - million Btu
NOx - nitrogen oxides
O₂ - oxygen
PM - particulate matter
ppmv - parts per million by volume
ROG - reactive organic gases
scf - standard cubic feet
yr - year

References:

BAAQMD. 2011. Regulation 9 Rule 7. Inorganic Gaseous Pollutants Nitrogen oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters.
USEPA. 1995. AP 42, Volume I, Fifth Edition. §1.4. Natural Gas Combustion. Available online at: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>
USEPA. 2001. Preferred and Alternative Methods for Estimating Air Emissions from Boilers. January. Available online at: <http://www.epa.gov/ttnchie1/eiip/techreport/volume02/ii02.pdf>.

Area Emissions Estimates

Piers 30-32 + Seawall Lot 330 Project Alternative Emission Calculations

Venue	Floor Area (ft ²)	Building Surface Area ¹ (ft ²)	Architectural Coatings			Consumer Products		
			Reapplication Rate	Indoor Paint VOC EF ²	Outdoor Paint VOC EF ²	Architectural Coating VOC emissions ³	Consumer Product VOC EF ⁴	Consumer Product VOC emissions
				[g/L]	[g/L]	[lb/yr]	(lb/ft ² /day)	[lb/yr]
Piers 30- 32 Event Center, including GSW offices	720890	1441780	10%	100	150	752	1.51E-05	3973
Piers 30-32 Retail Buildings	103172	206344				108		569
Piers 30-32 Parking Garage	234411	468822				245		1292
SWL330 Residences	208844	563879				294		1151
SWL330 Retail Buildings	29854	59708				31		165
SWL330 Hotel	178406	356812				186		983
SWL330 Shared Space	11447	22894				12		63
SWL330 Parking Garage	106339	212678				111		586

Notes:

1. Residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Assumptions used in CalEEMod, and based on SCAQMD's 1993 CEQA guide.
2. Based on California paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors.
3. Assuming 1 gallon of paint covers 180 square feet, consistent with CalEEMod methodology
4. San Francisco-specific area source emission factor developed by San Francisco Environmental Planning (SFEP) for ROG from consumer products.

Venue	Floor Area (ft ²)	Dwelling Units	Landscaping EFs ^{1,2}				Landscaping Emissions			
			ROG	CO	NOx	PM ₁₀	ROG	CO	NOx	PM ₁₀
			[lb/ft ² /yr]	[lb/ft ² /yr]	[lb/ft ² /yr]	[lb/ft ² /yr]	[lb/yr]	[lb/yr]	[lb/yr]	[lb/yr]
Piers 30- 32 Event Center, including GSW offices	720890	-	1.78E-06	1.86E-05	1.74E-07	6.71E-08	1.28	13.43	0.13	0.05
Piers 30-32 Retail Buildings	103172	-					0.18	1.92	0.02	0.01
Piers 30-32 Parking Garage	234411	-					0.42	4.37	0.04	0.02
SWL330 Residences	208844	176	0.461	15.0	0.174	0.082	81.1	2632.1	30.6	14.4
SWL330 Retail Buildings	29854	-	1.78E-06	1.86E-05	1.74E-07	6.71E-08	0.05	0.56	0.01	0.00
SWL330 Hotel	178406	-					0.32	3.32	0.03	0.01
SWL330 Shared Space	11447	-					0.02	0.21	0.00	0.00
SWL330 Parking Garage	106339	-					0.19	1.98	0.02	0.01

Notes:

1. EFs based on CalEEMod defaults, equipment assumed to be during 180 summer days.
2. For residences units are lb/dwelling unit/yr.

Area Emissions Estimates

Venue	Floor Area [ft ²]	Dwelling Units with Hearths ¹	Hearth Emissions ²			
			ROG [lb/yr]	NO _x [lb/yr]	CO [lb/yr]	PM ₁₀ [lb/yr]
SWL330 Residences	208844	121	1.2	10	4.3	0.82

Notes:

1. Number of hearths used is default percent provided by BAAQMD as per CalEEMod methodology. All hearths assumed to be gas-powered; installation of new wood burning fireplaces banned (San Francisco Building Code, Chapter 31, Section 3102.8).

2. Emissions calculated using emission factors from AP-42, Chapter 1, for residential furnaces, as per CalEEMod methodology. Heating value of natural gas was assumed to be 1,020 MMBtu/MMSCF, and default CalEEMod values were used for average heating rate per hour and average time of use per year for San Francisco.

Area Sources	Total Engine Emissions [ton/yr]				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Architectural Coatings	0.87	--	--	--	--
Consumer Products	4.39	--	--	--	--
Landscaping	0.04	1.33	0.02	0.01	0.01
Hearths	0.00	0.01	0.00	0.00	0.00
Total Project Emissions:	5.30	1.33	0.02	0.01	0.01

APPENDIX WS

Wind and Shadow

Wind Study April 23, 2015

TABLES



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
1	41	13	e	42	12	-1	e	23	0	-13	
2	28	0		23	0	0		21	0	0	
3	22	0		17	0	0		33	0	0	
4	14	0		21	0	0		15	0	0	
5	36	0		29	0	0		27	0	0	
6	36	0		44	39	39	e	33	0	0	
7	39	6	e	34	0	-6		28	0	-6	
8	35	0		24	0	0		33	0	0	
9	29	0		28	0	0		39	7	7	e
10	24	0		24	0	0		26	0	0	
11	15	0		28	0	0		27	0	0	
12	24	0		23	0	0		21	0	0	
13	33	0		27	0	0		27	0	0	
14	30	0		28	0	0		33	0	0	
15	32	0		29	0	0		24	0	0	
16	27	0		19	0	0		21	0	0	
17	21	0		20	0	0		24	0	0	
18	18	0		31	0	0		30	0	0	
19	20	0		25	0	0		28	0	0	
20	24	0		24	0	0		22	0	0	
21	30	0		22	0	0		29	0	0	



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
22	26	0		25	0	0		25	0	0	
23	21	0		26	0	0		28	0	0	
24	23	0		19	0	0		20	0	0	
25	26	0		16	0	0		15	0	0	
26	34	0		18	0	0		13	0	0	
27	32	0		23	0	0		21	0	0	
28	28	0		33	0	0		33	0	0	
29	25	0		21	0	0		17	0	0	
30	23	0		25	0	0		25	0	0	
31	24	0		20	0	0		23	0	0	
32	24	0		32	0	0		34	0	0	
33	27	0		30	0	0		28	0	0	
34	Data not available			24	0	-		27	0	-	
35				34	0	-		35	0	-	
36				25	0	-		26	0	-	
37				14	0	-		17	0	-	
38				15	0	-		14	0	-	
39				21	0	-		29	0	-	
40				32	0	-		40	10	-	e
41				34	0	-		37	4	-	e
42				21	0	-		22	0	-	



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
43	Data not available			38	2	-	e	34	0	-	
44				34	0	-		31	0	-	
45				25	0	-		24	0	-	
46				24	0	-		28	0	-	
47				22	0	-		23	0	-	
48				23	0	-		21	0	-	
49				31	0		19	0	0		19
50	35	0		40	5	5	e	27	0	0	
51	34	0		33	0	0		22	0	0	
52	31	0		28	0	0		23	0	0	
53	23	0		27	0	0		18	0	0	
54	38	3	e	26	0	-3		19	0	-3	
55	29	0		25	0	0		19	0	0	
56	22	0		28	0	0		22	0	0	
57	30	0		23	0	0		15	0	0	
58	19	0		23	0	0		16	0	0	
59	21	0		19	0	0		15	0	0	
60	Data not available			Data not available				Data not available			
61											
62				37	3	-	e	34	0	-	
63				29	0	-		25	0	-	



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative						
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds			
64	Data not available			33	0	-		33	0	-				
65				45	25	-	e	44	20	-	e			
66				37	3	-	e	36	0	-				
67				33	0	-		31	0	-				
68				30	0	-		28	0	-				
69				11	0	-		10	0	-				
70				11	0	-		10	0	-				
71				19	0	-		20	0	-				
72				29	0	-		21	0	-				
73				44	18	-	e	33	0	-				
74				30	0	-		22	0	-				
75				24	0	-		23	0	-				
76				27	0	-		20	0	-				
77				20	0	-		16	0	-				
78				18	0	-		17	0	-				
79				20	0	-		20	0	-				
80				9	0	-		9	0	-				
81				26	0	-		22	0	-				
82				31	0		24	0	0		19	0	0	
83				31	0		28	0	0		23	0	0	
84	34	0		20	0	0		15	0	0				



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
85	31	0		26	0	0		25	0	0	
86	32	0		22	0	0		16	0	0	
87	31	0		19	0	0		14	0	0	
88	32	0		10	0	0		11	0	0	
89	31	0		12	0	0		12	0	0	
90	29	0		24	0	0		16	0	0	
91	34	0		25	0	0		18	0	0	
92	32	0		20	0	0		16	0	0	
93	31	0		30	0	0		21	0	0	
94	29	0		20	0	0		18	0	0	
95	35	0		29	0	0		24	0	0	
96	29	0		32	0	0		30	0	0	
97	34	0		23	0	0		23	0	0	
98	39	6	e	35	0	-6		23	0	-6	
99	40	8	e	41	14	6	e	33	0	-8	
100	22	0		21	0	0		26	0	0	
101	32	0		29	0	0		30	0	0	
102	35	0		33	0	0		30	0	0	
103	37	1	e	35	0	-1		33	0	-1	
104	33	0		35	0	0		33	0	0	
105	45	70	e	43	57	-13	e	42	35	-35	e



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
106	39	5	e	42	12	7	e	40	12	7	e
107	Data not available			Data not available				Data not available			
108	Data not available			Data not available				Data not available			
109	29	0		Data not available				Data not available			
110	28	0									
111	32	0									
112	35	0									
113	31	0									
114	28	0									
115	29	0									
116	34	0									
117	30	0									
118	29	0									
119	26	0									
120	28	0									
121	26	0									
122	31	0									
123	30	0									
124	27	0									
125	33	0									
126	33	0									



Table 1a: Wind Hazard Results – Original Plaza Design

References	Existing			Existing + Project				Project + Cumulative											
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds								
127	34	0		Data not available	Data not available			Data not available	Data not available										
128	32	0																	
129	33	0																	
130	31	0																	
131	33	0																	
132	33	0																	
133	33	0																	
134	34	0																	
135	33	0																	
136	32	0																	
137	28	0																	
138	29	0																	
139	32	0																	
140	32	0																	
141	31	0																	
142	33	0																	
Average Wind Speeds, Total Hours & Exceeds	30	112	$\frac{8}{103}$									26	190	-	$\frac{11}{104}$	24	88	-	$\frac{6}{104}$
Averages & Totals – Sidewalks & Plaza*	29	112	$\frac{8}{69}$									26	139	27	$\frac{6}{69}$	24	54	-58	$\frac{3}{69}$

*Sidewalks & Plaza: Locations 1 – 33, 49 – 59, 82 – 106



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
1	20	46	e	19	38	-1	e	11	10	-9	
2	16	30	e	14	22	-2	e	9	5	-7	
3	13	16	e	10	5	-3		16	32	3	e
4	6	0		10	7	4		9	2	3	
5	19	45	e	15	25	-4	e	14	24	-5	e
6	17	32	e	22	52	5	e	16	31	-1	e
7	19	41	e	20	48	1	e	14	21	-5	e
8	17	34	e	13	21	-4	e	16	30	-1	e
9	15	26	e	16	30	1	e	20	42	5	e
10	14	19	e	13	18	-1	e	12	16	-2	e
11	8	1		13	19	5	e	15	25	7	e
12	11	10		11	10	0		12	15	1	e
13	18	37	e	15	25	-3	e	14	22	-4	e
14	17	35	e	16	31	-1	e	16	30	-1	e
15	15	26	e	16	28	1	e	13	16	-2	e
16	12	13	e	10	6	-2		11	10	-1	
17	10	6		9	5	-1		11	10	1	
18	8	3		16	28	8	e	15	27	7	e
19	10	6		10	8	0		15	24	5	e
20	14	20	e	14	19	0	e	11	10	-3	



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
21	16	28	e	12	16	-4	e	14	22	-2	e
22	14	24	e	10	8	-4		11	10	-3	
23	11	10		14	22	3	e	14	19	3	e
24	11	10		10	7	-1		10	6	-1	
25	13	15	e	8	2	-5		8	1	-5	
26	17	34	e	10	5	-7		7	0	-10	
27	16	31	e	12	12	-4	e	11	10	-5	
28	16	31	e	17	34	1	e	17	32	1	e
29	14	24	e	10	8	-4		9	4	-5	
30	13	20	e	11	10	-2		12	13	-1	e
31	12	16	e	11	10	-1		11	10	-1	
32	11	10		17	38	6	e	17	33	6	e
33	14	24	e	17	34	3	e	15	25	1	e
34	Data not available			13	18	-	e	13	17	-	e
35				20	44	-	e	16	27	-	e
36				14	22	-	e	13	19	-	e
37				7	1	-		7	2	-	
38				8	1	-		7	0	-	
39				11	10	-		14	22	-	e
40				18	39	-	e	19	37	-	e



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative						
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds			
41	Data not available			17	36	-	e	19	37	-	e			
42				10	8	-		11	10	-				
43				20	45	-	e	19	42	-	e			
44				17	36	-	e	17	34	-	e			
45				14	22	-	e	13	20	-	e			
46				11	10	-		11	10	-				
47				12	14	-	e	11	10	-				
48				10	6	-		9	4	-				
49				16	33	e	10	7	-6		11	10	-5	
50				16	32	e	22	52	6	e	15	27	-1	e
51	18	39	e	16	30	-2	e	11	10	-7				
52	14	25	e	13	15	-1	e	9	4	-5				
53	12	14	e	13	15	1	e	8	2	-4				
54	18	36	e	12	13	-6	e	10	5	-8				
55	15	24	e	12	13	-3	e	10	6	-5				
56	12	16	e	14	19	2	e	10	6	-2				
57	16	31	e	11	10	-5		8	2	-8				
58	10	6		11	10	1		8	2	-2				
59	12	12	e	11	10	-1		8	1	-4				
60	Data not available			Data not available				Data not available						



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
61	Data not available	Data not available	Data not available	Data not available				Data not available			
62				18	39	-	e	16	32	-	e
63				15	25	-	e	14	24	-	e
64				17	36	-	e	16	32	-	e
65				17	33	-	e	17	27	-	e
66				12	12	-	e	12	14	-	e
67				10	7	-		10	9	-	
68				8	5	-		8	5	-	
69				6	0	-		5	0	-	
70				6	0	-		6	0	-	
71				10	5	-		9	4	-	
72				11	10	-		9	5	-	
73				16	27	-	e	14	21	-	e
74				11	10	-		9	5	-	
75				10	7	-		10	6	-	
76				11	10	-		9	6	-	
77				8	3	-		8	2	-	
78				7	2	-		7	1	-	
79				10	6	-		9	6	-	
80				5	0	-		5	0	-	



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
81	Data not available			7	4	-		7	3	-	
82	17	35	e	9	6	-8		9	5	-8	
83	16	33	e	11	10	-5		11	10	-5	
84	18	38	e	7	2	-11		7	1	-11	
85	17	35	e	14	22	-3	e	14	21	-3	e
86	17	37	e	9	4	-8		7	1	-10	
87	17	35	e	11	10	-6		7	0	-10	
88	18	38	e	5	0	-13		5	0	-13	
89	17	34	e	6	0	-11		6	0	-11	
90	15	25	e	14	19	-1	e	7	1	-8	
91	17	34	e	15	23	-2	e	8	2	-9	
92	16	30	e	12	12	-4	e	8	1	-8	
93	16	28	e	17	33	1	e	9	5	-7	
94	14	23	e	11	10	-3		7	2	-7	
95	17	36	e	16	30	-1	e	10	6	-7	
96	16	31	e	16	30	0	e	15	27	-1	e
97	17	31	e	13	19	-4	e	9	4	-8	
98	20	41	e	21	48	1	e	11	10	-9	
99	21	48	e	23	52	2	e	15	26	-6	e
100	11	10		11	10	0		12	14	1	e



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
101	15	26	e	14	23	-1	e	15	28	0	e
102	18	40	e	17	33	-1	e	16	31	-2	e
103	19	44	e	18	40	-1	e	17	37	-2	e
104	18	41	e	20	47	2	e	18	44	0	e
105	25	51	e	25	50	1	e	23	48	-1	e
106	18	36	e	19	41	1	e	21	48	3	e
107	Data not available			Data not available				Data not available			
108	Data not available										
109	16	32	e								
110	16	31	e								
111	16	29	e								
112	17	35	e								
113	16	29	e								
114	13	16	e								
115	15	23	e								
116	19	41	e								
117	16	28	e								
118	16	30	e								
119	14	25	e								
120	16	32	e								



Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
121	14	25	e	Data not available	Data not available	Data not available	Data not available	Data not available	Data not available	Data not available	Data not available
122	16	32	e								
123	16	30	e								
124	15	25	e								
125	16	32	e								
126	17	33	e								
127	17	37	e								
128	17	35	e								
129	17	37	e								
130	16	32	e								
131	18	39	e								
132	16	31	e								
133	17	34	e								
134	17	37	e								
135	17	34	e								
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138	15	27	e								
139	18	39	e								
140	18	38	e								

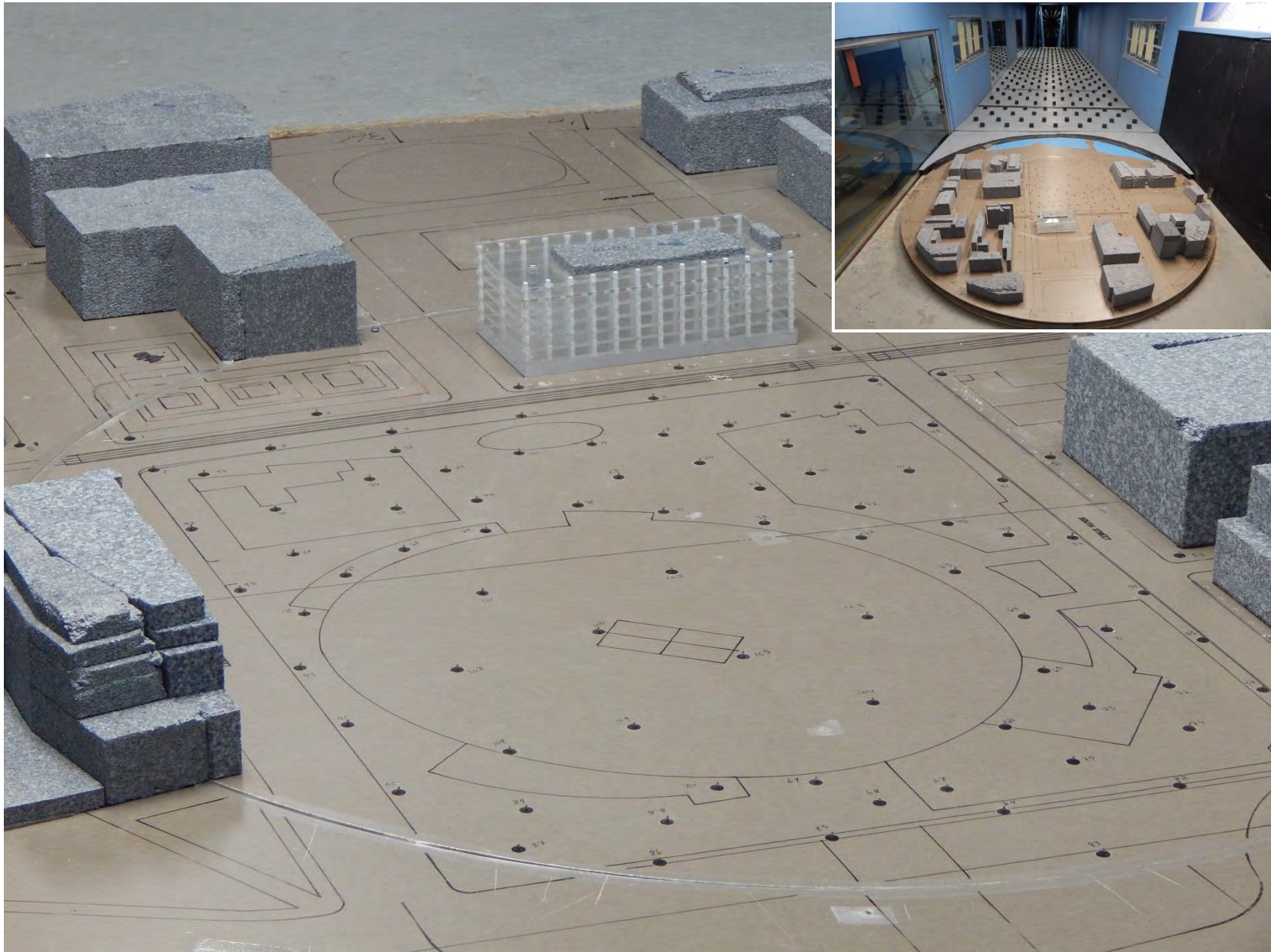


Table 2a: Wind Comfort Results – Original Plaza Design

Reference	Existing			Existing + Project				Project + Cumulative			
Location Number	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds	Wind Speed Exceeded 10% of Time (mph)	Percent of Time Wind Speed Exceeds 11 mph	Speed Change Relative to Existing (mph)	Exceeds
141	17	36	e	Data not available				Data not available			
142	17	37	e								
Average Wind Speeds & Percentages, Total Exceedances	15	28	$\frac{92}{103}$	13	19	-	$\frac{58}{104}$	12	14	-	$\frac{46}{104}$
Averages & Totals – Sidewalks & Plaza*	15	27	$\frac{58}{69}$	14	21	-2	$\frac{43}{69}$	12	15	-3	$\frac{31}{69}$

