

SAN MATEO DRAEGER'S TIA REPORT

222 EAST 4TH AVENUE, SAN MATEO, CA

October 2022



Inside front cover

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San Mateo Draeger's TIA

222 East 4th Avenue, San Mateo, CA

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Project Number 24837.009

October 2022



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TABLE OF CONTENTS

Contents

Executive Summary	v
Project Trip Generation.....	v
CEQA Analysis	v
Local Transportation Analysis	v
Introduction	1
Project Description	1
Existing and Proposed uses	1
CEQA Analysis.....	1
Screening Criteria.....	1
VMT Impact Discussion	2
Local Transportation Analysis.....	7
Scope of Study	7
Existing Conditions.....	11
Baseline (Opening Year) Conditions	21
Project Travel Demand.....	24
Baseline Plus Project Conditions	25
Cumulative Conditions	28
Cumulative Plus Project Conditions.....	31
Additional Transportation Analysis.....	34
Technical Appendix.....	41

LIST OF FIGURES

Figure 1: Project Location	2
Figure 2: Site Plan	3
Figure 3: HQT A Map.....	3
Figure 4: VMT per Employee Map (VMT Labeled)	4
Figure 5: VMT per Employee Map (TAZ Labeled)	5
Figure 6: Study Intersections.....	9
Figure 7: Existing and Proposed Bicycle Network	13
Figure 8: Existing Transit Service	16
Figure 9: Existing and Baseline (Opening Year) Lane Configurations & Traffic Control at Study Intersections	18
Figure 10: Existing Conditions Peak Hour (AM) Turning Movement Volumes.....	19
Figure 11: Existing Conditions Peak Hour (PM) Turning Movement Volumes	20
Figure 12: Baseline (Opening Year) Conditions Peak Hour (AM) Turning Movement Volumes.....	22
Figure 13: Baseline (Opening Year) Conditions Peak Hour (PM) Turning Movement Volumes.....	23
Figure 14: Baseline (Opening Year) Plus Project Conditions Peak Hour (AM) Turning Movement Volumes	26
Figure 15: Baseline (Opening Year) Plus Project Conditions Peak Hour (PM) Turning Movement Volumes	27
Figure 16: Cumulative Conditions Peak Hour (AM) Turning Movement Volumes	29
Figure 17: Cumulative Conditions Peak Hour (PM) Turning Movement Volumes.....	30
Figure 18: Cumulative Conditions Plus Project Peak Hour (AM) Turning Movement Volumes.....	32
Figure 19: Cumulative Conditions Plus Project Peak Hour (PM) Turning Movement Volumes	33

LIST OF TABLES

Table 1: City of San Mateo Parking Requirements and Proposed Project Parking Spaces Calculation	2
Table 2: Level of Service Definition for Intersections.....	10
Table 3: Existing Transit Service	15
Table 4: Existing Conditions Intersection Operations Results	17
Table 5: Baseline (Opening Year) Conditions Intersection Operations Results.....	21
Table 6: Project Trip Generation.....	25
Table 7: Baseline (Opening Year) Plus Project Conditions Intersection Operations Results	25
Table 8: Cumulative Conditions Intersection Operations Results.....	28
Table 9: Cumulative Plus Project Intersection Operations Results.....	31
Table 10: 95th Percentile Queue Lengths for Existing Conditions	38
Table 11: 95th Percentile Queue Lengths for Baseline (Opening Year) and Baseline Plus Project Conditions	39
Table 12: 95th Percentile Queue Lengths for Cumulative and Cumulative Plus Project Conditions	40

APPENDICES

Appendix A: Project Travel Demand Memorandum
Appendix B: Existing Conditions Worksheets
Appendix C: Baseline (Opening Year) Conditions Worksheets
Appendix D: Baseline (Opening Year) Plus Project Conditions Worksheets
Appendix E: Cumulative Conditions Worksheets
Appendix F: Cumulative Plus Project Conditions Worksheets
Appendix G: 95th Percentile Queue Length Worksheets

EXECUTIVE SUMMARY

PROJECT TRIP GENERATION

The proposed project is estimated to generate 169 vehicle trips (120 inbound, 49 outbound) during the weekday AM peak hour and 201 vehicle trips (70 inbound, 131 outbound) during the weekday PM peak hour. The existing Draeger's supermarket is estimated to generate 304 vehicle trips (167 inbound, 137 outbound) during the weekday AM peak hour and 432 vehicle trips (216 inbound, 216 outbound) during the weekday PM peak hour. The proposed project generates fewer AM and PM peak hour trips when compared to the AM and PM peak hour trips currently being generated by the existing Draeger's supermarket.

CEQA ANALYSIS

This project is located within a half mile of the San Mateo Downtown Caltrain station, and it meets the detailed screening criteria requirements to be considered within a High-Quality Transit Area (HQTa) per the City VMT Guidelines. In meeting at least one of the five screening criteria, the proposed project can be presumed to result in a less than significant VMT impact and therefore is exempted from the detailed VMT analysis.

LOCAL TRANSPORTATION ANALYSIS

Kittelson conducted the intersection level of service analysis at all five study intersections for Existing, Baseline (Opening Year), Baseline (Opening Year) Plus Project, Cumulative, and Cumulative Plus Project Conditions for weekday AM and PM peak hour traffic conditions. Kittelson reviewed the site access and on-site circulation based on the proposed site plan and the changes in the 95th percentile queue lengths caused by the proposed project at the study intersections. The results for all scenarios are presented in the report below. The proposed project would not cause any study intersections to exceed the level of service standard as specified in the City of San Mateo TIA guidelines in the existing, baseline (opening year), and cumulative conditions.¹ Storage capacity is exceeded for the EB and SB approaches at 4th Ave and B St in the AM and PM Cumulative and Cumulative Plus Project scenarios as well as the EB only approach at 4th Ave and Ellsworth in the Cumulative and Cumulative Plus Project PM scenarios. Although storage capacity is exceeded in these scenarios, queue lengths do not increase with respect to plus project scenarios when compared to no project scenarios. Thus, the proposed project does not impact the status quo.

¹ City of San Mateo Transportation Impact Analysis Guidelines, 2020.



Section 1

Introduction

INTRODUCTION

This report documents the California Environmental Quality Act (CEQA) analysis findings and the local transportation analysis conducted for the proposed 222 E. 4th Avenue Draeger's Site Mixed Use Project development in San Mateo, California (Figure 1).