*Sidewalks & Plaza: Locations 1 – 33, 49 – 59, 82 – 106

FIGURES



**Wind Tunnel Study Model
Existing**

Warrior's Arena – San Francisco, CA

Figure No. 1a

Date: April 23, 2015



Project #1401775



**Wind Tunnel Study Model
Existing + Project**

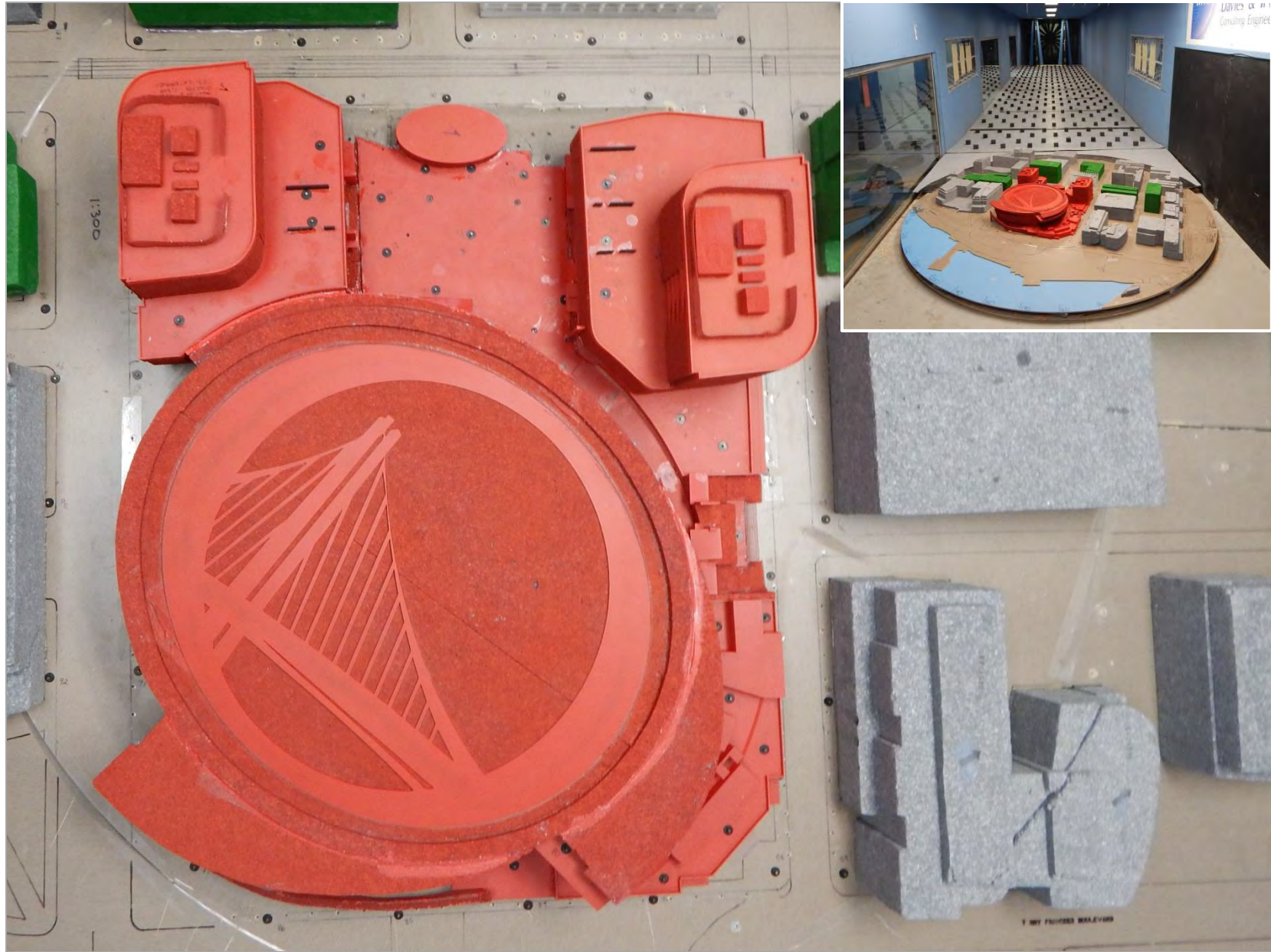
Warrior's Arena – San Francisco, CA

Figure No. 1b

Date: April 15, 2015



Project #1401775



Wind Tunnel Study Model
Project + Cumulative

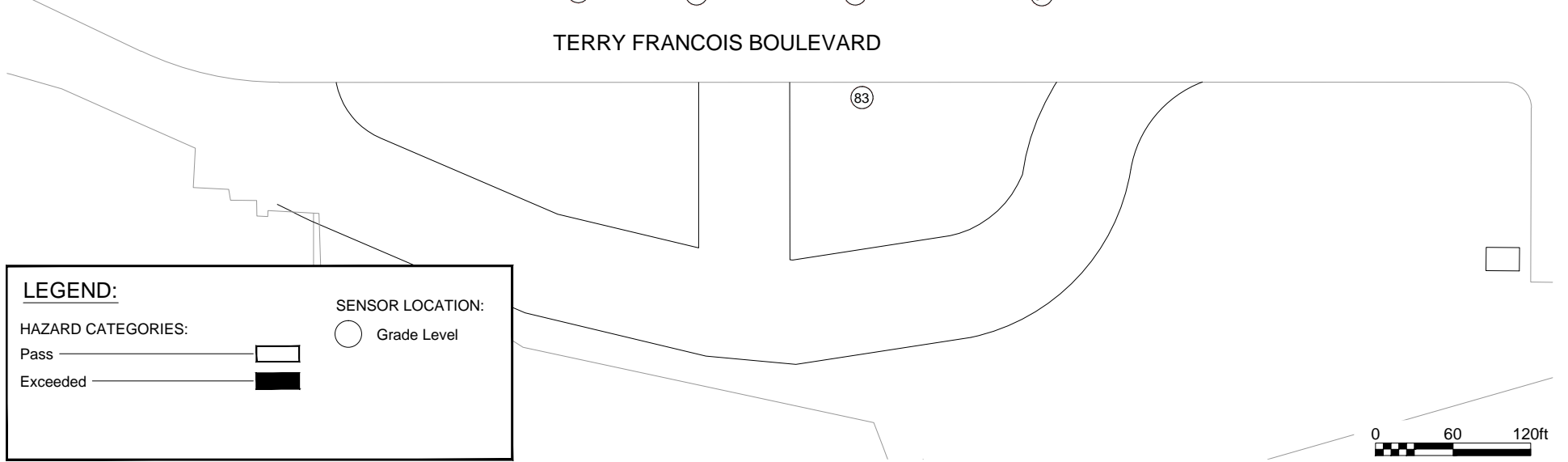
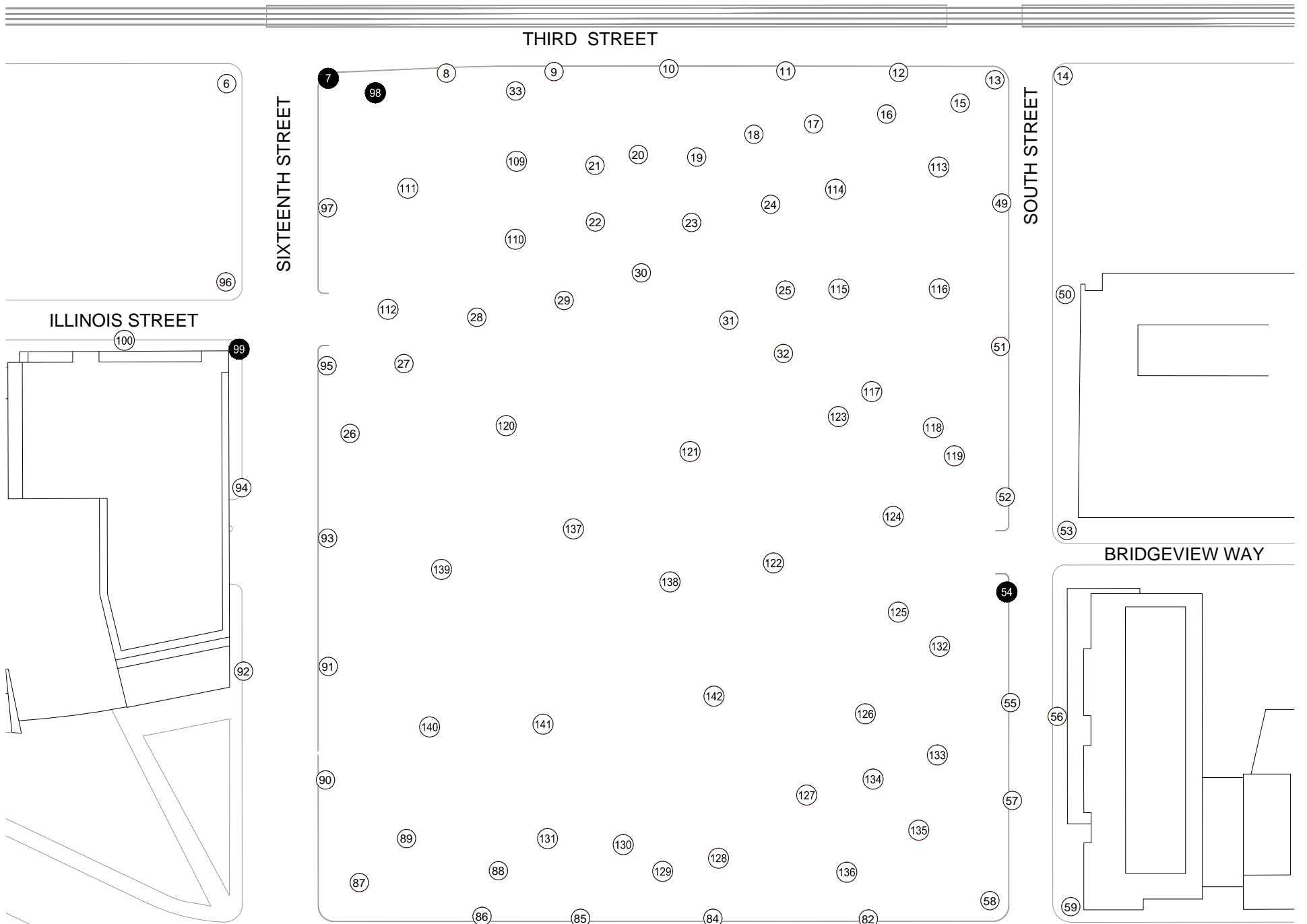
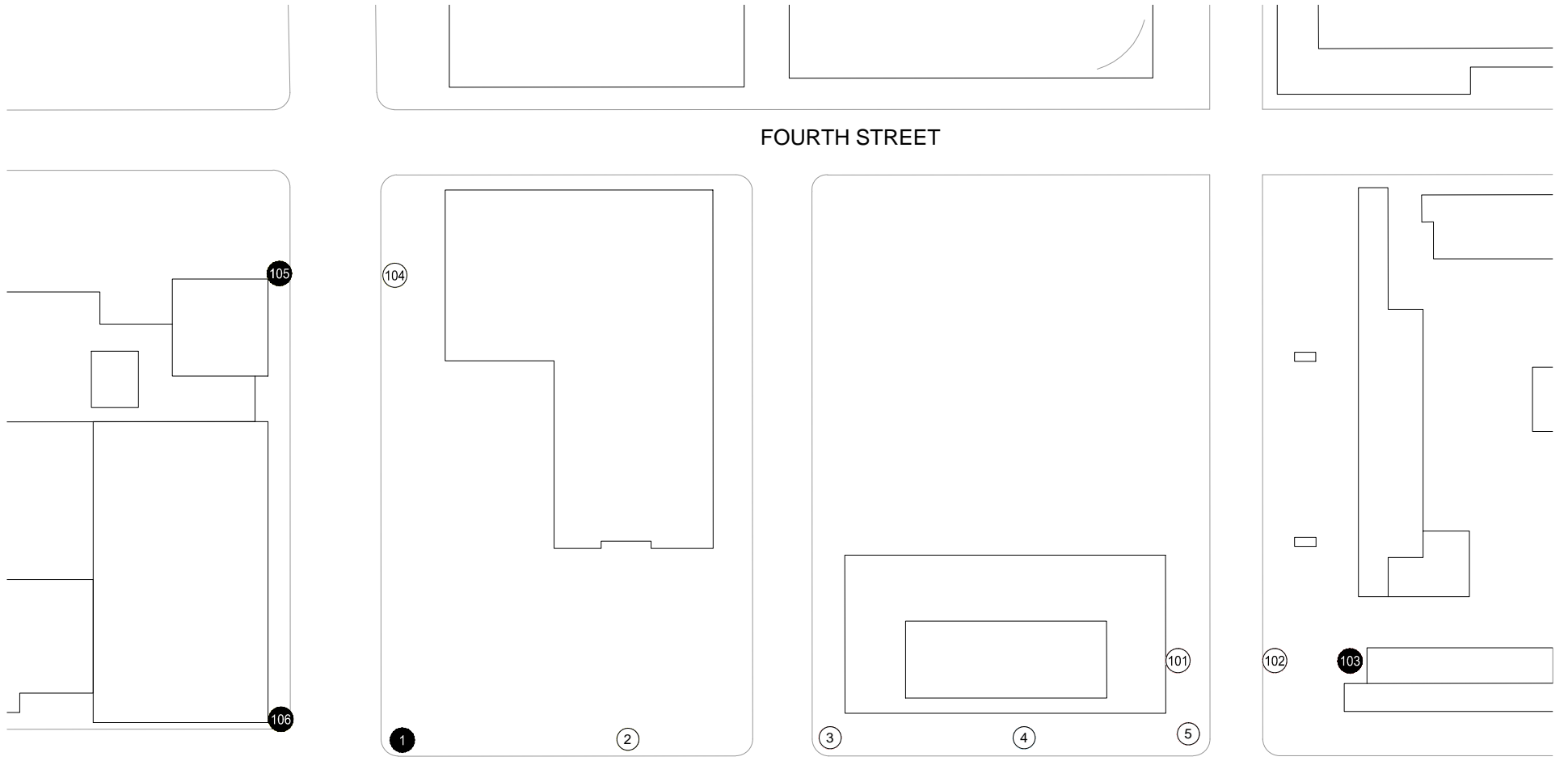
Warrior's Arena – San Francisco, CA

Figure No. 1c

Date: April 15, 2015

Project #1401775





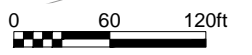
LEGEND:

HAZARD CATEGORIES:

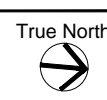
- Pass
- Exceeded

SENSOR LOCATION:

- Grade Level



Pedestrian Wind Hazard Conditions - Existing
 Annual (January to December, 6:00am to 8:00pm)

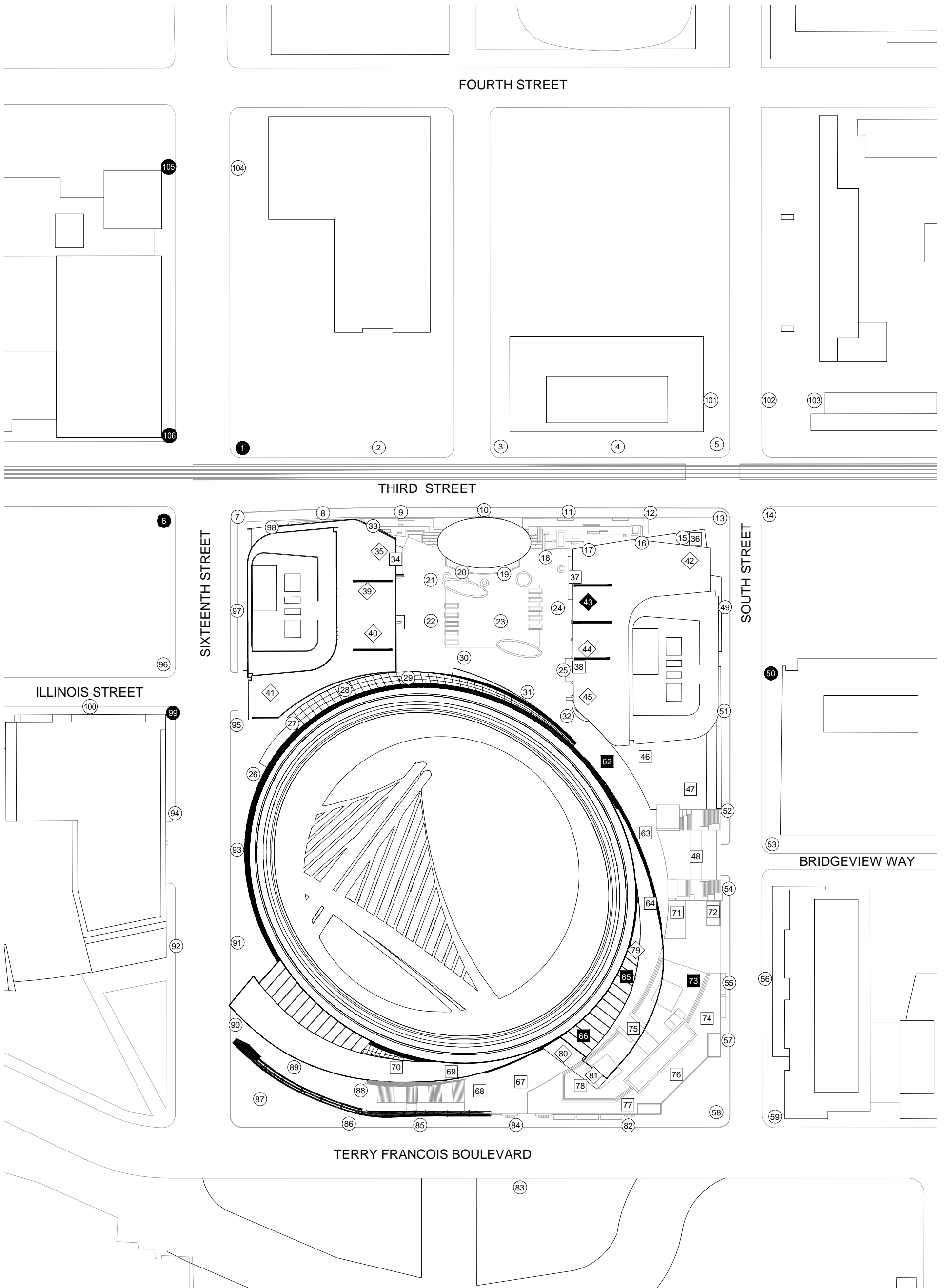


Drawn by: ARM | Figure: 2a
 Approx. Scale: 1"=120'
 Date Revised: April 22, 2015



Project #1401775

Y a i q A E a U a O a & E O C E



FOURTH STREET

THIRD STREET

SIXTEENTH STREET

SOUTH STREET

ILLINOIS STREET

BRIDGEVIEW WAY

TERRY FRANCOIS BOULEVARD

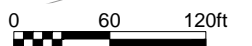
LEGEND:

HAZARD CATEGORIES:

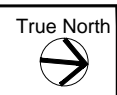
- Pass
- Exceeded

SENSOR LOCATION:

- Grade Level
Entry Plaza
- Main Concourse
Suite Level
Office Tower Floor 1
- Bayfront Terrace
Office Tower Floor 5

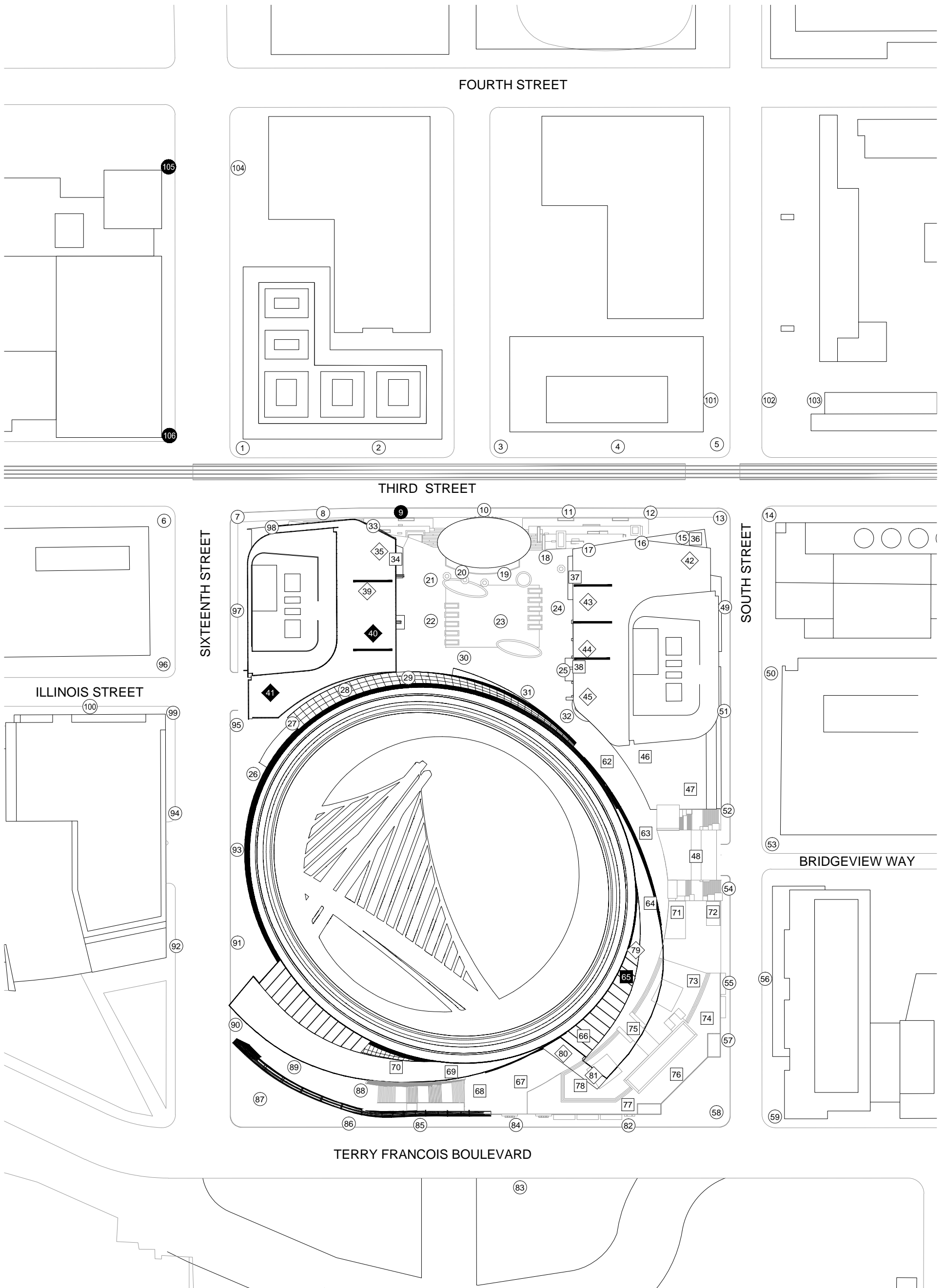


Pedestrian Wind Hazard Conditions - Existing + Project
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 2b
Approx. Scale: 1"=120'
Date Revised: Apr. 15, 2015





FOURTH STREET

THIRD STREET

SIXTEENTH STREET

SOUTH STREET

ILLINOIS STREET

BRIDGEVIEW WAY

TERRY FRANCOIS BOULEVARD








LEGEND:

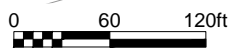
HAZARD CATEGORIES:

Pass 

Exceeded 

SENSOR LOCATION:

-  Grade Level
-  Entry Plaza
-  Main Concourse
-  Suite Level
-  Office Tower Floor 1
-  Bayfront Terrace
-  Office Tower Floor 5

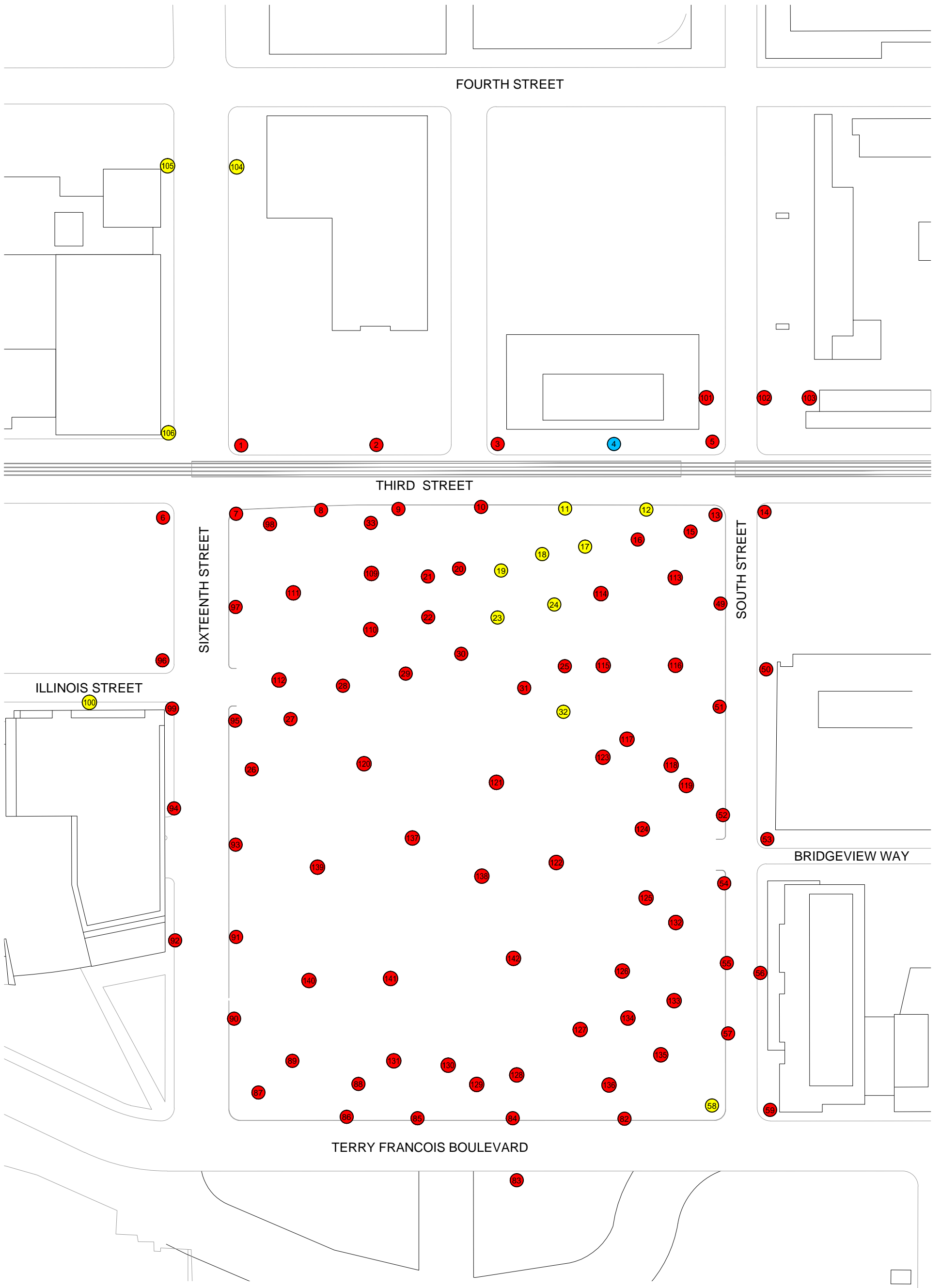


Pedestrian Wind Hazard Conditions - Project + Cumulative
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 2C
Approx. Scale: 1"=120'
Date Revised: Apr. 15, 2015





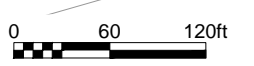
LEGEND:

COMFORT CATEGORIES:

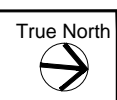
- 1 - 7 mph
- 8 - 11 mph
- > 11 mph

SENSOR LOCATION:

- Grade Level

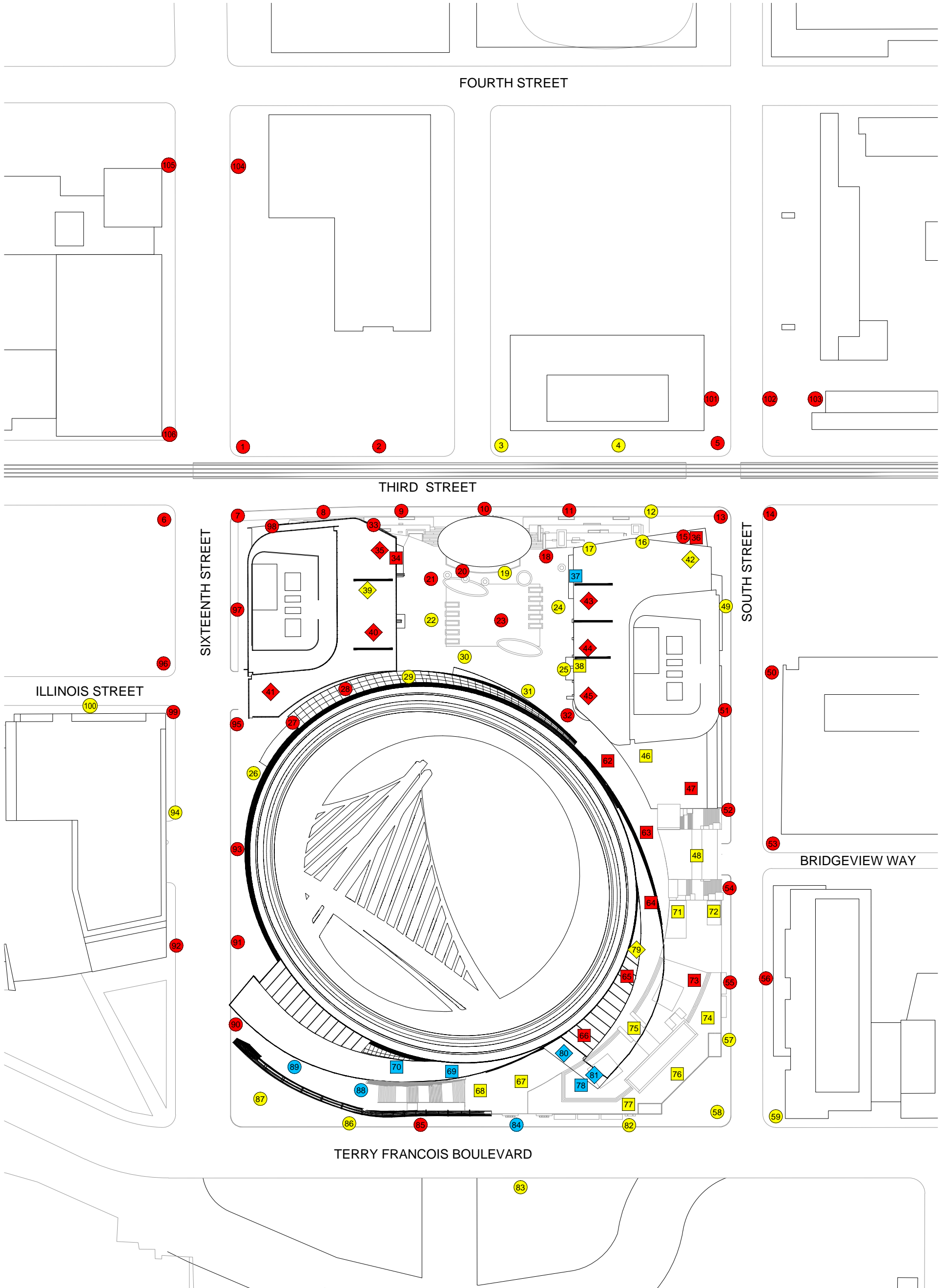


Pedestrian Wind Comfort Conditions - Existing
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 3a
Approx. Scale: 1"=120'
Date Revised: April 22, 2015





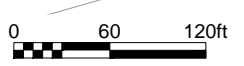
LEGEND:

COMFORT CATEGORIES:

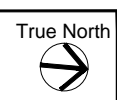
- 1 - 7 mph
- 8 - 11 mph
- > 11 mph

SENSOR LOCATION:

- Grade Level
Entry Plaza
- Main Concourse
Suite Level
Office Tower Floor 1
- Bayfront Terrace
Office Tower Floor 5

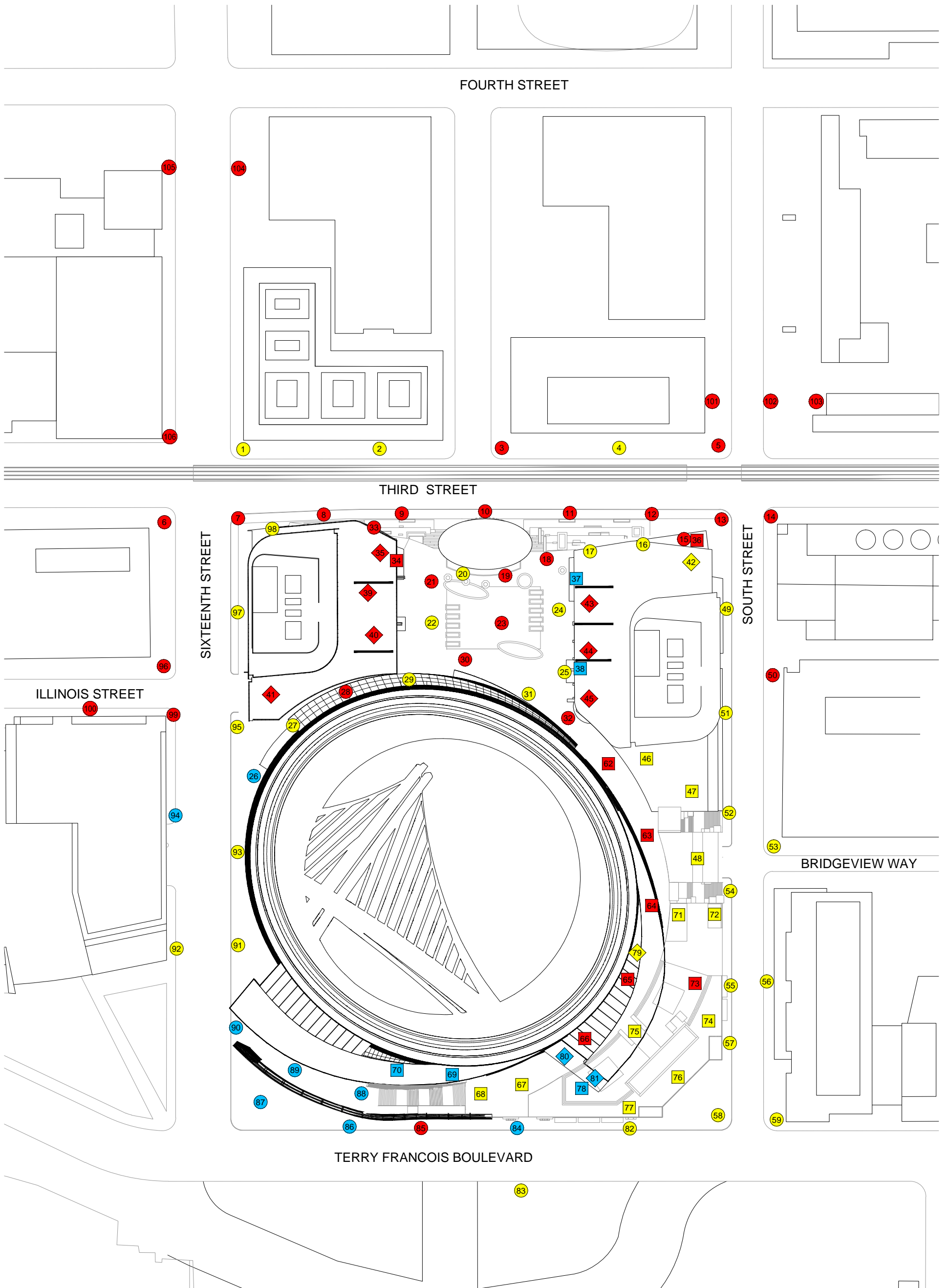


Pedestrian Wind Comfort Conditions - Existing + Project
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM Figure: 3b
Approx. Scale: 1"=120'
Date Revised: Apr. 15, 2015





FOURTH STREET

THIRD STREET

ILLINOIS STREET

SIXTEENTH STREET

SOUTH STREET

BRIDGEVIEW WAY

TERRY FRANCOIS BOULEVARD

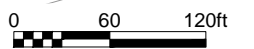
LEGEND:

COMFORT CATEGORIES:

- 1 - 7 mph
- 8 - 11 mph
- > 11 mph

SENSOR LOCATION:

- Grade Level
Entry Plaza
- Main Concourse
Suite Level
Office Tower Floor 1
- Bayfront Terrace
Office Tower Floor 5



Pedestrian Wind Comfort Conditions - Project + Cumulative
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 3C
Approx. Scale: 1"=120'
Date Revised: Apr. 15, 2015



Wind Study May 12, 2015

TABLES



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
1	41	13	e	28	0	-13		22	0	-13	
2	28	0		22	0	0		26	0	0	
3	22	0		18	0	0		31	0	0	
4	14	0		19	0	0		15	0	0	
5	36	0		28	0	0		26	0	0	
6	36	0		42	22	22	e	30	0	0	
7	39	6	e	34	0	-6		27	0	-6	
8	35	0		24	0	0		32	0	0	
9	29	0		29	0	0		37	3	3	e
10	24	0		26	0	0		35	0	0	
11	15	0		27	0	0		28	0	0	
12	24	0		24	0	0		22	0	0	
13	33	0		27	0	0		25	0	0	
14	30	0		29	0	0		26	0	0	
15	32	0		28	0	0		24	0	0	
16	27	0		20	0	0		20	0	0	
17	21	0		17	0	0		20	0	0	
18	18	0		34	0	0		34	0	0	
19	20	0		20	0	0		26	0	0	
20	24	0		26	0	0		31	0	0	
21	30	0		17	0	0		22	0	0	



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
22	26	0		19	0	0		23	0	0	
23	21	0		23	0	0		24	0	0	
24	23	0		21	0	0		17	0	0	
25	26	0		17	0	0		15	0	0	
26	34	0		18	0	0		13	0	0	
27	32	0		26	0	0		24	0	0	
28	28	0		32	0	0		30	0	0	
29	25	0		23	0	0		17	0	0	
30	23	0		24	0	0		23	0	0	
31	24	0		20	0	0		20	0	0	
32	24	0		35	0	0		34	0	0	
33	27	0		26	0	0		29	0	0	
34	Data not available			26	0	-		26	0	-	
35				33	0	-		34	0	-	
36				25	0	-		23	0	-	
37				14	0	-		14	0	-	
38				16	0	-		13	0	-	
39				21	0	-		28	0	-	
40				31	0	-		39	5	-	e
41				33	0	-		35	0	-	
42				21	0	-		21	0	-	



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
43	Data not available			37	2	-	e	34	0	-	
44				32	0	-		31	0	-	
45				26	0	-		24	0	-	
46				21	0	-		28	0	-	
47				22	0	-		23	0	-	
48				22	0	-		22	0	-	
49				31	0		20	0	0		20
50	35	0		39	3	3	e	33	0	0	
51	34	0		33	0	0		24	0	0	
52	31	0		28	0	0		23	0	0	
53	23	0		27	0	0		16	0	0	
54	38	3	e	26	0	-3		19	0	-3	
55	29	0		23	0	0		20	0	0	
56	22	0		26	0	0		19	0	0	
57	30	0		22	0	0		16	0	0	
58	19	0		23	0	0		16	0	0	
59	21	0		17	0	0		13	0	0	
60	Data not available			Data not available				Data not available			
61				Data not available				Data not available			
62				35	0	-		35	0	-	
63				28	0	-		26	0	-	



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative						
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds			
64	Data not available			32	0	-		34	0	-				
65				44	21	-	e	42	12	-	e			
66				38	3	-	e	34	0	-				
67				33	0	-		30	0	-				
68				30	0	-		26	0	-				
69				11	0	-		10	0	-				
70				11	0	-		9	0	-				
71				19	0	-		20	0	-				
72				27	0	-		19	0	-				
73				43	16	-	e	29	0	-				
74				29	0	-		18	0	-				
75				24	0	-		21	0	-				
76				30	0	-		21	0	-				
77				19	0	-		16	0	-				
78				18	0	-		16	0	-				
79				20	0	-		20	0	-				
80				9	0	-		8	0	-				
81				27	0	-		23	0	-				
82				31	0		23	0	0		19	0	0	
83				31	0		27	0	0		22	0	0	
84	34	0		20	0	0		15	0	0				



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
85	31	0		25	0	0		24	0	0	
86	32	0		23	0	0		16	0	0	
87	31	0		17	0	0		14	0	0	
88	32	0		11	0	0		10	0	0	
89	31	0		11	0	0		12	0	0	
90	29	0		20	0	0		14	0	0	
91	34	0		24	0	0		17	0	0	
92	32	0		20	0	0		16	0	0	
93	31	0		27	0	0		18	0	0	
94	29	0		18	0	0		17	0	0	
95	35	0		24	0	0		21	0	0	
96	29	0		30	0	0		29	0	0	
97	34	0		21	0	0		22	0	0	
98	39	6	e	37	9	3	e	19	0	-6	
99	40	8	e	41	17	9	e	33	0	-8	
100	22	0		20	0	0		26	0	0	
101	32	0		27	0	0		28	0	0	
102	35	0		31	0	0		30	0	0	
103	37	1	e	34	0	-1		31	0	-1	
104	33	0		30	0	0		28	0	0	
105	45	70	e	42	43	-27	e	39	13	-57	e



Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative			
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds
106	39	5	e	40	7	2	e	39	7	2	e
107	Data not available			Data not available				Data not available			
108	Data not available			Data not available				Data not available			
109	29	0		Data not available				Data not available			
110	28	0									
111	32	0									
112	35	0									
113	31	0									
114	28	0									
115	29	0									
116	34	0									
117	30	0									
118	29	0									
119	26	0									
120	28	0									
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122	31	0									
123	30	0									
124	27	0									
125	33	0									
126	33	0									