PROJECT DESCRIPTION

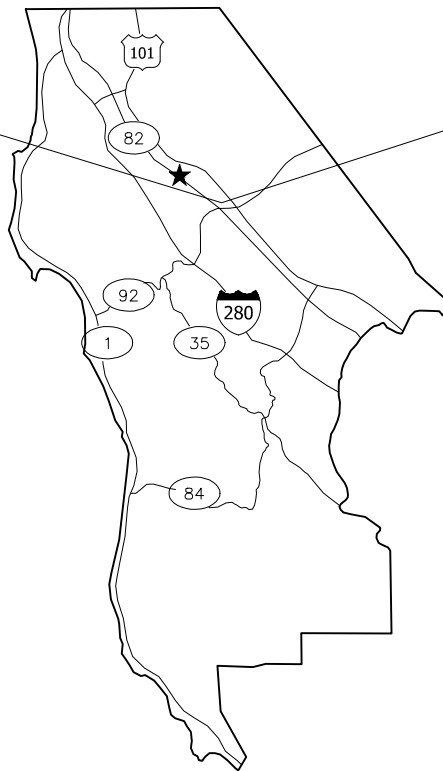
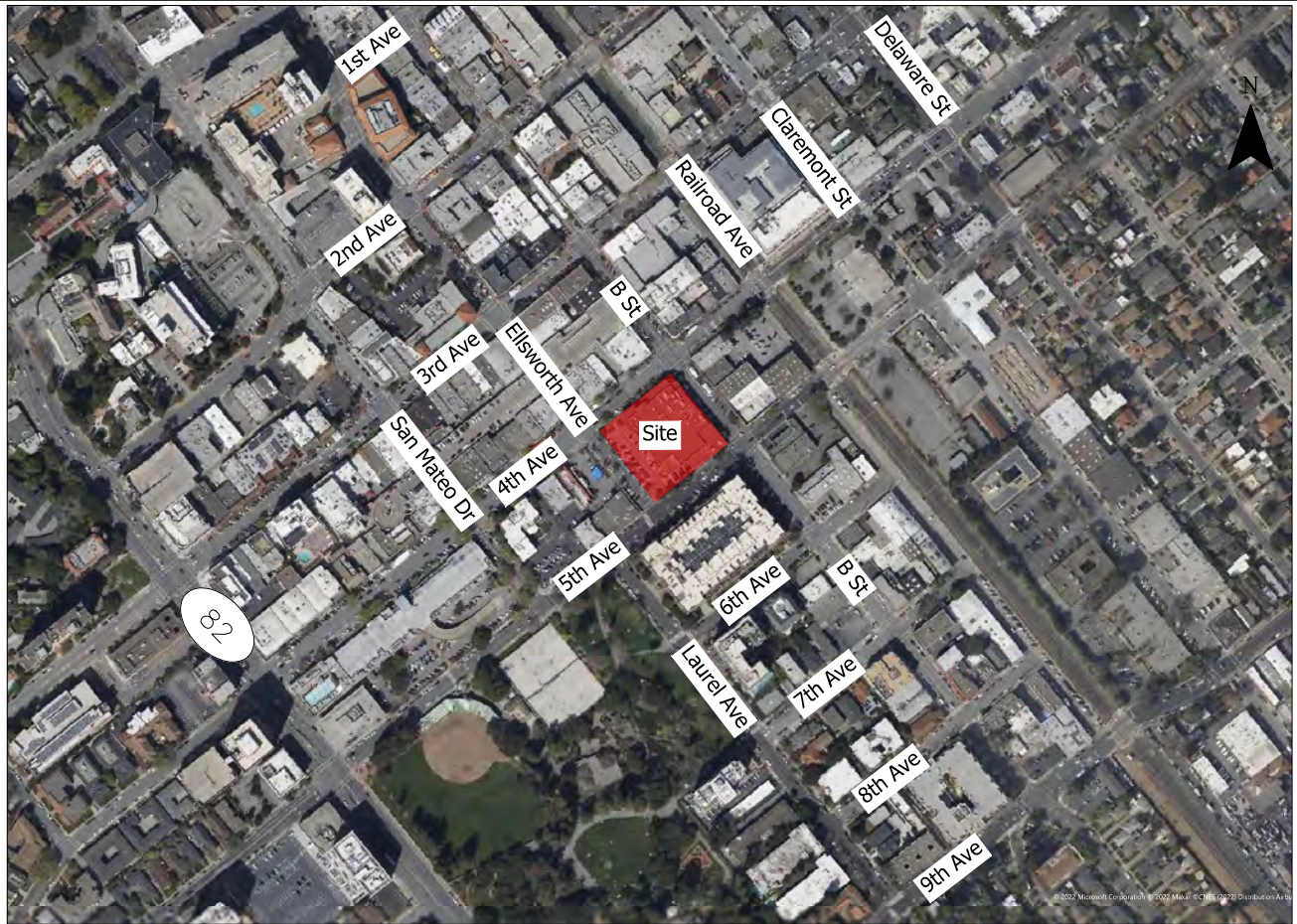
PROJECT LOCATION

The proposed project is located at 222 East 4th Avenue and is approximately 0.4 miles from the San Mateo Caltrain downtown station. Vehicular access to the site is proposed on 5th Avenue, where the garage entry/exit is provided. In addition, pedestrian and bike access to the garage is through a shared lobby on the east by B Street. The residential lobby is provided midblock on the east by B Street, the office lobby is provided midblock on the west by Ellsworth Avenue, and retail entrance is provided on the north by 4th Avenue. Nearby land uses include residential, commercial/retail, recreational, and a hospital. San Mateo Central Park is located to the southwest of the site. The Project site is in downtown San Mateo and is zoned as Central Business District/Residential Overlay District – Mixed Use (CBD).

EXISTING AND PROPOSED USES

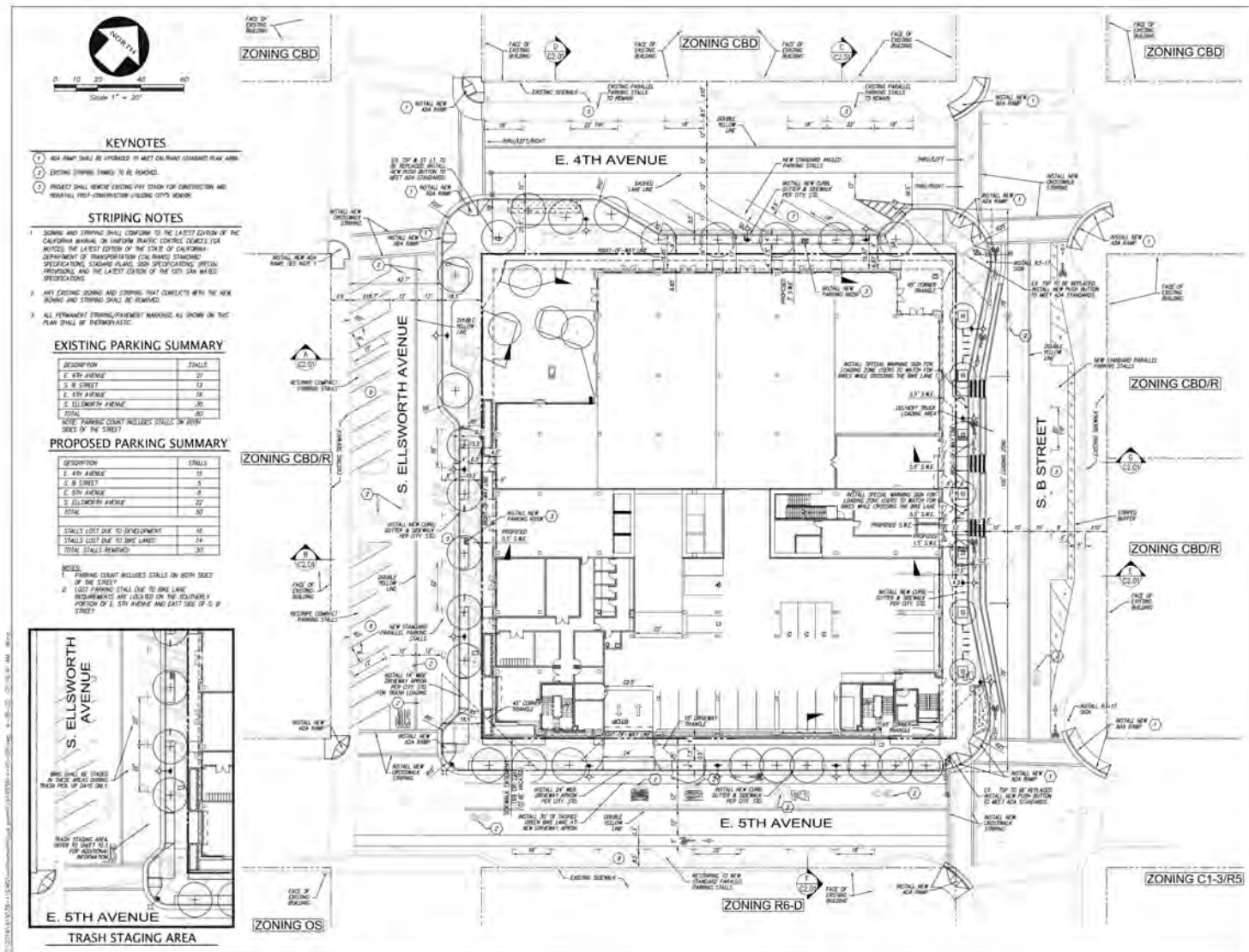
The existing site is the Draeger's grocery store, consisting of 60,965 SF.

Lane Partners is proposing to replace the existing 60,965 square feet Draeger's market located at 222 East 4th Avenue with a 5-story, approximately 152,533 square feet mixed-use building with two levels of below grade parking. The building would consist of approximately 104,554 square feet of office space, 17,658 square feet of retail space, and 8,997 square feet of residential space for 10 below-market-rate units at the lower income level. The retail floor would be located on the ground floor, the office space would be spread throughout the first four floors, and the residential space would be split between the ground floor (i.e., residential lobby/elevator) and the fifth floor living areas. The ground floor would also include 12,392 square feet of covered parking area and two levels (89,519 square feet) below grade for a total of 221 parking spaces. The Project site plan is shown in Figure 2. Regional access to the project is via State Route 82 (El Camino Real), and US 101 via 4th Avenue and 5th Avenue. Local access to the project site would be provided by 5th Avenue, 4th Avenue, Ellsworth Avenue, and B Street.



Project Location

Figure
1



222 EAST 4TH
LANE PARTNERS

LANE PARTNERS

KSH
ARCHITECTS
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KIER+WRIGHT

1001 Third Street, Suite 100
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ISSUES AND REVISIONS

No.	Date	Description
A	05/05/2021	Pre-Application Set
B	10/12/2020	Pre-App Resubmission
C	03/19/2021	Pre-App Resubmission
D	10/15/2021	Pre-App Resubmission
E	02/04/2022	Pre-App Resubmission
F	04/22/2022	Pre-App Resubmission

PROJECT NUMBER:
A-001-01

SHEET TITLE:
PRELIMINARY
STREET
LAYOUT PLAN
AS SHOWN

DESIGN APPROVAL:

C2.00

Site Plan
2

TRANSPORTATION DEMAND MANAGEMENT PLAN

The project would implement a Transportation Demand Management (TDM) Plan to encourage sustainable modes of transportation and reduce vehicle trips to and from the site. The TDM Plan is being developed by Steer Group as part of this project.

SCOPE OF STUDY

The purpose of this transportation analysis is to determine whether the proposed project would have transportation impacts, as defined by the City of San Mateo's Traffic Impact Analysis Guidelines, developed in accordance with the City's General Plan and the Governor's Office of Planning and Research (OPR) requirements in July 2020. The analysis covers the following topics:

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Senate Bill (SB) 743 changed the way transportation studies are conducted in California Environmental Quality Act (CEQA) documents. Specifically, SB 743 updated the way transportation impacts are measured for development projects, based on the number of daily trips and the distance traveled by those trips to their destinations (VMT). The technical advisory provided by the OPR specifically addresses the requirements of California SB 743 which mandated specific types of CEQA analysis of land use development and transportation projects effective July 1, 2020. The quantitative methodology, significance thresholds, and mitigation measures for conducting transportation analysis are based on VMT metrics.

LOCAL TRANSPORTATION ANALYSIS

The City of San Mateo requires the analysis of unsignalized and signalized intersections, though it does not require the analysis of roadway segments, in compliance with the 2030 General Plan. Since a roadway segment's capacity is generally controlled by the downstream intersection, an intersection analysis is sufficient for assessing a project's impacts. Based on the discussions with City Staff and the approved scope of work, Kittelson evaluated the following under the local transportation analysis section:

- Site Access and On-Site Circulation
 - Vehicular Access
 - Pedestrian Access
 - Bicyclist Access
 - Transit Access
 - Emergency Vehicle Access
- Intersection Operations
 - Level of Service
 - Vehicle Queueing



Section 2

CEQA Analysis

CEQA ANALYSIS

SCREENING CRITERIA

According to the technical advisory by OPR² and the more specific City VMT/TIA Guidelines³, a project may require a detailed VMT analysis unless it meets at least one of the City's five screening criteria:

1. *Small Projects* – As per the OPR advisory and the City VMT/TIA Guidelines, projects that generate or attract fewer than 110 vehicle trips per day are classified as 'small projects'. This proposed project has 10 residential units; 104,554 square feet of office space, and 17,658 square feet of retail space and generates 2,904 vehicle trips per day (Detailed trip generation is described in technical memo from Kittelson, dated August 22, 2022). The project generated trips are more than this screening threshold permits. **The project does not meet this criterion.**
2. *Affordable Housing* – As per the guidelines, residential projects that consist entirely of 100 percent deed restricted affordable housing are presumed to have a less than significant impact. The proposed project is a mixed-use development consisting of residential, office, and retail use. **The project does not meet this criterion.**
3. *Local-Serving Retail and Public Services* – As per the guidelines, projects that are locally serving retail with 50,000 square feet gross floor area or less are presumed to have a less than significant impact. The proposed project is a mixed use development and while the retail portion is only 17,658 square feet and therefore can be screened out, the building's office use cannot. **The project does not meet this criterion.**
4. *High-Quality Transit Area (HQTa)* – As per the guidelines, projects located within a HQTa do not require a detailed VMT analysis. The proposed project is in a high-quality transit area as specified by the City's HQTa map (Attachment A of the City's TIA Guidelines) which is included here as Figure 3. This exemption from a detailed VMT analysis does not apply if any of the following are true about the project:
 - a. Project has a floor area ratio (FAR) of less than 0.75 – **false**. The FAR for this proposed project development is 3.1.
 - b. Project includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction – **false**. The off-street parking requirement is determined by the Downtown Area Plan and the Downtown Specific Planning Area and Central Parking and Improvement District (CPID). Table 1 shows the minimum required amount of parking for the proposed project. The City requires 320 parking stalls based on the project characteristics. The project is providing 221 parking stalls.
 - c. Project is inconsistent with the applicable Metropolitan Transportation Commissions' (MTC) Sustainable Communities Strategy (SCS), as determined by the City - **false**. The City has not indicated that this project is out of alignment with the MTC SCS.

² Technical Advisory on Evaluating Transportation Impacts in CEQA, Governor's Office of Planning and Research, December 2018.

³ City of San Mateo Transportation Impact Analysis Guidelines, 2020.

- d. Project replaces affordable units with a smaller number of moderate- or high-income residential units – **false**. This project is not replacing any affordable residential units.

The proposed project meets the HQTa criterion and does not exhibit any of the characteristics which would exempt it from satisfying this screening.

Table 1: City of San Mateo Parking Requirements and Proposed Project Parking Spaces Calculation

Land use type	San Mateo Off-Street Parking Requirements (per 1,000 Gross Square Feet (SF) of Floor Area)			Proposed Project Parking Calcs	
	Employee/Resident	Visitor/Customer	Total	Total Units/Area	Parking Spaces
Office	2.4	0.2	2.6	104,554 SF	273
Retail	1.4	0.5	1.9	17,658 SF	34
<i>Residential</i>					
One-bedroom	1.0	0.2	1.2	8	10
Studio	1.0	0.2	1.2	2	3
				Total	320

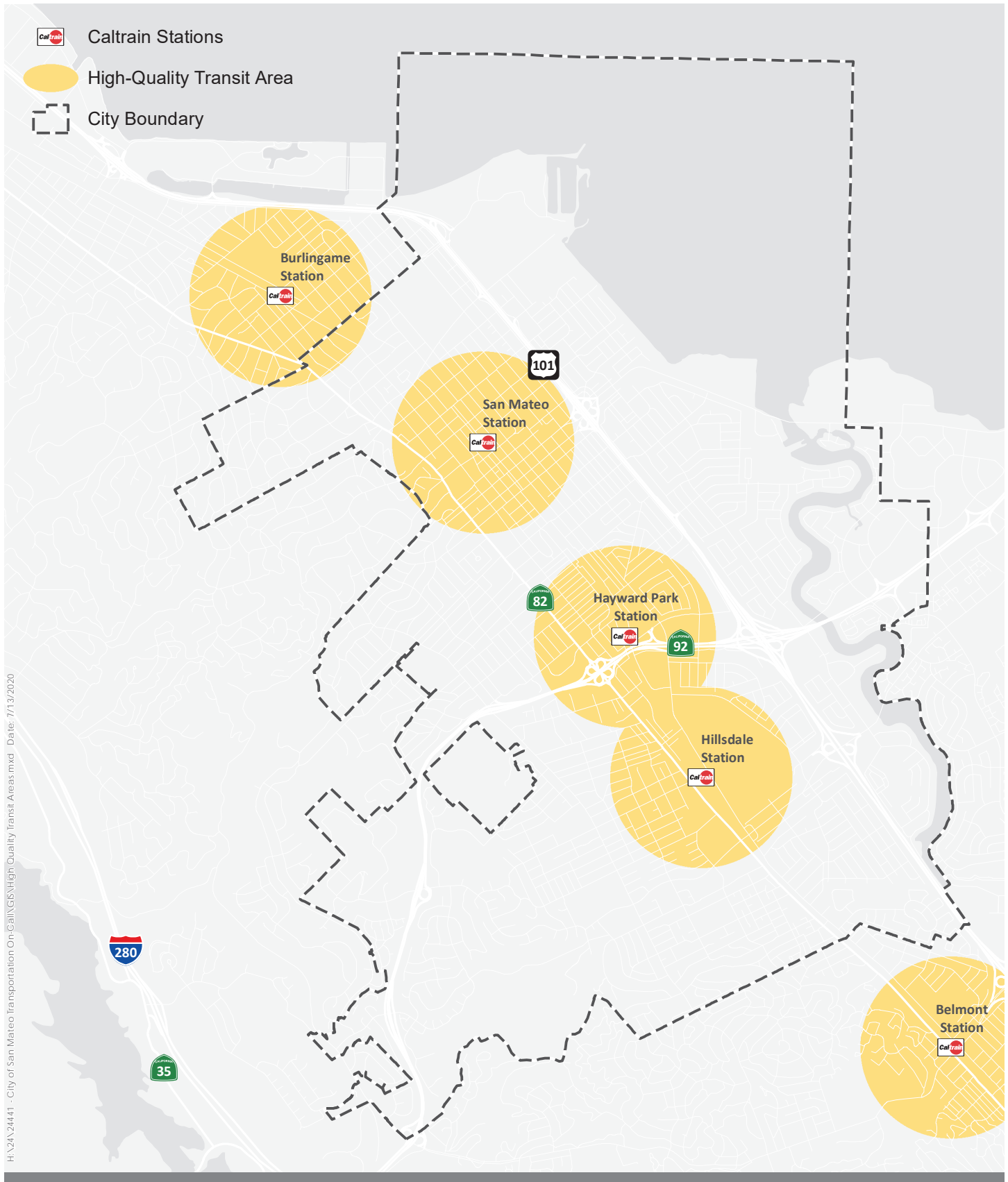
5. *Project Located in Low VMT Areas* – Projects that are proposed in areas that generate VMT below adopted City thresholds are presumed to have a less than significant VMT impact and thus can be screened out. The thresholds and project types that may be screened out are:
- Residential projects proposed in TAZs with total daily resident based VMT per capita that is 15% less than the existing regional average for the County of San Mateo. This is a mixed-use project and does not meet this criterion – **false**.
 - Office or employment portions of other non-residential uses with total daily employee based VMT per employee that is 15% less than the existing regional average for the County of San Mateo. The proposed mixed-use project is in Transportation Analysis Zone (TAZ) 3066 with VMT per Employee of 14.9. The San Mateo County has a regional average of 18.0 VMT per Employee with an impact threshold of 15.3 VMT per Employee (15% below regional average) for this mixed-use project – **true**.