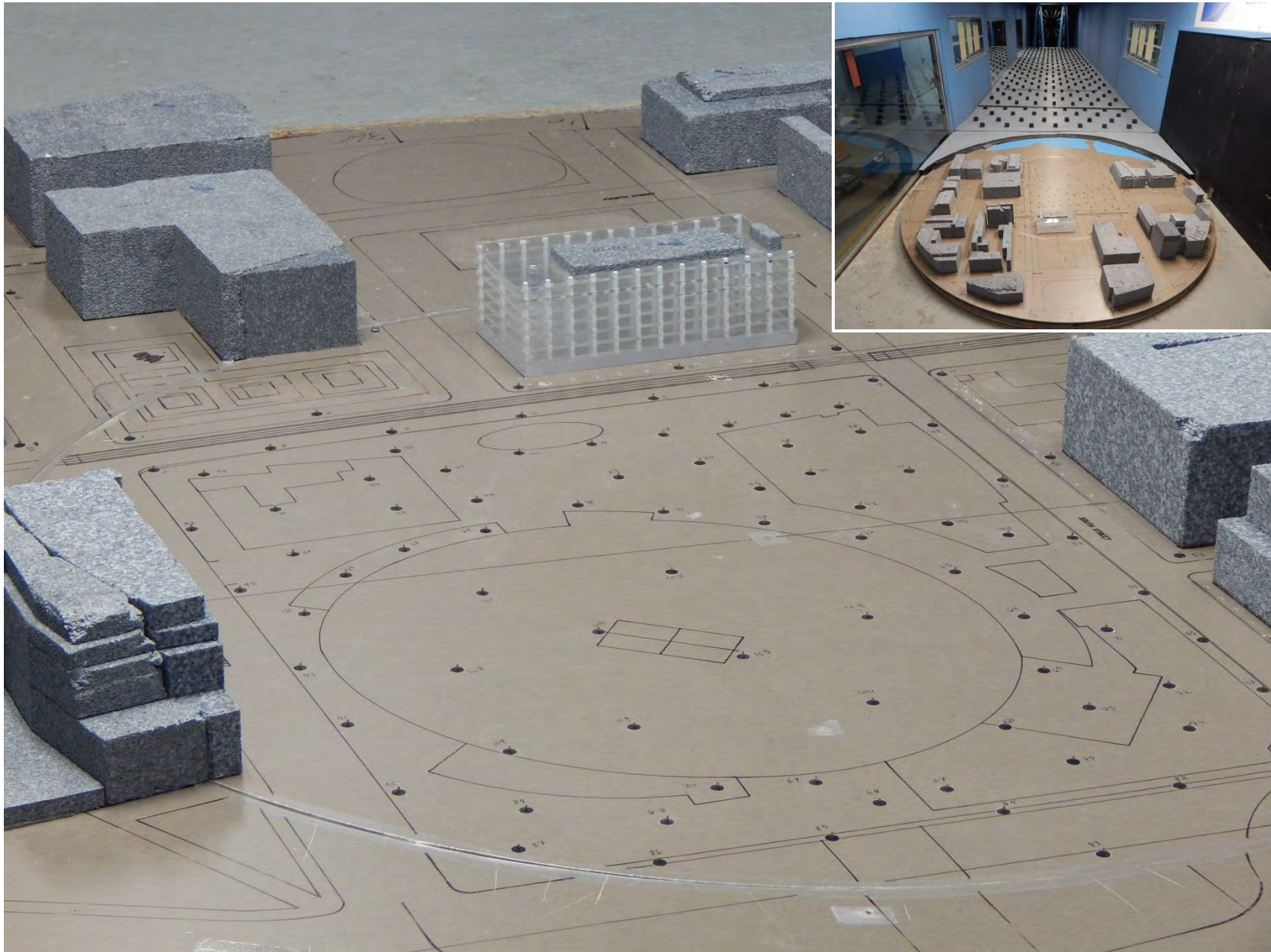


Table 1: Wind Hazard Results – VARA Plaza Design

References	Existing			Existing + VARA				VARA + Cumulative											
Location Number	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds	Wind Speed Exceeded 1 hour/year (mph)	Hours per Year Wind Speed Exceeds Hazard Criteria	Hours Change Relative to Existing	Exceeds								
127	34	0		Data not available	Data not available			Data not available	Data not available										
128	32	0																	
129	33	0																	
130	31	0																	
131	33	0																	
132	33	0																	
133	33	0																	
134	34	0																	
135	33	0																	
136	32	0																	
137	28	0																	
138	29	0																	
139	32	0																	
140	32	0																	
141	31	0																	
142	33	0																	
Average Wind Speeds, Total Hours & Exceeds	30	112	$\frac{8}{103}$									26	143	-	$\frac{10}{104}$	24	40	-	$\frac{5}{104}$
Averages & Totals – Sidewalks & Plaza*	29	112	$\frac{8}{69}$									25	101	-11	$\frac{6}{69}$	23	23	-89	$\frac{3}{69}$

*Sidewalks & Plaza: Locations 1 – 33, 49 – 59, 82 – 106

FIGURES



**Wind Tunnel Study Model
Existing**

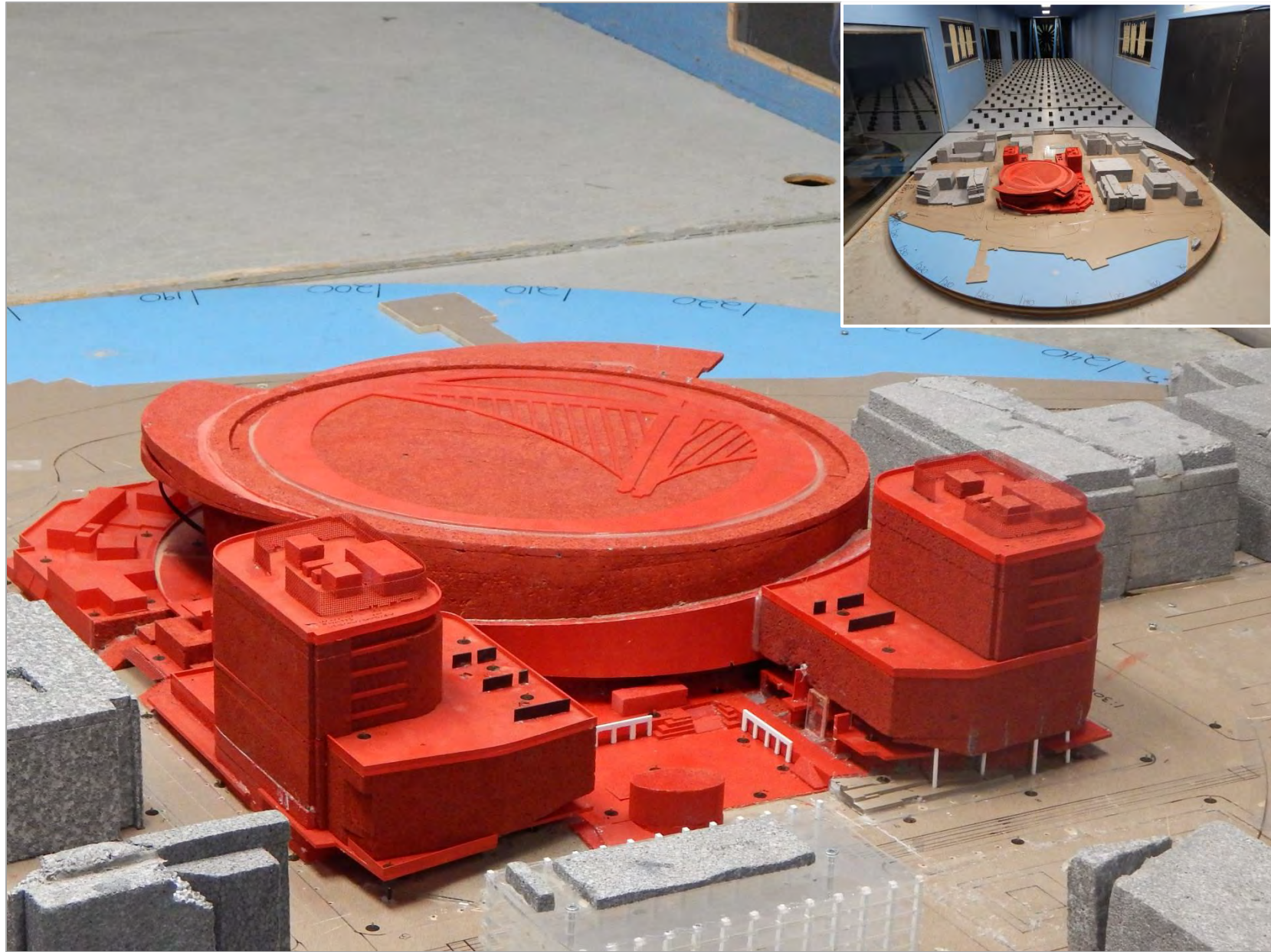
Warrior's Arena – San Francisco, CA

Figure No. 1a

Date: April 23, 2015



Project #1401775



Wind Tunnel Study Model
Existing + VARA Project

Warrior's Arena – San Francisco, CA

Figure No. 1b

Project #1401775

Date: May 12, 2015





Wind Tunnel Study Model
VARA Project + Cumulative

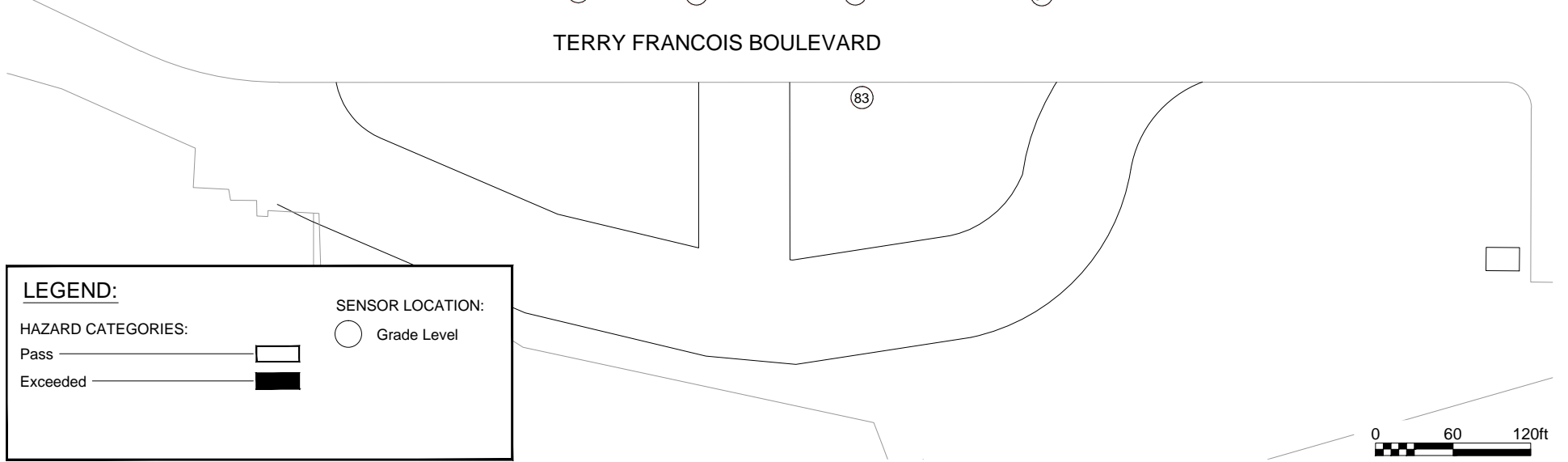
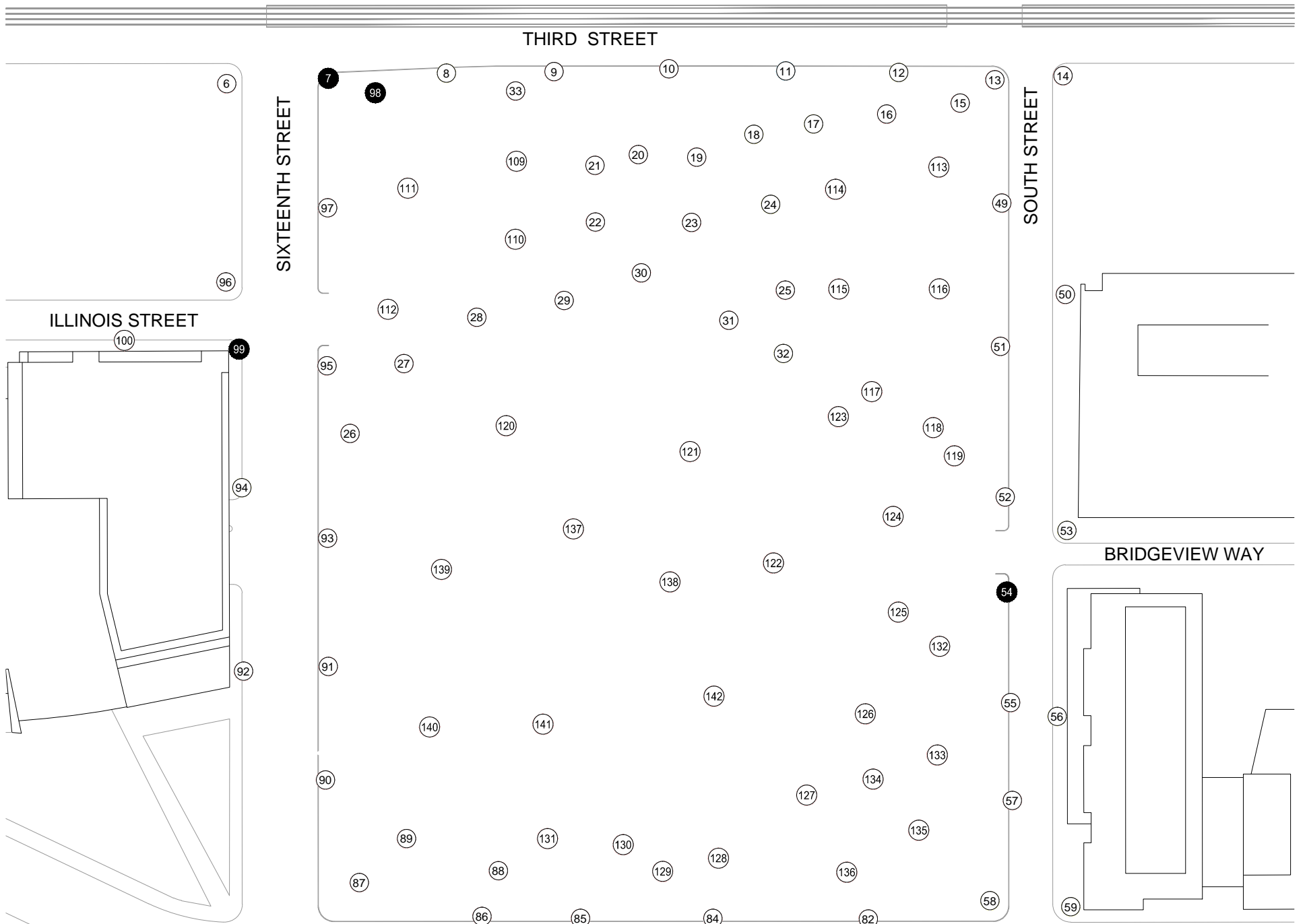
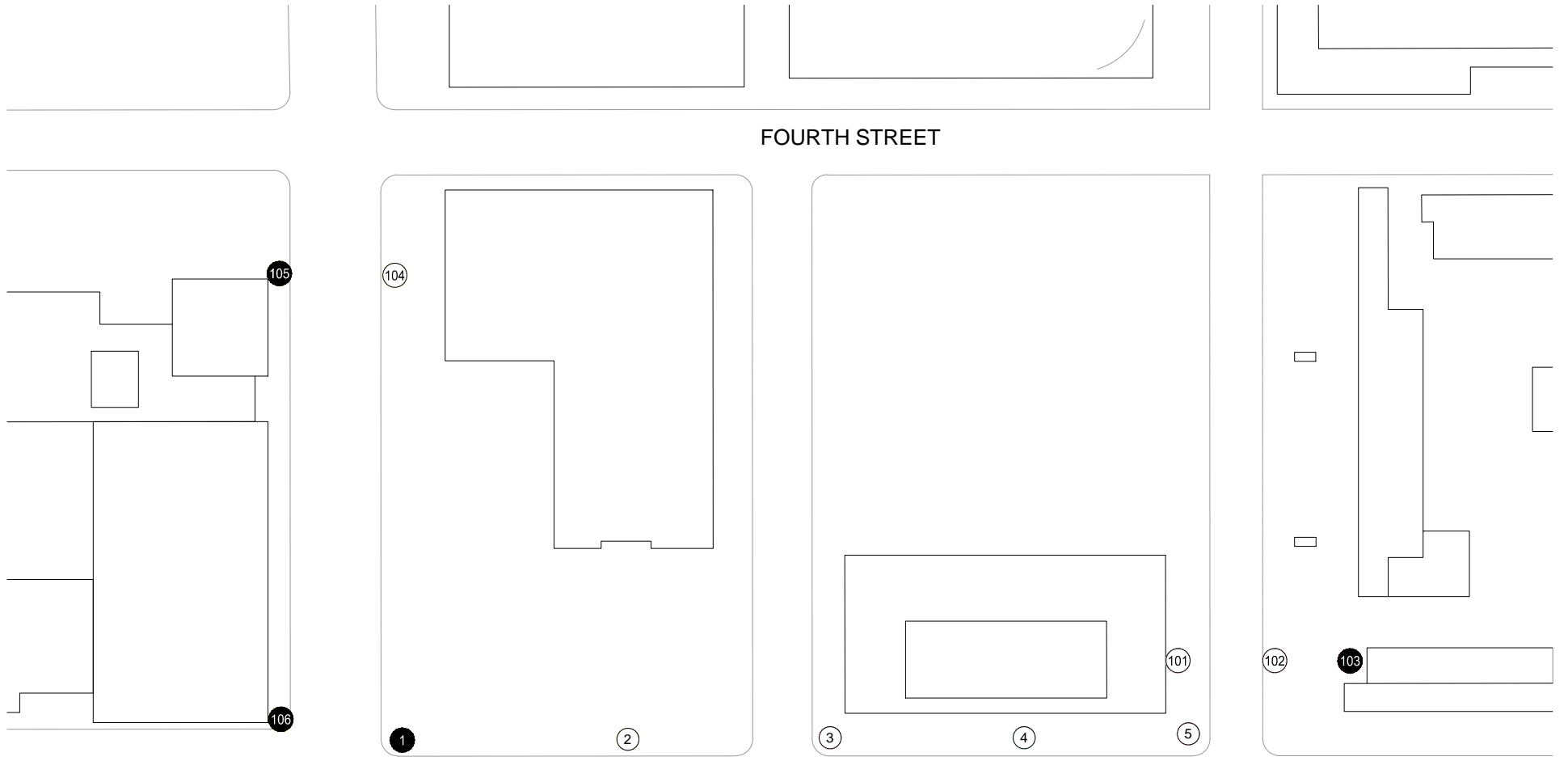
Warrior's Arena – San Francisco, CA

Figure No. 1c

Date: May 12, 2015





Project #1401775




LEGEND:

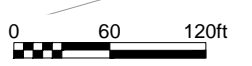
HAZARD CATEGORIES:

Pass 

Exceeded 

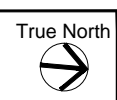
SENSOR LOCATION:

 Grade Level



Pedestrian Wind Hazard Conditions - Existing
 Annual (January to December, 6:00am to 8:00pm)

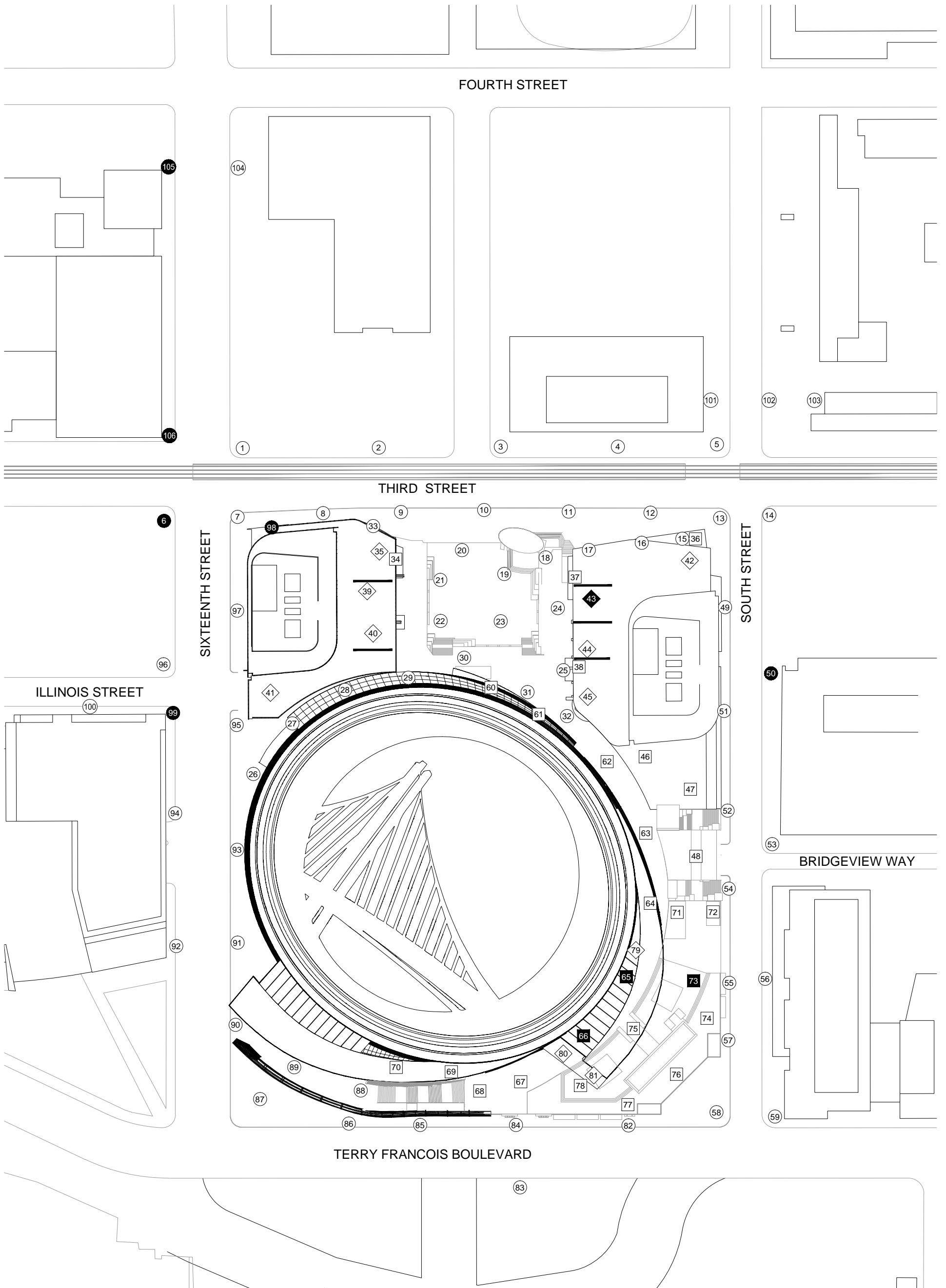
Year: 2015
 Date: 04/22/15
 Project: 1401775



Drawn by: ARM | Figure: 2a
 Approx. Scale: 1"=120'
 Date Revised: April 22, 2015



Project #1401775



FOURTH STREET

THIRD STREET

SIXTEENTH STREET

SOUTH STREET

ILLINOIS STREET

BRIDGEVIEW WAY

TERRY FRANCOIS BOULEVARD

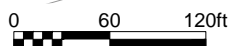
LEGEND:

HAZARD CATEGORIES:

- Pass
- Exceeded

SENSOR LOCATION:

- Grade Level Entry Plaza
- Main Concourse Suite Level Office Tower Floor 1
- Bayfront Terrace Office Tower Floor 5