The proposed project is a mixed-use development that includes retail, office, and residential uses. While the nonresidential component of the proposed project screens out, the overall project does not screen out as the residential thresholds are not applicable for the mixed-use project.

VMT IMPACT DISCUSSION

A review of the OPR Technical Advisory and City TIA Guidelines has determined that the project meets the minimum of one of the five of the VMT screening criteria - it is in a High-Quality Transit Area. Therefore, the project is presumed to have a less than significant impact on VMT and is exempt from detailed VMT analysis.

Figure 3



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High-quality transit areas are within 1/2 mile of an existing major transit stop or an existing stop along a high-quality transit corridor



Figure 4

Average VMT/ Employee by TAZ

- < 15.3 - Below Target VMT (County Average - 15%)
- 15.3 - 18.0 - Target VMT (County Average-15%) to County Average
- > 18.0 - Above County Average
- No Data
- City Boundary
- High Quality Transit Area
- Priority Development Area

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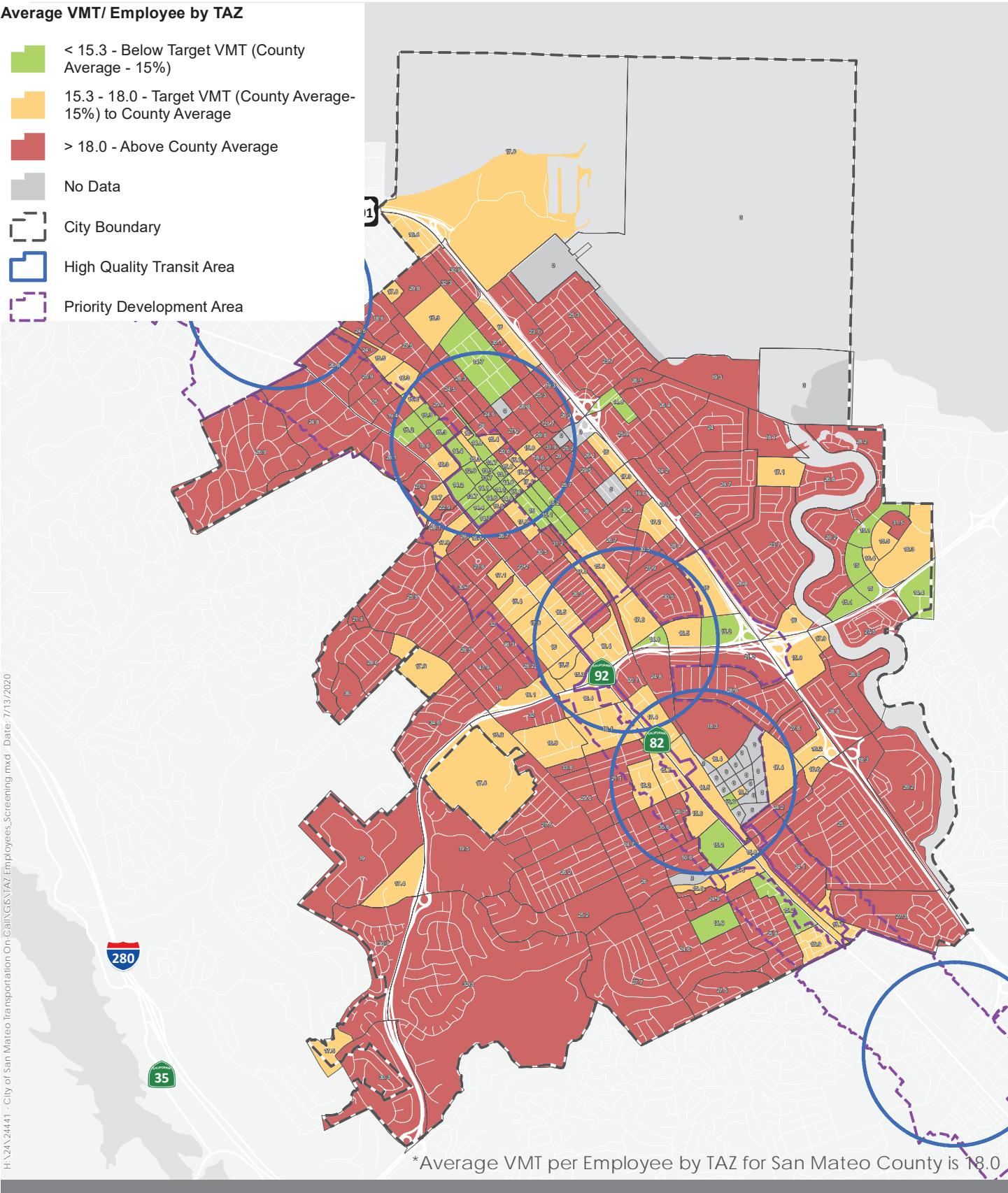
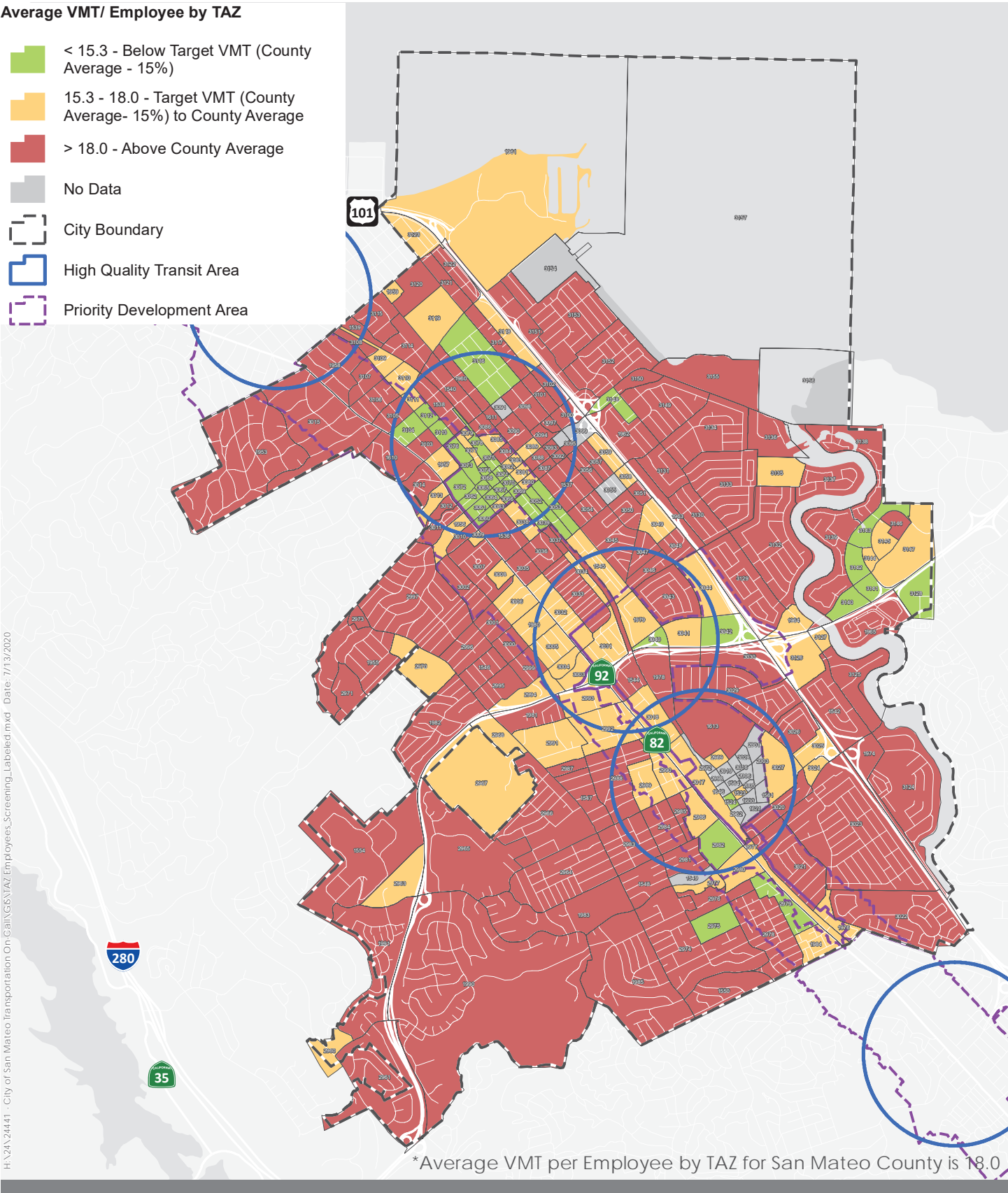


Figure 5

Average VMT/ Employee by TAZ

- < 15.3 - Below Target VMT (County Average - 15%)
- 15.3 - 18.0 - Target VMT (County Average- 15%) to County Average
- > 18.0 - Above County Average
- No Data
- City Boundary
- High Quality Transit Area
- Priority Development Area



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Section 3

Local Transportation Analysis

LOCAL TRANSPORTATION ANALYSIS

SCOPE OF STUDY

TIME PERIODS

Traffic conditions at the study intersections were analyzed for the weekday a.m. (7-9 am) and p.m. peak (4-6 pm) hours of adjacent street traffic. It is during these peak commute periods that the traffic demand on the roadway system is the greatest.

Kittelson obtained the multimodal intersection turning movement counts at three of the five study intersections from the City for the weekday a.m. (7-9 am) and p.m. (4-6 pm) peak periods when the existing project site generated trips. These intersections included: E 5th Ave/Ellsworth Avenue, E 5th Ave/B Street, and E 4th Ave/B Street. The multimodal intersection turning movement counts for E 4th Ave/Ellsworth Ave and E 5th Ave/Laurel Ave were obtained using the Streetlight data. These turning movement counts obtained from Streetlight data were adjusted so that the intersection entry and exit volumes match the adjacent counts collected at the other study intersections. After these checks were performed, it was observed that the counts obtained from Streetlight data at E 5th Ave/Laurel Ave seemed to be overestimated when compared to the adjacent intersections. Hence, counts were collected at this intersection of E 5th Ave/Laurel Ave and these collected counts were used for analyzing traffic conditions as part of this project.

Transportation conditions were evaluated for the following scenarios:

- *Existing Conditions.* Traffic volumes for the Existing Conditions were estimated using historical counts and Streetlight data, as collecting turning movement volumes at the study intersections was not recommended due to COVID-19⁴ conditions. However, due to unavailability of accurate multimodal count data at E 5th Ave/Laurel Ave, Kittelson collected counts at this one intersection.
- *Baseline (Opening Year) Conditions.* Baseline (Opening Year) traffic volumes were estimated by adding the projected volumes from approved, but not yet completed land use development and transportation projects to existing peak hour volumes for the project completion year.
- *Baseline (Opening Year) Plus Project Conditions.* Baseline (Opening Year) traffic volumes with the project were estimated by adding the additional traffic generated by the project to the approved/baseline (opening year) traffic volumes. Baseline (Opening Year) Plus Project Conditions were evaluated relative to Baseline (Opening Year) Conditions to determine the effects the proposed project would have on the Baseline (Opening Year) roadway network.
- *Cumulative Conditions.* Cumulative Conditions are represented by future traffic volumes on the roadway network. This scenario was estimated by adding a regional growth to existing traffic volumes between the existing year and future year (2040).
- *Cumulative Plus Project Conditions.* Cumulative traffic volumes with the project are estimated by adding cumulative traffic volumes to the additional traffic generated by the project. Cumulative

⁴ The COVID-19 pandemic resulted in shelter-in-place orders across the Bay Area and travel demand was significantly reduced across all modes. Travel patterns also changed substantially. These changes are the result of multiple factors such as school closures, restrictions on business operations, and an increased amount of telecommuting.

Plus Project Conditions were evaluated relative to Cumulative Conditions to determine the effects the proposed project would have on the future roadway network.

STUDY INTERSECTIONS

The following five study intersections were selected for analysis and are shown in Figure 6. Intersections with an asterisk indicate counts obtained using Streetlight data.