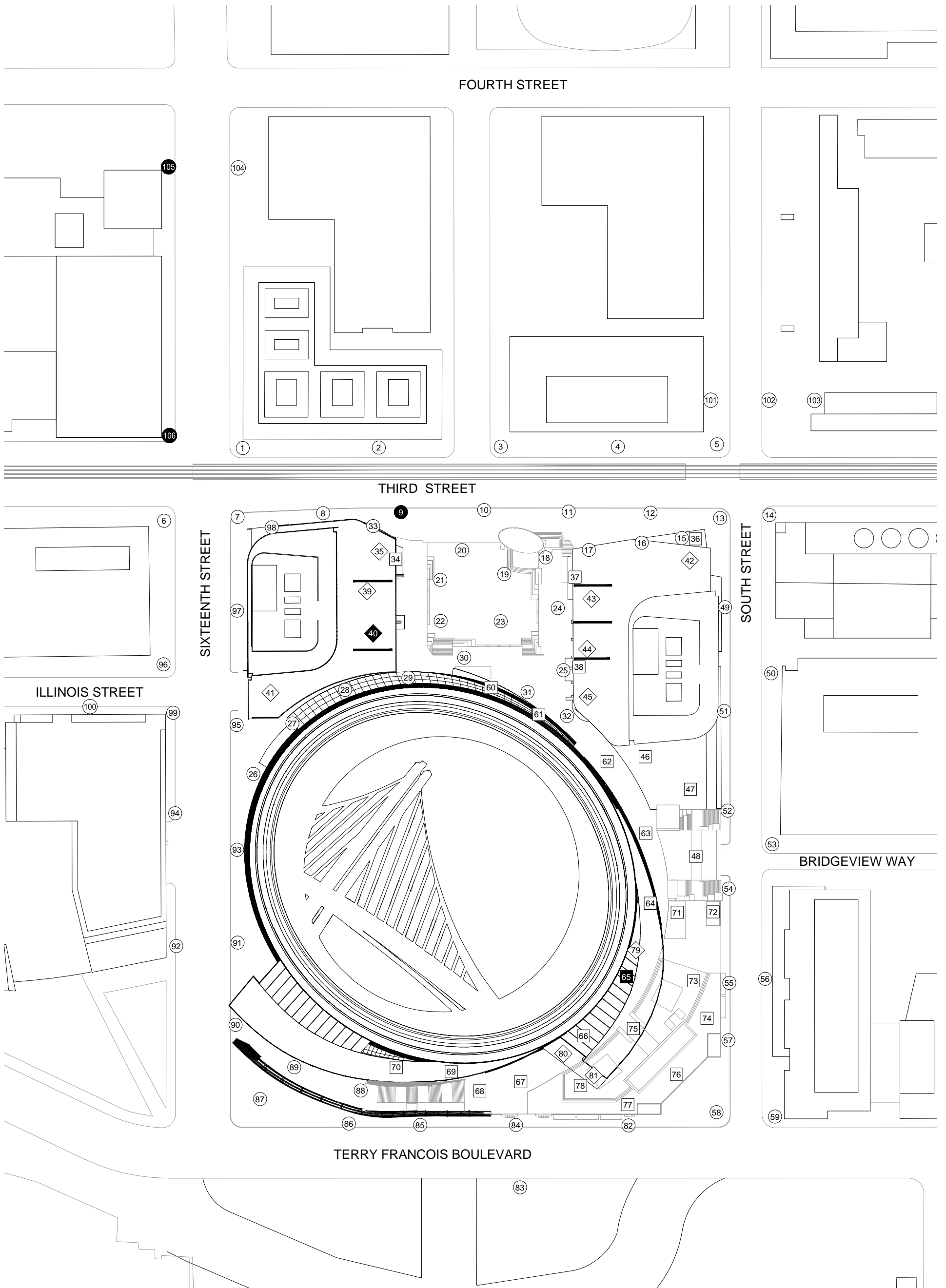


Pedestrian Wind Hazard Conditions - Existing + VARA Project
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 2b
Approx. Scale: 1"=120'
Date Revised: May 12, 2015





FOURTH STREET

THIRD STREET

SIXTEENTH STREET

SOUTH STREET

ILLINOIS STREET

BRIDGEVIEW WAY

TERRY FRANCOIS BOULEVARD

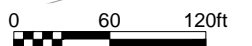
LEGEND:

HAZARD CATEGORIES:

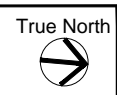
- Pass
- Exceeded

SENSOR LOCATION:

- Grade Level
Entry Plaza
- Main Concourse
Suite Level
Office Tower Floor 1
- Bayfront Terrace
Office Tower Floor 5



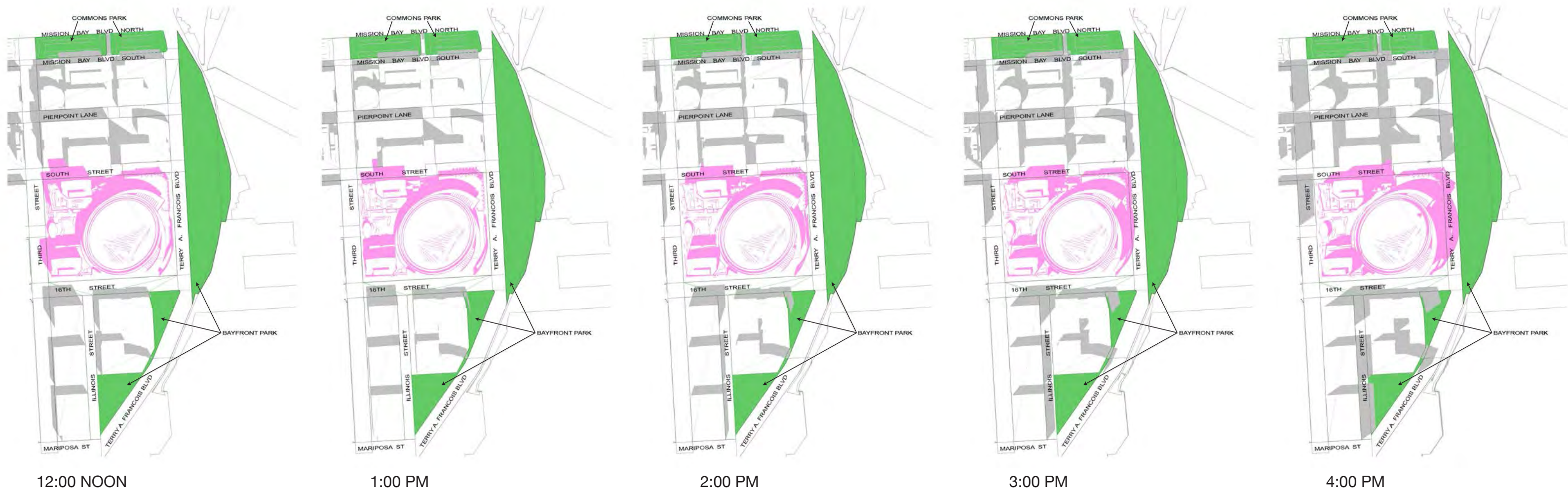
Pedestrian Wind Hazard Conditions - VARA Project + Cumulative
Annual (January to December, 6:00am to 8:00pm)



Drawn by: ARM | Figure: 2C
Approx. Scale: 1"=120'
Date Revised: May 12, 2015



Shadow



Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 1: March 21 Shadows



Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 2: April 21 Shadows



Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 3: May 21 Shadows



12:00 NOON

1:00 PM

2:00 PM

3:00 PM

4:00 PM

Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 4: June 21 Shadows



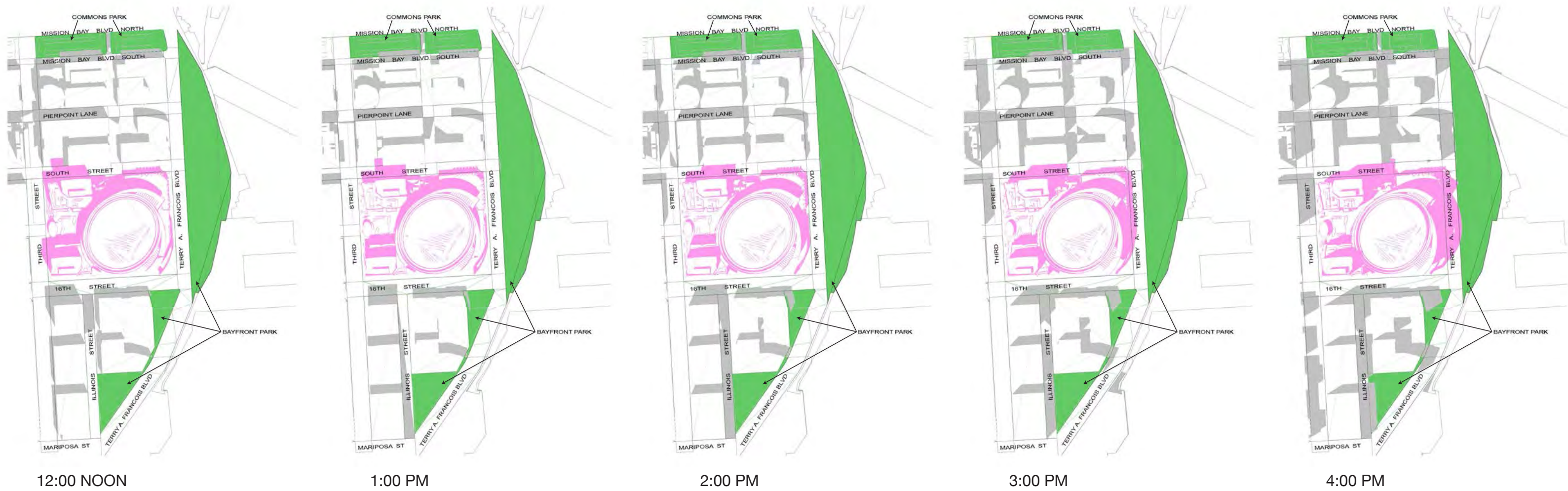
Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 5: July 21 Shadows



Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 6: August 21 Shadows



Public open space areas shown in green fill; proposed project shadows are shown in red; and shadows from existing and cumulative development are shown in grey

Figure 7: September 21 Shadows

APPENDIX HYD

Combined Sewer Impacts Analysis Technical Memorandum



Subject:	Combined Sewer Impacts Analysis
Project:	Golden State Warriors Arena EIR
Prepared By:	Beth Goldstein, PE, LEED AP, QSD/QSP
Date:	February 25, 2015
Reference:	130001

1 Purpose

The purpose of this analysis is to determine the changes, if any, to the frequency, duration or volume of combined sewer discharges (CSDs) from the City's combined sewer system (CSS) due to the contribution of dry weather flow (DWF) from the proposed Golden State Warriors (GSW) arena in the Mission Bay area of San Francisco, CA. This analysis considers only the impact to CSD from changes in DWF only, it does not analyze the impacts on dry weather capacity of the CSS (that analysis is being conducted by SFDPW)¹.

2 Scenarios Analyzed

Three scenarios were analyzed: base case, project, and cumulative. The base case scenario includes existing conditions plus developments and improvements expected to be substantially complete previous to occupancy of the GSW arena. The project scenario adds the DWF from the arena only and the cumulative scenario adds the project DWF plus DWF from reasonably foreseeable projects in the basin. In all three scenarios, the wet weather flow (stormwater runoff) is assumed to not contribute to the CSS; rather is treated and pumped directly to the Bay. All DWF from the proposed GSW arena is assumed to flow to the Mariposa pump station (MPS), therefore Mariposa is the only basin analyzed.

3 Description of Model

The model used for this analysis is a single basin, mass balance hydrologic model developed by SFDPW called "hydrocalc". It takes static hydrologic inputs such as area, C factor, storage volume, pumping rate, and applies a user selected rainfall file as time varying input. The time step is 5 minute.

4 Model Inputs

The following inputs were used in analyzing the three scenarios described in Section 2:

¹ SFDPW, "Mariposa Pump Station (MPS) Dry Weather Flow Hydraulic Analysis", Technical Memorandum from Bassam Aldhafari to Manfred Wong and Bessie Tam, February 3, 2015.

Annual Rain (inch) ¹	Contributing Acres ²	C Factor ¹	WW Pump ² (mgd)	DW Pump ² (mgd)
26	180	0.76	10	1.2

Data Sources:

1. SFDPW ICM model
2. SFDPW TM, 2/3/15

The only input which varies between scenarios is the DWF contribution. The DWF contributions by scenario were derived from the SFDPW MPS TM (2/3/15) and are detailed in the table in Attachment 1. The contributing area outlined in the SFDPW TM is shown in Attachment 2.

5 Model Results

The model predicts the following changes to estimated CSD frequency, volume and duration assuming average DWF to the Mariposa Pump Station:

	DWF (mgd)	Frequency (Count)	Volume (Mgal)	Duration (Hrs)
Baseline	1.21	10	5.34	17.2
Project	1.38	10	5.63	17.3
Cumulative	1.69	10	6.32	18.2

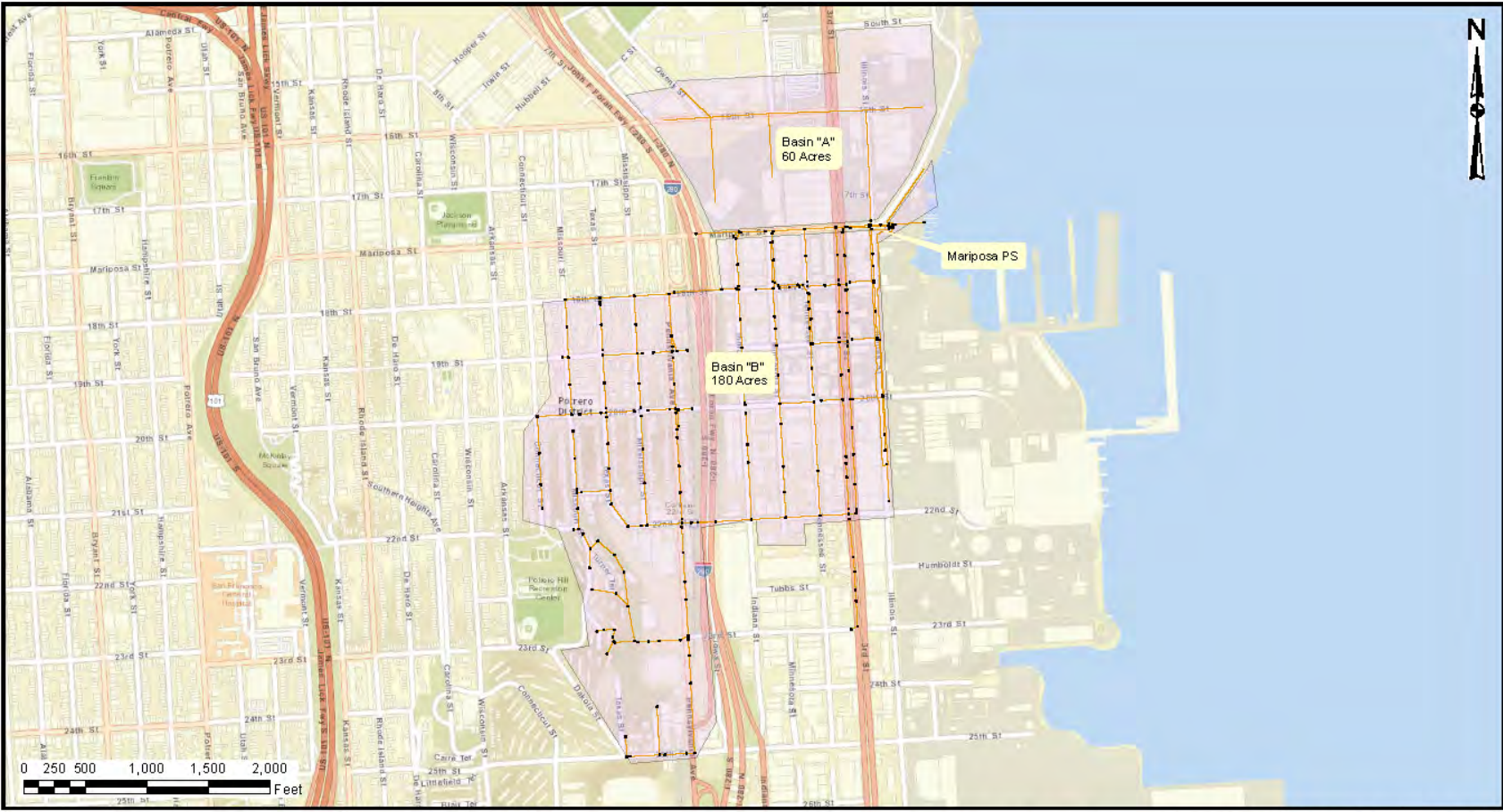
Assuming peak DWF for the arena only (a conservative assumption that every overflow occurs during maximum occupancy), the model predicts the following:


	DWF (mgd)	Frequency (Count)	Volume (Mgal)	Duration (Hrs)
Baseline	1.21	10	5.34	17.2
Project	2.28	10	7.2	19.4
Cumulative	2.60	11	7.98	21.8

ATTACHMENT 1.

Dry Weather Flows (DWFs) from Mission Bay South (Basin "A")

BASELINE				PROJECT			CUMULATIVE		
Parcel	Average DWF (gpm)	Peak DWF (gpm)		Parcel	Average DWF (gpm)	Peak DWF (gpm)	Parcel	Average DWF (gpm)	Peak Flow (gpm)
24a/b	71	213		29-32	114	746	25b	39	117
24c	9	27					33-34	63	190
25a	32	96					hospital		
hospital phase 1 (X3, 36-39)	90	474					phase 2	77	405
X4, P23-24	16.7	50					40	40	118
PHASE TOTAL (gpm)	219	860			114	746		219	830
PHASE TOTAL (mgd)	0.31	1.24			0.16	1.07		0.32	1.20
RUNNING TOTAL (gpm)	219	860			333	1606		552	2436
RUNNING TOTAL (mgd)	0.31	1.24			0.479	2.31		0.794	3.51
DWF from Basin "B"	0.6	1.00			0.6	1.00		0.6	1.00
I&I	0.3	0.3			0.3	0.3		0.3	0.3
TOTAL (mgd)	1.21	2.54			1.38	3.61		1.69	4.81



<ul style="list-style-type: none"> ● Manhole → Existing Network □ Catchment 		<p>HYDRAULIC STUDY: MISSION BAY/MARIPOSA PS SANITARY FLOW ANALYSIS</p>	<p>STUDY BY: BA</p>	<p>APPROVED BY: WL</p>	<p>HYD JO: 2508J</p>
<p>TRIBUTARY AREA (SANITARY) AND EXISTING NETWORK MAP</p>			<p>ATTACHMENT 2</p>		

APPENDIX MIT

Mission Bay FSEIR Mitigation Measures: Applicability to Proposed Project

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MISSION BAY FSEIR MITIGATION MEASURES: APPLICABILITY TO PROPOSED PROJECT