1. E 5th Avenue/Laurel Avenue
2. E 5th Avenue/Ellsworth Avenue
3. E 5th Avenue/B Street
4. E 4th Avenue/B Street
5. E 4th Avenue/ Ellsworth Avenue*

INTERSECTION LEVEL OF SERVICE (LOS) CRITERIA

Level of service (LOS) describes the operating conditions experienced by motorists. LOS is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions and delay, freedom to maneuver, driving comfort, and convenience. LOS A through LOS F covers the entire range of traffic operations that might occur. Motorists using a facility that operates at a LOS A experience very little delay, while those using a facility that operates at a LOS F will experience long delays. Intersection analyses for the five study intersections were conducted using the operational methodologies outlined in the Highway Capacity Manual 6th Edition (HCM 6th Edition) methodology (Transportation Research Board, Washington, D.C., 2016), calculated with Synchro 11 software.

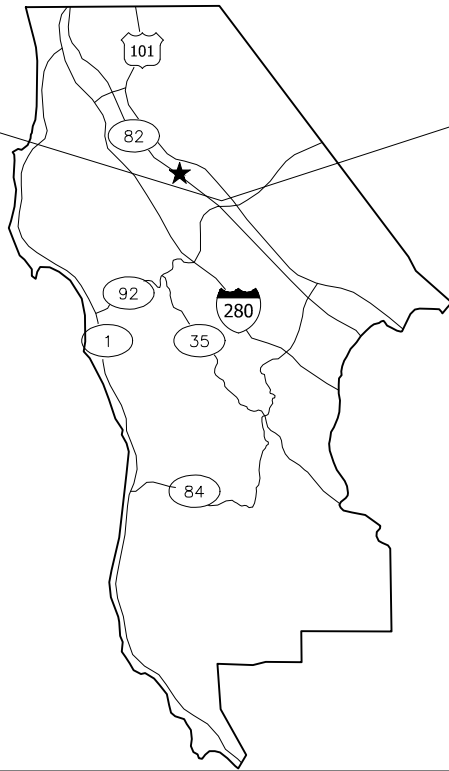
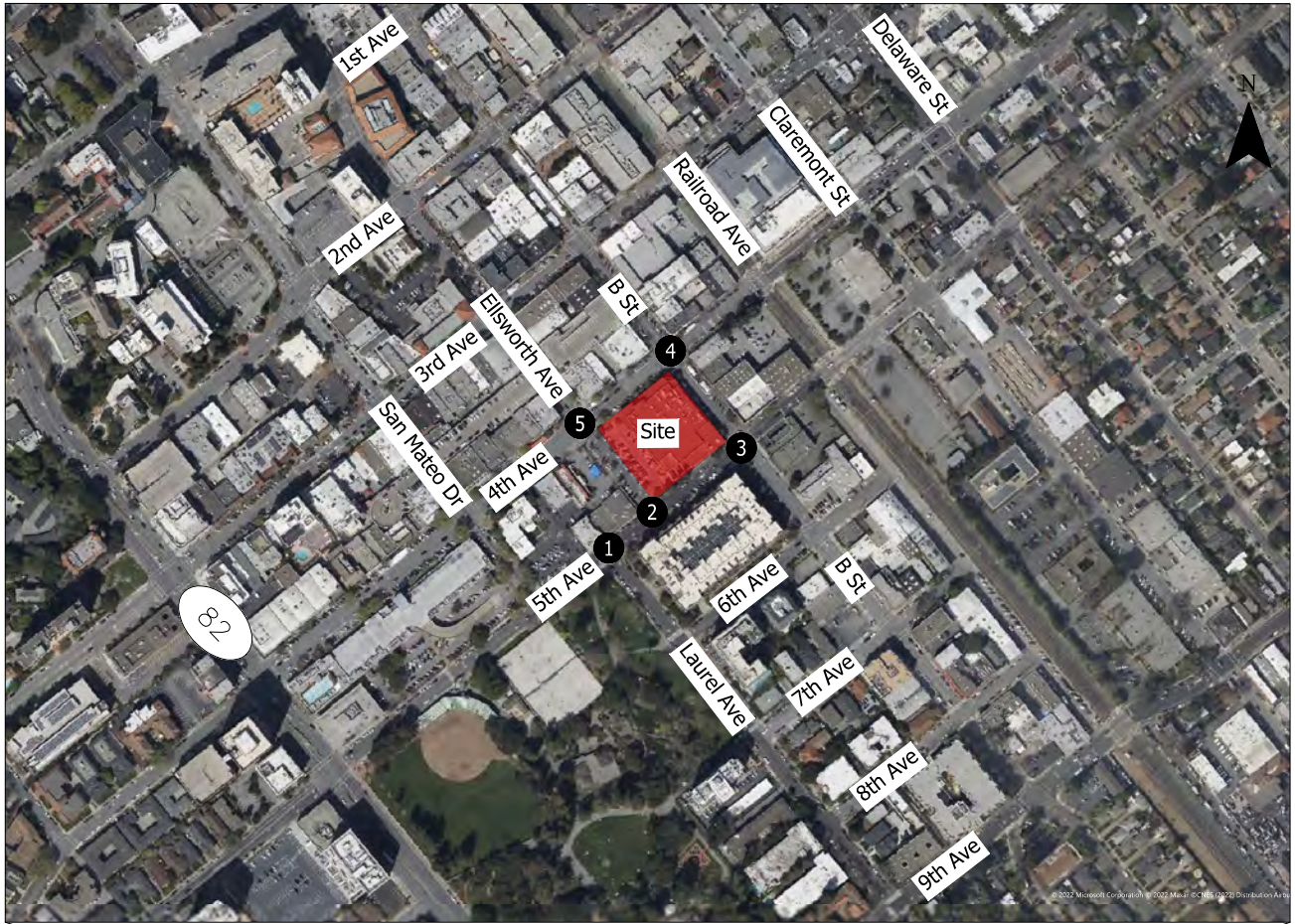
Signalized Intersections

The HCM procedure calculates a weighted average control delay in seconds per vehicle at a signalized intersection and assigns a level of service designation based upon the delay. The City of San Mateo level of service standard is mid-LOS D (delay of 45 seconds) or better for all signalized study intersections.

Unsignalized Intersections

The HCM methodology calculates a weighted average control delay in seconds per vehicle for each controlled intersection leg and for the intersection. For two-way stop-controlled intersections, the LOS for the worst approach is used as the LOS performance measure. The City of San Mateo does not have a LOS standard for unsignalized intersections as specified in the 2030 General Plan. The City adopted Transportation Impact Analysis (TIA) Guidelines in August 2020 to include LOS standards for unsignalized intersections. According to the City of San Mateo standard, unsignalized intersections should maintain a LOS no worse than LOS E.

Table 2 presents the relationship of average delay to level of service for both signalized and unsignalized intersections.