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
D. VISUAL QUALITY AND URBAN DESIGN			
North/ South	<p>D.1 <u>Lighting and Glare</u></p> <p>Design parking structure lighting to minimize off-site glare. The design could include 45-degree cutoff angles on light fixtures to focus light within the site, and specifications that spill lighting from parking areas would be 0.25 foot-candle or less at 5 feet from the property line of the parking areas. Applies to individual sites within the Project Area.</p>	No	Pursuant to Public Resources Code 21099(d), aesthetics impacts of the proposed GSW project are not considered significant. Consequently, Mission Bay FSEIR Mitigation Measure D.1 is not required.
South	<p>D.2 <u>Architectural Resources - Evaluation of Fire Station No. 30</u></p> <p>D.2a. Retain an architectural historian to prepare an evaluation of the architectural integrity and historical importance of Fire Station No. 30 prior to development on this site. If the building is determined to be eligible for the National Register, preserve, rehabilitate, and reuse the building in a manner that is consistent with the Secretary of the Interior's guidelines for historic preservation.</p> <p>D.2b. If Fire Station No. 30 is found to be eligible for the National Register, require the following mitigation measures to reduce (though not eliminate) the significant impact prior to demolition of the structure:</p> <ul style="list-style-type: none"> Prepare a Historical American Building Survey, including the precise recording of the structure through measurements, drawings, and photographs Provide sufficient detail in the survey documentation so that after demolition the historical structure could be reconstructed from the survey data File copies of the records and documents with the appropriate federal, state, and city agencies Include salvage and selective re-use of building materials in the mitigation program once the survey has been completed <p>Upon completion, provide a copy of the report to the San Francisco Planning Department, the President of the San Francisco Landmarks Preservation Advisory Board, and the San Francisco Redevelopment Agency.</p>	No	Mission Bay FSEIR Mitigation Measure D.2a-b is only applicable to development within the Fire Station 30 site, and not the project site, and consequently, it is not applicable to the proposed project.
North / South	<p>D.3 <u>Archaeological Resources</u></p> <p>Retain the services of an archaeologist, because of the strong possibility of encountering the remains of cultural or historic artifacts or features in the six historic resources areas. The Environmental Review Officer (ERO) in consultation with the President of the Landmarks Preservation Advisory Board (LPAB) and the archaeologist would determine: 1) whether the archaeologist should instruct all excavation and foundation crews on the project site of the potential for discovery of historic archaeological deposits and artifacts, and the procedures to be followed if such materials are uncovered; and 2) prior to the commencement of foundation excavation, a program of archaeological testing.</p>	No	Mission Bay FSEIR Mitigation Measure D.3 is only applicable to development within the Mission Bay FSEIR-identified historic resource areas in the Mission Bay plan area, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure D.3 is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
D. VISUAL QUALITY AND URBAN DESIGN (cont.)			
North / South (cont.)	<p>Retain a qualified historic archaeologist to supervise a pre-foundation excavation testing program for each phase of Project Area development or each construction site, as appropriate, using a series of mechanical, exploratory borings or other testing methods determined by the archaeologist to be appropriate. A qualified historical archaeologist would supervise the testing in the six historic resource areas to determine the probability of finding cultural and historical remains. At the completion of the archaeological testing program, the archaeologist would submit a written report first and directly to the ERO and the President of the LPAB, with a copy to the project sponsor, which describes the findings, assesses their significance and proposes appropriate recommendations for any additional procedures necessary for the mitigation of adverse impacts to cultural resources determined to be significant.</p> <p>Retain a certified archaeologist to supervise a program of on-site monitoring during site excavation in the six historic resource areas, following site clearance and pre-excavation testing. The certified archaeologist would record observations in a permanent log. Should cultural or historic artifacts be found following commencement of excavation activities, the archaeologist would assess the significance of the find, and immediately report to the ERO and the President of LPAB. Upon receiving the advice of the consultant and the LPAB, the ERO would recommend specific mitigation measures, if necessary. The monitoring program, whether or not there are finds of significance, would result in a written report to be submitted first and directly to the ERO and the President of the LPAB, with a copy to the project sponsor.</p> <p>Suspend excavation or construction activities which might damage discovered cultural resources for a total maximum of four weeks over the course of construction at each site to permit inspection, recommendation and retrieval, if appropriate.</p> <p>Implement an appropriate security program to prevent looting or destruction, if cultural resources of potential significance are discovered. Any discovered cultural artifact assessed as significant by the archaeologist upon concurrence by the ERO and the President of the LPAB would be placed in a repository designated for such materials or possibly exhibited in a public display. Following approval of the archaeological testing and monitoring program reports by the ERO and the President of LPAB, a final report would be sent to the California Archaeological Site Survey Office at Sonoma State University, the Foundation for San Francisco's Architectural Heritage and the State Office of Historic Preservation. The Office of Environmental Review would receive three final copies of the final archaeological findings report. Archaeological testing could be coordinated with other site investigations for geotechnical and toxic waste purposes.</p>		However the Initial Study for the proposed project identifies Mitigation Measure M-CP-2a (Archaeological Testing, Monitoring and/or Data Recovery Program) which would in effect implement the requirements of Mission Bay FSEIR Mitigation Measure D.3 at the project site.
North / South	<p>D.4 <u>Archaeological Exploration Program</u></p> <p>Develop archaeological exploration programs, consistent with Measure D.3, above, for pre-identified sensitive historic archaeological areas that should include the following:</p> <p>D.4a. Define specific research parameters and prepare a written study plan in consultation with the ERO and LPAB prior to subsurface exploration, with emphasis on National Register determination of historical significance and the maximum retrieval of archaeological data</p>	No	Mission Bay FSEIR Mitigation Measure D.4 is only applicable to development within the Mission Bay FSEIR-identified historic resource areas in the Mission Bay plan area, and not the project site. Consequently, Mitigation Measure D.3 is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
D. VISUAL QUALITY AND URBAN DESIGN (cont.)			
North / South (cont.)	D.4b. Examine large-scale exposure of soil profiles		However, the Initial Study for the proposed project identifies Mitigation Measure M-CP-2a (Archaeological Testing, Monitoring and/or Data Recovery Program) which would in effect implement the requirements of Mission Bay FSEIR Mitigation Measure D.4 at the project site.
	D.4c. Complete detailed field records, including photographs and drawings, to document subsurface soil profiles, archaeological deposits and integrity of such deposits		
	D.4d. Complete a detailed report of findings to describe research and exploration methodologies, testing results, all archaeological findings and recommendations for resource management		
North / South	D.5 <u>Archaeological Monitoring at 19th Century City Dump</u> Archival review suggests that depositional integrity of the late 19th-century city dump has been lost because of scavenging while the dump was in operation; however, important historical artifacts may still be present. Pre-construction archaeological testing is therefore not recommended. Archaeological monitoring during construction would be the appropriate mitigation measure for that area. Therefore, retain the services of a qualified archaeologist. The ERO in consultation with the President of the LPAB and the archaeologist would determine whether the archaeologist should instruct all excavation and foundation crews in the area of the 19 th -century city dump of the potential for discovery of cultural and historic artifacts or features. If such artifacts or features were uncovered, follow procedures described in Measure D.3 for suspension of construction activities, notification of the ERO and President of the LPAB, and development recovery measures, as appropriate.	No	Mission Bay FSEIR Mitigation Measure D.5 is only applicable to development within the 19th Century City Dump site, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure D.5 is not applicable to the proposed project.
North / South	D.6 <u>Unknown Archaeological Remains</u> The entire Mission Bay Project Area has at least some sensitivity for the presence of unknown archaeological remains. Prehistoric cultural deposits could be encountered in three identified areas and unknown historical features, artifact caches and debris areas could be located anywhere in the Project Area. Follow procedures for instructing excavation crews, notifying the ERO and President of the LPAB, and developing recovery measures, as described in Measure D.3, above. In addition, in the event that prehistoric archaeological deposits are discovered, consult local Native American organizations. Dialogue with the ERO, LPAB and the archaeological consultant would take place in developing acceptable archaeological testing and excavation procedures, particularly in regard to the disposition of cultural materials and Native American burials.	No	The City has updated its standard mitigation measures for accidental discovery of archeological resources. Consequently, MB FSEIR Mitigation Measure D.6 replaced with Mitigation Measure M-CP-2b (Accidental Discovery of Archaeological Resources)
North / South	D.7 <u>Pedestrian-Level Winds</u> Require a qualified wind consultant to review specific designs for buildings 100 feet or more in height for potential wind effects. The Redevelopment Agency would conduct wind review of high-rise structures above 100 ft. Wind tunnel testing would also be required unless, upon review by a qualified wind consultant, and with concurrence by the Agency, it is determined that the exposure, massing and orientation of the buildings are such that impacts, based on a 26-mile-per-hour hazard for a single hour of the year criterion, will not occur. The purpose of the wind tunnel studies is to determine design-specific impacts and to provide a basis for design modifications to mitigate these impacts. Projects within Mission Bay, including UCSF, would be required to meet this standard or to mitigate exceedances through building design.	Yes	Pursuant to Mission Bay FSEIR Mitigation Measure D.7, wind tunnel testing was conducted for the proposed development at Blocks 29-32, the results of which are included in the SEIR.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
D. VISUAL QUALITY AND URBAN DESIGN (cont.)			
North / South	D.8 <u>Shadows</u> The Redevelopment Plan documents would require analysis of potential shadows on existing and proposed open spaces during the building design and review process when exceptions to certain standards governing the shape or locations of buildings are requested that would cause over 13% of Mission Creek Park (either North or South), 20% of Bayfront Park, 17% of Triangle Square or 11% of Mission Bay Commons to be in continuous shadow for a period of one hour from March to September between 10:00 a.m. and 4:00 p.m.	Yes	Pursuant to Mission Bay FSEIR Mitigation Measure D.8, a shadow analysis was conducted for the proposed development at Blocks 29-32, the results of which are included in the SEIR.
E. TRANSPORTATION			
North	E.1 <u>Third Street/King Street</u> E.1a. Widen the northbound approach to provide an additional through lane on the west side of Third Street. E.1b. Reconfigure the existing traffic signal. E.1c. Install "Don't Block the Box" signs.	No	Mission Bay FSEIR Mitigation Measure E.1 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.2 <u>Third Street/Berry Street</u> E.2a. Restripe the northbound approach to provide an additional through lane. E.2b. Reconfigure the existing traffic signal. E.2c. Install "Don't Block the Box" signs.	No	Mission Bay FSEIR Mitigation Measure E.2 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.3 <u>Third Street/Owens Street</u> E.3a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.3 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.4 <u>Third Street/The Common</u> E.4a. Install new traffic signals.	No	Mission Bay FSEIR Mitigation Measure E.4 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.5 <u>Third Street/South Street</u> E.5a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.5 has already been implemented, and consequently, is not applicable to the proposed project.

MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
South	E.6 <u>Third Street/16th Street</u> E.6a. Widen the northbound approach to provide two exclusive left-turn lanes. E.6b. Reconfigure the existing traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.6 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.7 <u>Third Street/Mariposa Street</u> E.7a. Widen the eastbound approach to provide an additional through lane. E.7b. Widen and restripe the westbound approach to provide an exclusive left-turn lane and an additional through lane. E.7c. Reconfigure the existing traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.7 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.8 <u>Fourth Street/King Street</u> E.8a. Widen the eastbound approach to provide an exclusive right-turn lane. E.8b. Reconfigure the existing traffic signal. E.8c. Install "Don't Block the Box" signs.	No	Mission Bay FSEIR Mitigation Measure E.8 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.9 <u>Fourth Street/Berry Street</u> E.9a. Restripe the westbound approach to provide an additional lane. E.9b. Restripe the northbound approach to provide an additional lane. E.9c. Reconfigure the existing traffic signal. E.9d. Install "Don't Block the Box" signs.	No	Mission Bay FSEIR Mitigation Measure E.9 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.10 <u>Fourth Street/Owens Street</u> E.10a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.10 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.11 <u>Fourth Street/UCSF private street</u> E.11a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.11 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.12 <u>Fourth Street/16th Street</u> E.12a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.12 has already been implemented, and consequently, is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
South	E.13 <u>Fourth Street/Mariposa Street</u> E.13a. Widen the eastbound and westbound approaches to provide exclusive left-turn lanes. E.13b. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.13 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.14 <u>Seventh Street/16th Street</u> E.14a. Remove on-street parking on all approaches. E.14b. Restripe the northbound and eastbound approaches to provide an additional through lane. E.14c. Restripe the southbound approach to provide an additional through lane and an exclusive left-turn lane. E.14d. Restripe the westbound approach to provide an additional through lane and a right-turn pocket. E.14e. Install a new traffic signal. E.14f. Provide the appropriate traffic warning devices for the Caltrain track crossing.	No	Mission Bay FSEIR Mitigation Measure E.14 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.15 <u>Owens Street/16th Street</u> E.15a. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.15 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.16 <u>Owens Street/Mariposa Street/I-280 Off-ramp</u> E.16a. Widen the eastbound approach to provide an exclusive left-turn lane. E.16b. Reconfigure the existing traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.16 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.17 <u>I-280 On-ramp/Mariposa Street</u> E.17a. Widen the westbound approach to provide an exclusive left-turn lane. E.17b. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.17 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.18 <u>Seventh Street/The Common</u> E.18a. Install a new traffic signal. E.18b. Provide the appropriate traffic warning devices for the Caltrain railroad track at-grade crossing.	No	Mission Bay FSEIR Mitigation Measure E.18 has already been implemented, and consequently, is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North	E.19 <u>Fifth Street/King Street</u> E.19a. Narrow approximately 250 feet of the median on the westbound approach to provide an exclusive left-turn lane. E.19b. Restripe the I-280 off-ramp touchdown and narrow the median on the south side of King Street for a distance of about 300 feet beginning at the intersection with Fifth Street, to increase the number of eastbound lanes from the existing two to three. E.19c. Reconfigure the existing traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.19 is a mitigation measure applicable to development within Mission Bay North, and is therefore not applicable to the proposed project. Mission Bay FSEIR Mitigation Measure E.19 is assumed to be implemented by 2040, and is included in the Cumulative scenario
North/ South	E.21 <u>Third Street</u> E.21a. Widen the west side of Third Street between Berry Street and King Street to accommodate the additional lanes described in Measure E.01. E.21b. Widen Third Street for approximately one-third the distance between Mariposa Street and 16th Street to accommodate the lane configuration described in Measure E.6. E.21c. In cooperation with the Public Transportation Commission and the Department of Public Works, reconfigure Third Street in the Project Area to accommodate the Third Street light rail transit median while maintaining two travel lanes in each direction and exclusive left-turn lanes at specific locations, as listed in Measures E.06 and E.07.	No	Mission Bay FSEIR Mitigation Measure E.21 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.22 <u>Mariposa Street</u> E.22a. Widen Mariposa Street between Terry A. François Boulevard and Pennsylvania Street, including the bridge over the Caltrain tracks.	No	Mission Bay FSEIR Mitigation Measure E.22 has already been implemented, and consequently, is not applicable to the proposed project.
North / South	E.23 <u>Fourth Street</u> E.23a. Widen Fourth Street between China Basin Channel and King Street to accommodate the Third Street light rail tracks and a MUNI station platform between Berry and King Streets. E.23b. Extend Fourth Street southward, parallel to Third Street, to intersect with Mariposa Street at the existing intersection with Minnesota Street.	No	Mission Bay FSEIR Mitigation Measure E.23 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.24 <u>King Street</u> E.24a. Widen eastbound King Street between Fifth and Fourth Streets to accommodate the lane configurations for the Fourth Street/King Street intersection in Measure E.08. E.24b. Construct westbound King Street frontage road between Fifth Street and Berry Street.	No	Mission Bay FSEIR Mitigation Measure E.24 has already been implemented, and consequently, is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
South	<p>E.25 <u>Owens Street</u></p> <p>E.25a. Construct Owens Street between Third and Fourth Streets, providing a median approximately 24 feet wide to accommodate the MUNI Third Street light rail line, with no on-street parking.</p> <p>E.25b. Construct Owens Street between Fourth Street and The Common, providing on-street parking on the north side of the street only.</p> <p>E.25c. Extend Owens Street northward from 16th Street to The Common, providing no on-street parking.</p> <p>E.25d. Construct Owens Street between 16th Street and Mariposa Street, providing no on-street parking.</p>	No	<p>Mission Bay FSEIR Mitigation Measure E.25 has been partially implemented. Owens Street between Third Street and the traffic circle at Mission Bay Drive has been renamed Channel Street.</p> <p>Mission Bay FSEIR Mitigation Measures E.25a and E.25c have already been implemented, and consequently, are not applicable to the proposed project.</p> <p>The section of Owens Street between Fourth Street and the traffic circle at Mission Bay Drive (FSEIR Mitigation Measures E.25b) has been partially implemented and will be completed as planned development adjacent to Owens Street is completed. Therefore FSEIR Mitigation Measure E.25b is not applicable to the proposed project.</p> <p>The section of Owens Street between 16th and Mariposa Streets is under construction as part of the UCSF Medical Center project (FSEIR Mitigation Measures E.25d), and therefore is not applicable to the proposed project.</p>
South	<p>E.26 <u>North Common and South Common Streets connection to Seventh Street</u></p> <p>E.26a. Construct an “at-grade” connection to Seventh Street across Caltrain tracks, in conjunction with Measure E.18 for the new intersection.</p> <p>E.26b. Prohibit parking at trolleybus stops for the 22-Fillmore line east of Third Street where bus line is extended.</p>	No	<p>Mission Bay FSEIR Mitigation Measure E.26 has already been implemented (i.e., Mission Bay Drive), and consequently, is not applicable to the proposed project.</p>
South	<p>E.27 <u>Muni Line 22-Fillmore</u></p> <p>Reroute the MUNI 22-Fillmore trolleybus line to travel on 16th Street to Third Street, and then north on Third Street to The Common. If not already accomplished, install trolleybus wire support poles and/or eyebolts on buildings along the new route, and complete North Common Street and South Common Street east of Third Street. Prohibit parking on North Common and South Common Streets at trolleybus stops.</p>	No	<p>As part of Mission Bay FSEIR Mitigation Measure E.27, the temporary 55 16th Street motor coach route between Mission Street and Third Street was initiated in February 2015. The</p>

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
South (cont.)			extension of the 22 Fillmore into Mission Bay will be implemented as part of the Muni Forward project Mission Bay FSEIR Mitigation Measure E.27 has already been implemented, and consequently, is not applicable to the proposed project.
South	<p>E.28 <u>Muni Line 30-Stockton or 45-Union/Stockton</u></p> <p>Extend about half of the 30-Stockton or the 45-Union/Stockton trolley buses south and east of the current terminus at the Caltrain terminal to the current terminus of the 22-Fillmore line, at the same time that the 22-Fillmore is rerouted as called for in Measure E.27. Route trolley buses to Connecticut Street via Townsend or Mission Bay Street, and then east to a new terminus near Third and 20th Streets. The coordination of Measure E.27 with E.28, to provide extended MUNI trolleybus service to Mission Bay by rerouting the 22-Fillmore and 30-Stockton or 30/45-Union/Stockton lines, shall be accomplished in phases, if necessary, to provide service as early in project development as MUNI service may be needed. The phases may include:</p> <p>E.28.a. Construct Mission Bay Street, the Seventh Street Connector to North and South Common Streets and the Caltrain at-grade rail crossing, and the portion of North and South Common Streets east of Third Street, early enough in project development to accommodate MUNI trolleybus travel, including poles and eyebolts supporting trolley wires, and provide poles and/or eyebolts supporting trolley wires along 16th Street and a portion of Common Streets in the Project Area, as described in Measure E.27 and above in this Measure; or</p> <p>E.28.b. If item E.28a is not feasible sufficiently early in project development, for an interim period until the necessary streets and trolley wires have been constructed as part of adjacent development, construct the portion of North and South Common Streets east of Third Street and install poles and/or eyebolts supporting trolley wires along the new route for the 22-Fillmore, and extend some but not all of the trolleybuses, so that both Mission Bay and Lower Potrero areas continue to be served. This measure involves only limited service to Mission Bay; or</p> <p>E.28.c. If item E.28a is not feasible sufficiently early in project development, for an interim period until the necessary streets and trolley wires have been constructed as part of adjacent development, provide service to Mission Bay temporarily using diesel buses on 16th Street; or</p> <p>E.28.d. Use a combination of items E.28b and E.28c to provide MUNI trolley bus service to both the Mission Bay and Lower Potrero areas until necessary streets and trolley wires have been constructed as part of adjacent development in the Project Area.</p>	No	As part of the TEP/Muni Forward project, the planned 10 Townsend service improvements will replace the extension of the 30 Stockton or 45 Union-Stockton into Mission Bay. Mission Bay FSEIR Mitigation Measure E.28 will be implemented as part of the TEP/Muni Forward project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North	E.29 <u>Seventh Street/Brannan Street</u> E.29a. Restripe the northbound approach to provide three lanes.	No	Mission Bay FSEIR Mitigation Measure E.29 is a mitigation measure applicable to development within Mission Bay North, and is therefore not applicable to the proposed project. This improvement will be implemented as part of buildout of the UCSF LRDP in Mission Bay.
North	E.30 <u>Seventh Street/Townsend Street</u> E.30.a. Restripe the southbound, eastbound, and westbound approaches to provide a left-turn lane, a through lane, and a right-turn lane. E.30.b. Restripe the northbound approach to provide a left turn lane, a through lane, and a shared right-through lane.	No	Mission Bay FSEIR Mitigation Measure E.30 has already been implemented, and consequently, it is not applicable to the proposed project
North	E.31 <u>Seventh Street/Berry Street</u> E.31.a. Restripe the eastbound approach to provide two lanes. E.31.b. Restripe the northbound approach to provide a shared left-through lane and a through lane and restripe the southbound approach to provide a through lane and a shared right-through lane.	No	The Mission Bay street network has since been revised, and Mission Bay FSEIR Measure E.31 is no longer applicable.
South	E.32 <u>Seventh Street/North and South Common Streets</u> E.32a. Restripe the northbound approach to provide two through lanes, and a right-turn lane. E.32.b. Restripe the southbound approach to provide two through lanes, and a left-turn lane.	No	Mission Bay FSEIR Mitigation Measure E.32 has already been implemented, and consequently, is not applicable to the proposed project.
South	E.33 <u>16th Street/Potrero Street</u> Restripe the eastbound and westbound approaches to provide a left-turn lane, a through lane and a shared right-through lane.	No	Mission Bay FSEIR Mitigation Measure E.33 has been superseded by improvements planned for 16 th Street as part of Muni Forward, and is not applicable to the proposed project.
South	E.34 <u>16th Street/Vermont Street</u> Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.34 has already been implemented, and consequently, is not applicable to the proposed project

MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North	E.35 <u>Eighth Street/Townsend Street</u> E.35.a. Eliminate traffic circle and reconfigure intersection. E.35.b. Install a new traffic signal.	No	Mission Bay FSEIR Mitigation Measure E.35 is a mitigation measure applicable to development within Mission Bay North, and consequently, is not applicable to the proposed project. The SFMTA has determined that signalization would create more problems for pedestrians and congestion for vehicular traffic, and application of modern roundabout techniques to improve operation of the intersection would be more appropriate.
North	E.36 <u>Third Street/Townsend Street</u> E.36.a. Remove the on-street parking on the westbound approach during the p.m. peak commute period. E.36.b. Provide an additional westbound through lane during the p.m. peak commute period.	No	Mission Bay FSEIR Mitigation Measure E.36 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.38 <u>Fourth Street/King Street</u> Widen the southbound approach to provide an additional lane, and restripe the intersection to provide one exclusive left-turn lane, one exclusive through lane, one shared right-through lane, and an exclusive right-turn lane for the southbound Fourth Street approach.	No	Mission Bay FSEIR Mitigation Measure E.38 has already been implemented, and consequently, is not applicable to the proposed project.
North	E.41 <u>Fourth Street</u> Widen the west side of Fourth Street for approximately half the distance between Townsend Street and King Street to provide the additional southbound lane noted in Mitigation Measure E.38, including providing additional right-of-way.	No	Mission Bay FSEIR Mitigation Measure E.41 has already been implemented, and consequently, is not applicable to the proposed project.
North / South	E.42 <u>Seventh Street</u> Eliminate on-street parking on both sides of Seventh Street between Townsend and 16th Streets during the morning and afternoon peak commute periods to accommodate the lane configuration changes described in Mitigation Measures E.29, E.30, E.31, and E.32.	No	Mission Bay FSEIR Mitigation Measure E.42 has already been implemented, and consequently, is not applicable to the proposed project.
North / South	E.43 <u>Increase Bay Bridge Tolls</u> Increase Bay Bridge tolls for single-occupant vehicle (SOV) trips during commute hours to discourage non-carpool traffic.	No	Mission Bay FSEIR Mitigation Measure E.43 has been implemented, and consequently, is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North / South	E.44 <u>AC Transit District</u> Encourage the Alameda-Contra Costa Transit District to expand transbay service to accommodate cumulative demand; encourage the Metropolitan Transportation Commission to provide funding for AC Transit District service expansion, and support AC Transit District in its requests for funding for other sources.	No	Future cumulative AC Transit service is projected to accommodate cumulative ridership, and therefore additional AC Transit service is not required. Mission Bay FSEIR Mitigation Measure E.44 consequently, is not applicable to the proposed project.
North/ South	E.45 <u>Extend N-Judah MUNI Metro Line</u> Extend and operate the route of the N-Judah MUNI Metro line from the Embarcadero station to Mariposa Street, using the MMX and Third Street light rail tracks.	No	Mission Bay FSEIR Mitigation Measure E.45 to be implemented with the Central Subway, and consequently, is not applicable to the proposed project.
North/ South	E.46 <u>Transportation Management Organizations</u> E.46.a Form a Mission Bay Transportation Management Association (TMA) to implement a Transportation System Management (TSM) Plan. E.46.b Form a Transportation Coordinating Committee (TCC) including representatives of Project Area property owners, UCSF, SFRA and appropriate City staff, including DPT, MUNI, and DPW, to address area-wide transportation planning issues and coordinate with other uses and neighborhoods in nearby areas.	No	Mission Bay FSEIR Mitigation Measure E.46 has been implemented, and consequently, is not applicable to the proposed project.
North/ South	E.47 <u>Transportation System Management (TSM) Plan</u> Prepare a TSM Plan, which could include the following elements:		
North/ South	E.47.a. <u>Shuttle Bus System</u> Operate shuttle bus service between Mission Bay and regional transit stops in San Francisco (e.g., BART, Caltrain, Ferry Terminal, Transbay Transit Terminal), and specific gathering points in major San Francisco residential neighborhoods (e.g., Richmond and Mission Districts).	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North/ South	E.47.b. <u>Transit Pass Sales</u> Sell transit passes in neighborhood retail stores and commercial buildings in the Project Area.	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
North/ South	E.47.c. <u>Employee Transportation Subsidies</u> Provide a system of employee transportation subsidies for major employers.	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
South	E.47.d. <u>Pedestrian Signals at Owens Street Near the Pedestrian Bridge.</u> Pedestrian signals at this location will provide continuity between the pedestrian bridge near Fifth Street and the pedestrian path adjacent to Owens Street, and the residential units in the central subarea of Mission Bay South.	No	Mission Bay FSEIR Mitigation Measure E.47d is not adjacent to the project site, and consequently, is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North/ South	<p>E.47.e. <u>Secure Bicycle Parking</u></p> <p>Provide secure bicycle parking areas in parking garages of residential buildings, office buildings, and research and development facilities. Provide secure bicycle parking areas by 1) constructing secure bicycle parking at a ratio of 1 bicycle parking space for every 20 automobile parking spaces, and 2) carrying out an annual survey program during project development to establish trends in bicycle use and to estimate demand for secure bicycle parking and for sidewalk bicycle racks, increasing the number of secure bicycle parking spaces or racks either in new buildings or in existing automobile parking facilities to meet the estimated demand.</p> <p>Provide secure bicycle racks throughout Mission Bay for the use of visitors.</p>	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
North/ South	<p>E.47.f. <u>Appropriate Street Lighting</u></p> <p>Ensure that sidewalks in Mission Bay are sufficiently lit to provide pedestrians and bicyclists with a greater sense of safety, and thereby encourage Mission Bay employees, visitors, and residents to walk and bicycle to and from Mission Bay.</p>	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
North/ South	<p>E.47.g. <u>Transit, Pedestrian and Bicycle Route Information</u></p> <p>Provide maps of the local and citywide pedestrian and bicycle routes with transit maps and information on kiosks throughout the Project Area to promote multi-modal travel.</p>	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
E. TRANSPORTATION (cont.)			
North/ South	E.47.h. <u>Parking Management Guidelines</u> Establish parking management guidelines for the private operators of parking facilities in the Project Area.	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
South	E.47.i <u>Flexible Work Time/Telecommuting</u> Where feasible, offer employees in the Project Area the opportunity to work on flexible schedules and/or telecommute so they could avoid peak hour traffic conditions.	Yes	This measure was adopted to encourage use of alternate modes and reduce auto mode. A Mission Bay South Transportation Management Plan has been developed which incorporates this mitigation measure, and it is part of the Mission Bay South Owner Participation Agreement for development within Mission Bay. Because the project sponsor would be subject to the Owner Participation Agreement, this mitigation measure is assumed to be part of the proposed project.
North/ South	E.49 <u>Ferry Service</u> Make a good faith effort to assist the Port of San Francisco and others in ongoing studies of the feasibility of expanding regional ferry service. Make good faith efforts to assist in implementing feasible study recommendations.	No	This measure is currently being implemented by the Water Emergency Transportation Authority.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
F. AIR QUALITY			
North/ South	<p>F.1 <u>TSM Measures</u> Implement measures to decrease vehicle trips, as described in Mitigation Measures E.46 through E.50 in Section VI.E, Mitigation Measures: Transportation</p>	Yes	
North/ South	<p>F.2 <u>Construction PM₁₀</u> As conditions of construction contracts, require contractors to implement the following mitigation program, based on the instructions in the BAAQMD CEQA Guidelines, at all construction sites within the Project Area:</p> <p>F.2.a. Water all active construction areas at least twice a day, or as needed to prevent visible dust plumes from blowing off-site</p> <p>F.2.b. Use tarpaulins or other effective covers for on-site storage piles and for haul trucks that travel on streets</p> <p>F.2.c. Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all <i>unpaved</i> parking areas and staging areas at construction sites</p> <p>F.2.d. Sweep all paved access routes, parking areas, and staging areas daily (preferably with water sweepers)</p> <p>F.2.e. Sweep streets daily (preferably with water sweepers) if visible amounts of soil material are carried onto public streets</p> <p>F.2.f. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more)</p> <p>F.2.g. Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)</p> <p>F.2.h. Limit traffic speeds on unpaved roads to 15 mph</p> <p>F.2.i. Install sandbags or other erosion control measures to prevent silt runoff to public roadways</p> <p>F.2.j. Replant vegetation in disturbed areas as quickly as possible</p> <p>F.2.k. Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site</p> <p>F.2.l. Install wind breaks, or plant trees / vegetative wind breaks at windward side(s) of construction areas</p> <p>F.2.m. Suspend excavation and grading on large construction sites when winds (instantaneous gusts) exceed 25 mph</p> <p>F.2.n. Limit the area subject to excavation, grading and other construction activity at any one time</p>	No	Mission Bay FSEIR Mitigation Measure F.2.a-n would effectively be implemented through compliance with the requirements of the Construction Dust Control Ordinance that was adopted in 2008. Therefore, Mission Bay FSEIR Mitigation Measure F.2 is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
F. AIR QUALITY (cont.)			
North/ South	F.3 <u>Toxic Air Contaminants (TACs)</u> Prior to issuing a certificate of occupancy for a facility containing potential toxic air contamination sources, obtain written verification from BAAQMD either that the facility has been issued a permit from BAAQMD, if required by law, or that permit requirements do not apply to the facility	No	Mission Bay FSEIR Mitigation Measure F.3 has been superseded by current BAAQMD permit requirements for diesel generators, and consequently, is not applicable to the proposed project.
South	F.4 <u>Meteorology Station</u> As soon as possible, to provide reliable wind data for informational purposes, and where applicable, to facilitate the preparation of risk assessment studies, locate and maintain a meteorology station at an appropriate location within the Project Area. F.4.a. Hire a contractor to select appropriate sites for location of the meteorology station to ensure accuracy of data. Preferably the site would be located at a first phase building at the UCSF site, which is centrally located in the Project Area F.4.b. Once site selections are recommended, contact the BAAQMD for consultation and comment on the sites F.4.c. Hire a contractor to select certified equipment and software F.4.d. Consult the BAAQMD on the equipment and software that is selected prior to purchase F.4.e. Construct and site the station according to BAAQMD standards (written guidelines may be obtained from the District) F.4.f. Provide data from the station to the BAAQMD on a real-time basis F.4.g. At a minimum, take continuous wind speed and direction measurements for a period of at least two years	No	Mission Bay FSEIR Mitigation Measure F.4.a-g has already been implemented, and consequently, is not applicable to the proposed project.
North/ South	F.5 <u>Dry Cleaning Facilities</u> Prohibit dry cleaning facilities that conduct on-site dry cleaning operations in residential areas within the Project Area. For any dry cleaning operations with the Project Area, require vapor barriers in their design and construct so as to reduce exposure to perchloroethylene and any other toxic air contaminants handled at the facility.	No	Mission Bay FSEIR Mitigation Measure F.5 is no longer applicable due to the regulatory phase out of perchloroethylene.
North/ South	F.6 <u>Child-Care Buffer Zones</u> Require preschool and childcare centers to notify BAAQMD and the San Francisco Department of Public Health regarding the locations of their operations, and require these centers to consult with these agencies regarding existing and possible future stationary and mobile sources of toxic air contaminants. The purpose of these consultations is to obtain information so that preschool and childcare centers can be located to minimize potential impacts from toxic air contaminants emissions sources.	No	Mission Bay FSEIR Mitigation Measure F.6 does not apply to the proposed project because the only TAC sources (diesel generators and motor vehicles) would be located in the garage where there would be no office uses or associated child care facilities.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
G. NOISE AND VIBRATION			
North/ South	G.1 <u>Noise Reduction in Pile Driving</u> Use noise-reducing pile driving techniques such as pre-drilling pile holes (if feasible, based on soils) to the maximum feasible depth, installing intake and exhaust mufflers on piledriving equipment, vibrating piles into place when feasible, installing shrouds around the piledriving hammer where feasible, and restricting the hours of operation.	No	The project proposes to install piles using drilling and cast-in-place techniques, and as a result, would implement Mission Bay FSEIR Mitigation Measure G.1 as part of the project. Consequently, Mission Bay FSEIR Mitigation Measure G.1 is not warranted for, nor applicable to, the proposed project.
North	G.2 <u>Analyze Potential Vibrations from Caltrain</u> Analyze potential vibration from Caltrain on the western-most block of Mission Bay North at Berry and King Streets, adjacent to Caltrain tracks, based on information about localized soils, and, if the analysis shows vibration could be significant without mitigation, design and construct foundations of buildings proposed to be on that block with vibration-reducing features to reduce potential impacts from adjacent passenger trains.	No	Mission Bay FSEIR Mitigation Measure G.2 is only applicable to development on the western-most block of Mission Bay North at Berry and King Streets, adjacent to Caltrain tracks. The project site is not in this location, and consequently, Mitigation Measure G.2 is not applicable to the proposed project.
H. SEISMICITY			
North/ South	H.1 <u>Heavy Equipment Storage</u> During the build-out period, store heavy construction equipment in the Project Area during the buildout period that is capable of traveling on damaged roads, clearing debris, and opening access to, and within, the Project Area after a major earthquake.	No	Implementation of the San Francisco Emergency Response Plan, the site-specific emergency response plan required under the Fire Code, and life safety requirements of the Building and Fire Codes fulfill the intent of Mission Bay FSEIR Mitigation Measure H.1.
North/ South	H.2 <u>Emergency Preparedness and Emergency Response</u> Following build-out, coordinate emergency response plans with the City regarding use of heavy equipment from the City storage yard in the vicinity of the Project Area	No	Implementation of the San Francisco Emergency Response Plan, prepared in 2008; implementation of the site-specific emergency response plan required under the Fire Code, and life safety requirements of the Building and Fire Codes fulfill the intent of Mission Bay FSEIR Mitigation Measure H.2.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
H. SEISMICITY (cont.)			
	H.3 <u>Comprehensive Preparedness and Response Plan</u>		
North/ South	H.3.a. Require the formulation of a comprehensive preparedness and response plan for the entire Project Area (as opposed to the typical building-by-building plan), integrated with the City's emergency response plans and in coordination with the Mayor's Office of Emergency Services. An emergency response plan should include: <ul style="list-style-type: none"> Community coordination and response Coordination with government services Outreach and training (not only for employees but also residents) Food and water Shelter Sanitation Consideration of need and potential locations for special facilities (operations, medical, etc.) in the context of the citywide Emergency Response Plan and the Project Area's location in Emergency Response District 3 Organization of employees into response teams Employee training in response procedures, including setting up a command post, communications, first aid, evacuation, security and clean-up 	No	Mission Bay FSEIR Mitigation Measure H.3a is applicable to the entire plan area, and not for individual developments in the plan area, including the proposed project, and consequently, is not applicable to the proposed project.
North/ South	H.3.b. In addition to the Project Area-wide plan, require each building or complex in the Project Area to prepare an emergency response plan. Each plan would be the responsibility of the owner(s) of each building or complex, and would be reviewed by the City periodically to ensure it is kept up to date.	No	Section 12.202(e)(1) of the San Francisco Fire Code, and the provisions of the Building Code fulfill the intent of Mission Bay FSEIR Mitigation Measure H.3b.
South	H.4 <u>Fire Station No. 30</u> Provide seismic rehabilitation of Fire Station No. 30 in the Project Area, if the building is to be reused for human occupancy.	No	Mission Bay FSEIR Mitigation Measure H.4 is only applicable to Fire Station 30, not the project site, and consequently, is not applicable to the proposed project.
South	H.5 <u>New Fire Station</u> At the time the San Francisco Fire Department determines the population or building density is high enough to warrant it, provide a new fire station in Mission Bay South to reduce the effects of limited emergency access to and from the site following a major earthquake.	No	The new Public Safety Building at Third Street and Mission Rock became operational in April 2015, and satisfies the requirements of Mission Bay FSEIR Mitigation Measure H.5.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
H. SEISMICITY (cont.)				
North/ South	H.6	<p><u>Facilitate Emergency Access Routes</u></p> <p>As part of the comprehensive preparedness plan identified in Mission Bay FSEIR Measure H.3, identify and implement feasible measures to facilitate and improve emergency access routes to the site, especially in the vicinity of Seventh and Owens Streets. Such measures could include design of open spaces to allow vehicle access following in a catastrophic event; designing underground utilities at the Owens and Seventh Streets connector to minimize severe damage or disconnection caused by earthquakes; constructing heavier pavement sections along critical routes if indicated through a geotechnical study; and siting buildings within the area bounded by Seventh Street, the Seventh Street connector, Owens Street, and 16th Street in a manner that would allow emergency vehicle access between these buildings in a catastrophic event.</p>	No	Mission Bay FSEIR Mitigation Measure H.6 is applicable to the entire plan area, and not for individual developments in the plan area, including the proposed project, and consequently, is not applicable to the proposed project.
North/ South	H.7	<p><u>Corrosivity</u></p> <p>Test soils for sulfate and chloride content. If necessary, use admixtures in concrete so it would not be susceptible to attack by sulfates, and/or use coated metal pipes so that pipes would be more resistant to corrosion by chlorides.</p>	No	The site-specific geotechnical investigation required by, and conducted in accordance with, the California and San Francisco Building Codes would address the potential for corrosion of the project's concrete piles, and would include specifications for the concrete to ensure that the piles would not be adversely affected by corrosion. Consequently, Mission Bay FSEIR Mitigation Measure H.7 no longer necessary.
I. HEALTH AND SAFETY				
South	I.1	<p><u>Biohazardous Materials Handling Guidelines</u></p> <p>Require businesses that handle biohazardous materials and do not receive federal funding to certify that they follow the guidelines published by the National Research Council and the United States Department of Health and Human Services Public Health Service, National Institutes of Health, and Centers for Disease Control, as set forth in <i>Biosafety in Microbiological and Biomedical Laboratories, Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)</i>, and <i>Guide for the Care and Use of Laboratory Animals</i>, or their successors, as applicable.</p>	Yes	Mission Bay FSEIR Mitigation Measure I.1 is included under SEIR Initial Study Mitigation Measure M-HZ-1a. Guidelines for Handling Biohazardous Materials.
South	I.2	<p><u>Use of HEPA Filters.</u></p> <p>Require businesses handling biohazardous materials to certify that they use high efficiency particulate air (HEPA) filters or substantially equivalent devices on all exhaust from Biosafety Level 3 laboratories unless they demonstrate that exhaust from their Biosafety Level 3 laboratories would not pose substantial health or safety hazards to the public or the environment. Require such businesses to certify that they inspect or monitor the filters regularly to ensure proper functioning.</p>	Yes	Mission Bay FSEIR Mitigation Measure I.2 is included under SEIR Initial Study Mitigation Measure M-HZ-1a. Guidelines for Handling Biohazardous Materials.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
I. HEALTH AND SAFETY (cont.)				
South	I.3	<p><u>Handling of Biohazardous Materials</u></p> <p>Require businesses handling biohazardous materials to certify that they do not handle or use biohazardous materials requiring Biosafety Level 4 containment (i.e., dangerous or exotic materials that pose high risks of life-threatening diseases or aerosol-transmitted infections, or unknown risks of transmission) in the Project Area.</p>	Yes	Mission Bay FSEIR Mitigation Measure I.3 is included under SEIR Initial Study Mitigation Measure M-HZ-1a. Guidelines for Handling Biohazardous Materials.
J. CONTAMINATED SOILS AND GROUNDWATER				
North/ South	J.1	<p><u>Risk Management Plan(s)</u></p> <p>Prior to any site development activities in the Project Area, develop and implement an RWQCB-approved Risk Management Plan or Plans (RMP). The RMP shall address all site development activities and post-development activities and shall include specific measures that would be protective of human health and the aquatic environment. The human health standards to be applied in the RMP are a cumulative cancer risk of 1×10^{-5} and Hazard Index of 1, or more stringent standards as may be required by the RWQCB. Amend the RMPs as required by the RWQCB to reflect new information regarding contamination, land use decisions, or as a result of Article 20 compliance.</p> <p><u>RMP Enforcement</u></p> <p>J.1a Provide an enforcement structure for RMPs, to be in place and effective during construction and after project development, including:</p> <ol style="list-style-type: none"> i. Develop and record a restrictive covenant as an Environmental Restriction and Covenant under California Civil Code Section 1471 that: <ol style="list-style-type: none"> a. Places limits on future uses in the Project Area consistent with the provisions in the RMP; b. Provides notice to current and future property owners that the RMP contains use restrictions and other requirements and obligates property owners to provide like notice to occupants; and c. Provides notice to current and future property owners that the RWQCB maintains residual regulatory enforcement authority over all portions of the Project Area sufficient to compel enforcement of the entire RMP. ii. As part of any future transfer of property title of any portion of the Project Area, require current property owners to provide a copy of the RMP to each of their future transferees. <p><u>Pre-Development</u></p> <p>Include, at a minimum, the following elements in the RMP:</p> <p>J.1b Limit direct access to areas with exposed native soils (defined as soils that exist at the site prior to project approval) and perform inspections to verify that measures taken to limit direct access are maintained.</p>	No	The Mission Bay RMP was completed for the Mission Bay Plan Area in 1999, in accordance with Mission Bay FSEIR Mitigation Measure J.1. In addition, a Revised RMP was completed for Pier 64 vicinity, including Blocks 29-32, in 2006. Consequently, Mission Bay FSEIR Mitigation Measure J.1 has been fulfilled by the preparation of these plans.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
J. CONTAMINATED SOILS AND GROUNDWATER (cont.)			
<p>North/ South (cont.)</p>	<p>Alternatively, for each location with exposed native soils, provide risk management procedures for those areas. If this alternative is chosen, for each exposed soil location that would remain vacant and undeveloped at the initiation of development, and for each site that becomes vacant and includes exposed native soil, evaluate and document potential health risks to the general public that could occur before site development using the following process:</p> <p>Evaluate sampling results to determine constituents that could pose a risk to the general public. Identify populations who could be exposed to the constituents in soils based on land uses within and adjacent to the Project Area. Exposed populations that would be considered would include adult and child visitors/trespassers, nearby residents (adults and children), and workers not involved in project construction within and adjacent to the Project Area. Using specific EPA- and DTSC-recommended exposure assumptions, identify the appropriate exposure pathways and assumptions in consultation with the RWQCB.</p> <p>Using the specific exposure assumptions identified above, adopt contaminant-specific interim target levels (ITLs) following regulatory risk assessment guidelines established by DTSC and EPA.</p> <p>Compare ITLs to the range of concentrations detected in exposed native soils to identify areas where ITLs are exceeded. No further action prior to development (other than that required under Article 20 or other applicable regulations) would be required in areas in which ITLs are not exceeded.</p> <p>J.1c For areas where ITLs are exceeded, identify specific Interim Risk Management (IRM) measures that would reduce potential contamination-related risks to Project Area occupants and visitors during site build-out. Based on the results of the ITL evaluation and need for site controls, general IRM measures could include measures such as:</p> <ul style="list-style-type: none"> i. <u>Limit Direct Access to Uncovered Native Soil on Undeveloped Portions of the Project Area.</u> To effectively limit access, install fencing or other physical barriers around the identified areas, and post "No trespassing" signs. ii. <u>Hydroseed or Apply Other Vegetative or Other Cover to Uncovered Areas.</u> Hydroseed or apply other vegetative or other cover to the uncovered areas to reduce the potential for windblown dusts to be generated, and to reduce the potential for individuals to have direct contact with the native soils. iii. <u>Include Safety Notices in Leases.</u> Notify tenants of occupied portions of the Project Areas of the potential risks involved with the disturbance of existing cover (asphalt, concrete, vegetation) or exposed native soil. iv. <u>Conduct Periodic Inspections of Open Spaces.</u> Conduct periodic inspections of the Project Area to reduce the illegal occupancy of open areas by transient populations, and to reduce the illegal dumping by unauthorized occupants or off-site populations. Implement additional security measures such as fencing and/or the use of security guards, if inspections show a need. 		

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
J. CONTAMINATED SOILS AND GROUNDWATER (cont.)			
<p>North/South (cont.)</p>	<p>v. <u>Periodic Monitoring</u>. Perform inspections verifying that risk management measures remain effective by identifying disturbances to cover materials that could result in the exposure of underlying native soil and by identifying areas where temporary fencing or other physical barriers might need to be reinstalled. If the inspections identify areas where measures have been rendered ineffective, implement corrective action.</p> <p><u>Development</u></p> <p>J.1d Include in the RMP, health and safety training and health protection objectives for workers who may directly contact contaminated soil during construction and/or maintenance, including Cal/OSHA worker safety regulations appropriate to the type of construction activity, location, and risk relative to the potential types of hazards associated with contaminated soil or groundwater, and where appropriate, compliance with Title 8, Group 16, requirements.</p> <p>J.1e Identify site access controls to be implemented during construction, such as:</p> <ul style="list-style-type: none"> i. Secure construction site to prevent unauthorized pedestrian/vehicular entry with fencing or other barrier of sufficient height and structural integrity to prevent entry and based upon the degree of control required. ii. Post No trespassing@ signs. iii. Provide on-site meetings with construction workers to inform them about security measures and reporting/contingency procedures. <p>J.1f Identify protocols for managing soil during construction, which will include at a minimum:</p> <ul style="list-style-type: none"> i. The dust controls found in Measure F.02 in Section VI.F, Mitigation Measures: Air Quality. ii. Standards for imported fill (defined as fill brought onto the site from outside the Project Area) that are protective of human health and the aquatic environment and an identified minimum depth of fill to be required for landscaped areas. iii. A requirement that prior to placement, if native soil in the Project Area is to be used on site in any manner that could result in direct human exposure, characterization of the soil be conducted to confirm that it meets appropriate standards approved by the RWQCB and would be appropriate for the intended use. iv. Protocols for managing stockpiled and excavated soils. v. A program for off-site dust monitoring, consisting of real-time monitoring for PM10 concentrations to demonstrate that the health and safety of all individuals not engaged in construction activities would not be adversely affected by chemicals that could be contained in dust generated by soil-disturbing activities. If monitoring shows dust levels exceeding 250 g/m3, implement additional dust control measures, such as continuous misting of exposed areas with water, until concentrations are reduced below the action level. 		

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
J. CONTAMINATED SOILS AND GROUNDWATER (cont.)			
North/South (cont.)	<p>J.1g Identify protocols for managing groundwater, which will include at a minimum:</p> <ul style="list-style-type: none"> i. Procedures to prevent unacceptable migration of contamination from defined plumes during dewatering, such as monitoring, counter-pumping, or installing sheetpiles down to Bay Mud before dewatering. ii. Procedures for the installation of subsurface pipelines and other utilities, where necessary, to prevent lateral transmission of chemicals in groundwater. Such procedures could include, but would not be limited to, selection of proper backfill materials and thickness and installation of clay plugs or barrier collars. <p>J.1h Include SWPPP requirements and BMPs as described in Mitigation Measure K.01 in Section VI.K, Mitigation Measures: Hydrology and Water Quality.</p> <p>J.1i Include a requirement that construction personnel be trained to recognize potential hazards associated with underground features that could contain hazardous materials, previously unidentified contamination, or buried hazardous debris.</p> <p>J.1j Develop and describe procedures for implementing a contingency plan, including appropriate notification and control procedures, in the event unanticipated subsurface hazards are discovered during construction. Control procedures could include, but would not be limited to, further investigation and removal of USTs or other hazards.</p> <p>J.1k Establish procedures, as necessary, so that construction activities avoid interfering with any RWQCB-required site investigation and remediation in the free product area.</p> <p><u>Post-Development</u></p> <p>J.1l Except where testing demonstrates that native soils meet standards established by the RWQCB as being protective of human health and the aquatic environment, require that upon project completion, all native soils shall be capped, so as to preclude human contact by using buildings, paved surfaces (such as parking lots, sidewalks, or roadways), or fill of a kind and depth approved by the RWQCB.</p> <p>J.1m Prohibit residences with unrestricted access to soils in front yards or backyards anywhere in the Project Area.</p> <p>J.1n Prohibit access to native soils for private use. If disturbance of native subsurface soils or groundwater dewatering is planned, carry out these activities in accordance with the elements of the RMP called for in Measures J.01d through J.01k. Following construction or excavation or soil disturbance, restore the cap in accordance with the provisions of the RMP as called for in Measure J.01l.</p> <p>J.1o Prohibit the use of shallow groundwater within the Project Area for domestic, industrial, or irrigation purposes. Permit installation of groundwater wells within the Project Area only for environmental monitoring purposes. Secure and lock environmental wells installed within the Project Area to prevent unauthorized access to the groundwater. In the event the use of shallow groundwater is proposed, perform an assessment of the risks from direct exposure to the groundwater prior to use and obtain RWQCB or other appropriate regulatory agency approval of the results of the assessment and proposed uses</p>		

MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
J. CONTAMINATED SOILS AND GROUNDWATER (cont.)			
North/ South	<p>J.2 <u>Site Specific Risk Evaluation</u></p> <p>Carry out a site-specific risk evaluation for each site in a non-residential area proposed to be used for a public school or child care facility; submit to RWQCB for review and approval. If cancer risks exceed 1×10^{-5} and/or non-cancer risk exceeds a Hazard Index of 1, carry out remediation designed to reduce risks to meet these standards or select another site that is shown to meet these standards.</p>	Yes	Included under SEIR Initial Study Mitigation Measure M-HZ-2: RMP Provisions for Child Care Facilities.
K. HYDROLOGY AND WATER QUALITY			
North/ South	<p>K.1 <u>Stormwater Pollution Prevention Program (SWPPP)</u></p> <p>Develop and implement a comprehensive Stormwater Pollution Prevention Plan (SWPPP) for all construction activities within the Project Area to avoid and minimize erosion and sedimentation in China Basin Channel and San Francisco Bay and to manage other aspects of the construction site. Include at least the following Best Management Practices, or substantially equivalent measures.</p> <p>K.1.a. Minimize dust during demolition, grading, and construction by lightly spraying exposed soil on a regular basis.</p> <p>K.1.b. Minimize wind and water erosion on temporary soil stockpiles by spraying with water during dry weather and covering with plastic sheeting or other similar material during the rainy season (November to April).</p> <p>K.1.c. Minimize the area and length of time during which the site is cleared and graded.</p> <p>K.1.d. Prevent the release of construction pollutants such as cement, mortar, paints and solvents, fuel and lubricating oils, pesticides, and herbicides by storing such materials in a bermed, or otherwise secured, area.</p> <p>K.1.e. As needed, install filter fences around the perimeter of the construction site to prevent off-site sediment discharge. Prior to grading the bank slopes of China Basin Channel for the proposed channel-edge treatments, install silt or filter fences to slow water and remove sediment. As needed, properly trench and anchor in the silt or filter fences so that they stand up to the forces of tidal fluctuation and wave action, and do not allow sediment-laden water to escape underneath them.</p> <p>K.1.f. Follow design and construction standards found in the <i>Manual of Standards for Erosion and Sediment Control Measures</i> for placement of riprap and stone size.</p> <p>K.1.g. Install and maintain sediment and oil and grease traps in local stormwater intakes during the construction period, or otherwise properly control oil and grease discharges.</p> <p>K.1.h. Clean wheels and cover loads of trucks carrying excavated soils before they leave the construction site.</p> <p>K.1.i. Implement a hazardous material spill prevention, control, and clean-up program for the construction period. As needed, the program would include measures such as constructing swales and barriers that would direct any potential spills away from the Channel and the Bay and into containment basins to prevent the movement of any materials from the construction site into water.</p>	No	Compliance with the current General Construction NPDES Permit would ensure a SWPPP with appropriate BMPs would be developed and implemented. Consequently Mitigation Measures K.1a through K.1i are not needed.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
K. HYDROLOGY AND WATER QUALITY (cont.)				
North/ South	K.2	<p><u>Changes in Sanitary Sewage Quality</u></p> <p>In addition to developing and implementing a Stormwater Management Program for the Central/Bay Basin (see Mitigation Measure K.05), participate in the City's existing Water Pollution Prevention Program. Facilitate implementation of the City's Water Pollution Prevention Program by providing and installing wastewater sampling ports in any building anticipated to have a potentially significant discharge of pollutants to the sanitary sewer, as determined by the Water Pollution Prevention Program of the San Francisco Public Utilities Commission's Bureau of Environmental Regulation and Management, and in locations as determined by the Water Pollution Prevention Program.</p>	Yes	Mission Bay FSEIR Mitigation Measure K.2 is included under SEIR Mitigation Measure M-H-6. Wastewater Sampling Ports.
North/ South	K.3	<p><u>Sewer Improvement Design</u></p> <p>Design and construct sewer improvements such that potential flows to the City's combined sewer system from the project do not contribute to an increase in the annual overflow volume as projected by the Bayside Planning Model by providing increased storage in oversized pipes, centralized storage facilities, smaller dispersed storage facilities, or detention basins, or through other means to reduce or delay stormwater discharges to the City system.</p>	Yes	Mission Bay FSEIR Mitigation Measure K.3 applies to the entire project area and Mission Bay FSEIR Mitigation Measure K.4 applies only to the planned separate stormwater system that would discharge stormwater flows directly to China Basin Channel (Mission Creek) and the Bay.
South	K.4	<p><u>Alternative Technologies to Improve Stormwater Discharge Quality</u></p> <p>Implement alternative technologies or use other means to reduce settleable solids and floatable materials in stormwater discharges to China Basin Channel to levels equivalent to, or better than City-treated combined sewer overflows. Such alternative technologies could include one or more of the following: biofilter system, vortex sediment system, catch basin filters, and/or additional source control measures to remove particulates from streets and parking lots.</p>		Implementation of Mitigation Scenario B (identified in Mission Bay FSEIR Summary of Comments and Responses in Volume III, beginning on p. XII.253) included separating the stormwater collection system and sanitary sewer in the reconfigured Mariposa sub-basin as well as in the reconfigured Central sub-basin. The master developer ultimately adopted and is currently implementing Mitigation Scenario B, as described in the Mission Bay South Infrastructure Plan. Implementation of this mitigation approach satisfies the requirements of Mission Bay FSEIR Mitigation Measures K.3 and K.4

MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
K. HYDROLOGY AND WATER QUALITY (cont.)			
South	<p>K.5 <u>Central/Bay Basin Stormwater Management Program</u></p> <p>Develop and implement a Stormwater Management Program for the Central/Bay Basin applicable to new and interim development under the Redevelopment Plan if any are contributing to direct discharges of stormwater to near-shore waters. Develop the plan in coordination with City and County of San Francisco agencies such as the Water Pollution Prevention Program of the City and County of San Francisco Public Utilities Commission's (SFPUC) Bureau of Environmental Regulation and Management, and the Clean Water Program. Develop the Stormwater Management Program according to guidelines contained in California Municipal Storm Water Best Management Practice Handbook and in California Industrial/Commercial Storm Water Best Management Practice Handbook. In addition, design the program with Best Management Practices consistent with the minimum control measures pursuant to the proposed Phase II stormwater regulations. Implement the Stormwater Management Program until a city-wide stormwater management program is developed that includes any area contributing to direct discharges of stormwater to near-shore waters. If the City and County of San Francisco develops a city-wide stormwater management program, such a program would supersede the stormwater management program for the Project Area. Periodically prepare and submit a monitoring report to the City detailing progress on implementation of Best Management Practices. Modify the Stormwater Management Program, as necessary, to respond to changes in conditions, and record any changes made (additions or deletions) in the monitoring report.</p>	No	Mission Bay FSEIR Mitigation Measure K.5 requires implementation of an individual stormwater management program that utilizes BMPs for Mission Bay until the Phase II regulations become final and Mission Bay is included in the City's stormwater management program. However, subsequent to publication of the Mission Bay FSEIR, the SWRCB adopted the General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer Systems. The CCSF also adopted Section 147 of Article 4.2 of the San Francisco Public Works Code in 2010 and published the associated Stormwater Design Guidelines. Discharges of stormwater from the project site to the separate storm sewer would be required to comply with these regulatory requirements as further described above. Therefore, Mission Bay FSEIR Mitigation Measure K.5 is not applicable to the proposed project.
North/ South	<p>K.6 <u>Structure Placement and Design to Minimize Dangers of Flooding</u></p> <p>Structures in the Project Area should be designed and located in such a way to assure the reasonable safety of structures and shoreline protective devices built in the Bay or in low-lying shoreline areas from the dangers of tidal flooding, including consideration of a rise in relative sea level. Detailed construction specifications to mitigate against impacts of a sea-level rise, however, would require specific flood protection engineering and building analysis by a licensed engineer where structures are proposed below a 99-foot elevation (Mission Bay Datum). Measures include:</p> <p>K.6.a. Setback from the water's edge</p> <p>K.6.b. Install seawalls, dikes, and/or berms during construction of infrastructure</p> <p>K.6.c. Provide for dewatering basements</p>	No	Mission Bay FSEIR Mitigation Measure K.6 is no longer warranted for the proposed project. FSEIR Mitigation Measures K.6a through K.6f apply to structures proposed below an elevation of -1 foot SFD (10 feet NAVD88). Elevations at the project site range from approximately -1 foot SFD (10 feet NAVD88) to +3 feet SFD (14 feet NAVD88); however some of the project components would extend below grade. The SFPUC inundation maps completed in 2014 have provided a

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
K. HYDROLOGY AND WATER QUALITY (cont.)			
North/ South (cont.)	<p>K.6.d. Construct streets and sidewalks above existing grades by reducing the amount of excavation for utilities or basements</p> <p>K.6.e. Use topsoil to raise the level of public open spaces</p> <p>K.6.f. Use half-basements and partially depressed garage levels to minimize excavation</p>		<p>more detailed assessment of areas of the project site that could be inundated due to sea level rise and indicate an area greater than previously anticipated in the Mission Bay FSEIR.</p> <p>However, the project incorporates into the project design measures that fulfill the requirements of FSEIR Mitigation Measure K.6. This includes designing the proposed project with flood-resistant building standards or, in some cases, to be capable of adapting to meet these standards when needed in the future in recognition of future flood hazards due to sea level rise.</p>
L. CHINA BASIN CHANNEL VEGETATION AND WILDLIFE			
North/ South	<p>L.1 <u>Salt Marsh Wetland Habitat Mitigation Plan</u></p> <p>Prepare and implement a salt marsh wetland habitat mitigation plan in accordance with the San Francisco District, U.S. Army Corps of Engineers Habitat Mitigation Planning Guidelines. Determine the details of the plan through the Section 404 permit process. Nothing in this mitigation measure is intended to constrain the flexibility needed to meet permitting agency requirements, or adjust to variability in field conditions, new information or technology, or other factors. Similarly, this condition is not intended to conflict with or constrain use of more natural alternative Channel edge treatments that are determined feasible and consistent with adopted Redevelopment Agency standards and guidelines applicable to Mission Bay as contained in Design for Development documents.</p>	No	Mission Bay FSEIR Mitigation Measure L.1 is only applicable to construction activities within the Mission Creek Channel, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure L.1 is not applicable to the proposed project.
North/ South	<p>L.2 <u>Wetland Habitat Avoidance</u></p> <p>Avoid salt marsh wetland habitat along the China Basin Channel shoreline during installation of suction inlets (and associated piping) used for fire-fighting water supply. Design the storm drain outfalls to minimize scouring and erosion of mudflats in coordination with relevant permitting agencies during the permitting process.</p>	No	Mission Bay FSEIR Mitigation Measure L.2 is only applicable to construction activities within the Mission Creek Channel, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure L.2 is not applicable to the proposed project.

MISSION BAY FSEIR SECTION / MITIGATION MEASURE		MB FSEIR Mitigation Measure Applicability to Project	Notes
L. CHINA BASIN CHANNEL VEGETATION AND WILDLIFE (cont.)			
North/ South	L.3 <u>Construction During Pacific Herring Spawning Season</u> Do not conduct any construction activities (including movement of heavy equipment or structures by barge or tugboat) with the potential to cause turbidity in Channel or Bay waters during the spawning season of Pacific herring (December 1-March 1).	No	Mission Bay FSEIR Mitigation Measure L.3 is only applicable to construction activities (including movement of construction barges and tugboats) within the Mission Creek Channel. Consequently, Mission Bay FSEIR Mitigation Measure L.3 is not applicable to the proposed project.
North / South	L.4 <u>Turbidity Prevention</u> Require the construction contractor to use shallow-draft tugboats, to prevent turbidity and sediment resuspension caused by tugboat activity in the Channel. Shallow-draft tugboats float higher in the water than deep-draft tugboats. Because they float higher, the tugboat propellers are not as deep under the water surface, and therefore are farther away from the bottom of the Channel. This arrangement has less potential to disturb bottom sediments because the local currents created by the propellers would not extend as deeply into the water column. Require the construction contractor to operate the tugboats at the minimum speed necessary to maintain maneuverability of the barges. Slower speeds would reduce the spin of tugboat propellers, thus minimizing turbidity and sediment resuspension.	No	Mission Bay FSEIR Mitigation Measure L.4 is only applicable to use of construction tugboats within the Mission Creek Channel. Consequently, Mission Bay FSEIR Mitigation Measure L.4 is not applicable to the proposed project.
North / South	L.5 <u>Construction In Channel</u> Confine resuspended sediments from construction activities in the Channel or Bay waters to the work site using submarine silt curtains around pile-driving or outfall construction sites, or silt fences properly anchored and trenched in place at the toe of slope below any grading or rubble-removing activities.	No	Mission Bay FSEIR Mitigation Measure L.5 is only applicable to construction activities within the Mission Creek Channel, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure L.5 is not applicable to the proposed project.
North / South	L.6 <u>Removal and Disposal Plan</u> Prepare a written plan for removal and disposal, including a description of any methods incorporated to avoid or minimize potential surface water contamination shall be prepared prior to removing existing support piles from China Basin Channel for the proposed Channel-edge treatments. Submit the plan to the San Francisco Bay Regional Water Quality Control Board for approval before implementation. Implement the plan during construction and have a qualified specialist monitored the plan to ensure adequate performance. Implement this plan during removal of pilings under the direction of a qualified specialist.	No	Mission Bay FSEIR Mitigation Measure L.6 is only applicable to construction activities within the Mission Creek Channel, and not the project site. Consequently, Mission Bay FSEIR Mitigation Measure L.2 is not applicable to the proposed project.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
M. COMMUNITY SERVICES AND UTILITIES			
South	<p>M.1 <u>Transfer School Site</u> Transfer the 2.2 acre school site to the San Francisco Unified School District in a developable condition prior to issuance of building permits for residential units that will make the total combined number of dwelling units in Mission Bay North and Mission Bay South equal to or greater than 3,200 dwelling units.</p>	No	Mission Bay FSEIR Mitigation Measure M.1 is only applicable to the 2.2-acre school site in the plan area, not the project site. Consequently, Mission Bay FSEIR Mitigation Measure M.1 is not applicable to the proposed project.
North / South	<p>M.2 <u>Include Water Conservation in Buildings and Landscaping</u> Include methods of water conservation in Mission Bay buildings and landscaping. Water conservation methods include the following:</p> <p>M.2.a. Install water conserving dishwashers and washing machines in rental apartments and condominiums</p> <p>M.2.b. Install water conserving dishwashers and water efficient centralized cooling systems in office buildings</p> <p>M.2.c. Incorporate water efficient laboratory techniques in research facilities where feasible</p> <p>M.2.d. Provide information to residences and businesses advising methods to conserve water</p> <p>M.2.e. Install water conserving irrigation systems (e.g., drip irrigation)</p> <p>M.2.f. Design landscaping using drought resistant and other low-water use plants</p>	No	Compliance with the 2013 California Green Building Code, 2013 San Francisco Green Building Code, San Francisco Water Efficient Irrigation Ordinance and the San Francisco Green Landscaping Ordinance would in effect implement FSEIR Mitigation Measures M.2a through M.2f. Therefore, Mission Bay FSEIR Mitigation Measures M.2a through M.2f are no longer required.
North / South	<p>M.3 <u>Extend Auxiliary Water Supply System</u> Extend the Auxiliary Water Supply System (High-Pressure System) through the interior of the Project Area. The routing, design and implementation of the AWSS extensions shall be determined by the Fire Department and the Department of Public Works.</p>	No	The AWSS has been extended through the interior of the plan area, and satisfies the requirements of Mitigation Measure M.3. Mission Bay FSEIR Mitigation Measure M.3 is not applicable to the proposed project.
South	<p>M.4 <u>Sewers and Wastewater Treatment</u> Construct a fence around any interim surface detention basins.</p>	No	There would be no interim stormwater detention ponds constructed on the site under the proposed project. Therefore Mission Bay FSEIR Mitigation Measure M.4 does not apply to the project.
South	<p>M.5 <u>Stormwater Runoff Control and Drainage</u> Drain stormwater runoff (up to a 5-year event) from newly constructed buildings and permanently covered surfaces in the Bay Basin into the City's combined sewer system until installation of a permanent sewer system.</p>	No	Mission Bay FSEIR Mitigation Measure M.5 is not applicable to the proposed project because the Bay basin has been incorporated into the reconfigured Central sub-basin and the project would discharge to the Mission Bay separate stormwater system that has already been constructed.

	MISSION BAY FSEIR SECTION / MITIGATION MEASURE	MB FSEIR Mitigation Measure Applicability to Project	Notes
M. COMMUNITY SERVICES AND UTILITIES (cont.)			
South	<p>M.6 <u>Construct New Fire Station and Provide New Engine Company</u></p> <p>M.6.a. <u>Construct New Fire Station</u></p> <p>Construct or pay for the construction of a new fire station in the Mission Bay South Redevelopment Area to house equipment and personnel serving the Project Area south of China Basin Channel, either in a new building or in the vacant Fire Station No. 30 after rehabilitation and expansion of that building. The San Francisco Fire Department shall review each proposed development phase to determine when land for the new fire station shall be transferred and when planning and design for the fire station shall be initiated.</p>	No	The new Public Safety Building at Third Street and Mission Rock Street in Mission Bay South became operational in April 2015, and satisfies the requirements of Mission Bay FSEIR Mitigation Measure M.6a.
South	<p>M.6.b. <u>Provide New Engine Company</u></p> <p>Provide or pay for the provision of an engine company and associated Fire Department personnel and equipment, and a truck company and associated personnel and equipment, to serve the Project Area south of China Basin Channel. The San Francisco Fire Department shall review each proposed development phase to determine when the engine company and truck company and related personnel and equipment shall be provided.</p>	No	SFFD Station 4 company currently operates in the Public Safety Building in Mission Bay South in April 2015, and satisfies the requirements of Mission Bay FSEIR Mitigation Measure M.6b.