Study Intersections

Figure
6

Table 2: Level of Service Definition for Intersections

Signalized Intersection	LOS	Description of Traffic Conditions	Unsignalized Intersection
Average Delay Per Vehicle (Seconds)			Average Delay Per Vehicle (Seconds)
≤10.0	A	Free flowing. Most vehicles do not have to stop.	≤10.0
>10.0 and ≤20.0	B	Minimal delays. Some vehicles have to stop, although waits are not bothersome.	>10.0 and ≤15.0
>20.0 and ≤35.0	C	Acceptable delays. Significant numbers of vehicles have to stop because of steady, high traffic volumes. Still, many pass without stopping.	>15.0 and ≤25.0
>35.0 and ≤55.0	D	Tolerable delays. Many vehicles have to stop. Drivers are aware of heavier traffic. Cars may have to wait through more than one red light. Queues begin to form, often on more than one approach.	>25.0 and ≤35.0
>55.0 and ≤80.0	E	Significant delays. Cars may have to wait through more than one red light. Long queues form, sometimes on several approaches.	>35.0 and ≤50.0
>80.0	F	Excessive delays. Intersection is jammed. Many cars have to wait through more than one red light, or more than 60 seconds. Traffic may back up into "up-stream" intersections.	>50.0

Source: Transportation Research Board, Highway Capacity Manual 6th Edition (Washington D.C., 2016)

GENERAL PLAN LOS POLICY STANDARD

Per the City's General Plan Circulation Element Policy C 2.7 (Section E), all projects are required, at a minimum, to pay a transportation mitigation fee. The transportation mitigation fee is used to fund planned transportation improvements that are identified in the City of San Mateo Traffic Mitigation Program. The cost of the off-site improvements may be reimbursed by the City if a reimbursement program is established through the timeframe of the City of San Mateo's current Traffic Mitigation Program or at the time when the improvement was initially scheduled. In addition to paying the transportation impact fee, a development project may be required to fund off-site circulation improvements which are needed as a result of project generated traffic if:

Signalized Intersections

- The level of service at the intersection drops below mid-level LOS D (average delay of more than 45 seconds) when the project traffic is added, **and**
- An intersection that operates below its level of service standard under the base year conditions experiences an increase in delay of four or more seconds, **and**
- The needed improvement of the intersection(s) is not funded in the applicable five-year City Capital Improvement Program from the date of application approval.

Unsignalized Intersections

- a) The level of service at the intersection drops from LOS E or better to LOS F (average delay of more than 50 seconds) when the project traffic is added, and
- b) An intersection that operates below its level of service standard under the base year conditions experiences an increase in delay of four or more seconds, and
- c) The needed improvement of the intersection(s) is not funded in the applicable five-year City Capital Improvement Program from the date of application approval.

Transportation studies typically evaluate whether unsignalized intersections are functioning adequately and whether signalization is warranted using the peak-hour volume signal warrant described in the California MUTCD.

EXISTING CONDITIONS

ROADWAY NETWORK

Regional access to the project is via State Route 82 (El Camino Real), and US 101 via 4th Avenue and 5th Avenue.

State Route 82 (El Camino Real) is a four-to six lane state highway in California, serving as a major north-south corridor in the Peninsula. It extends from Interstate 880 in San Jose at the south end to Interstate 280 in San Francisco at the north end. It runs parallel to the Caltrain line along much of the route. Access to and from the project study area is provided via signalized intersections at 4th Avenue and 5th Avenue.

US 101 is a eight-to ten lane state highway in California, serving as the primary coastal route providing access to the San Francisco Bay Area. It is also the primary commuting route between San Francisco and San Jose. Access to and from the project study area is provided via interchanges at 3rd Avenue and 4th Avenue to the northeast of the project site.

4th Avenue is an east-west, three to four-lane arterial roadway extending from Dartmouth Road on the west and transitioning into J Hart Clinton Drive in the east after crossing US 101. Arterial roads link residential and commercial districts and serve shorter through traffic needs. In the vicinity of the project site, 4th Avenue has three to four lanes. The road is directly adjacent to the project site and is proposed to provide direct access to the project site.

5th Avenue is an east-west, two to three-lane arterial roadway extending from Virginia Avenue on the west and transitioning into Amphlett Boulevard in the east. Arterial roads link residential and commercial districts and serve shorter through traffic needs. In the vicinity of the project site, 5th Avenue has two lanes. The road is directly adjacent to the project site and is proposed to provide direct access.

B Street is a north-south, two-lane collector roadway extending from Tilton Ave on the north and transitioning into South Boulevard on the south. Collector roads link arterial roads to local roads and serve some through traffic needs. In the vicinity of the project site, B Street has two lanes. The road is directly adjacent to the project site and is proposed to provide direct access.

Ellsworth Avenue is a north-south, two-lane collector roadway extending from Bellevue Avenue on the north to 5th Avenue on the south. Collector roads link arterial roads to local roads and serve some through traffic needs. In the vicinity of the project site, 5th Avenue has two lanes. The road is directly adjacent to the project site and is proposed to provide direct access.

PEDESTRIAN FACILITIES AND AMENITIES

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. In the project vicinity, sidewalks exist along both sides of 4th Avenue, 5th Avenue, B Street, and one side of Ellsworth Avenue through the site, providing pedestrian access to and from the project site. Marked crosswalks with pedestrian signal heads and push buttons are provided at the B Street/4th Avenue, Ellsworth Avenue/4th Avenue, and B Street/5th Avenue intersections. The overall network of sidewalks and crosswalks in the study area has excellent connectivity and provides pedestrians with safe routes to maneuver.

BICYCLE FACILITIES AND AMENITIES

Bicycle facilities are defined by the following four classes⁵:

- **Class I** (Multi-use Path) – Provides a completely separated facility designed for the exclusive use of bicyclists and pedestrians with crossing points minimized.
- **Class II** (Bike Lane) – Provides a restricted right-of-way designated lane for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with crossflows by pedestrians and motorists permitted.
- **Class III** (Bike Route/Bicycle Boulevard) – Bike route provide signage and permanent markings on low-stress roadways to increase driver awareness of people biking. No exclusive right of way is provided. Bicycle boulevards prioritize bicycle through-travel and use traffic calming to slow vehicle traffic and maintain low motor vehicle volumes. These routes are often applied on quiet streets and through residential neighborhoods.⁶
- **Class IV** (Separated Bike Lane) – Provides a restricted right-of-way designated lane for the exclusive use of bicyclists that is separated by a vertical element to provide further separation from motor vehicle traffic.

The existing and proposed⁷ bicycle routes within the study area are described below. The existing bicycle network is shown in Figure 7.

B Street – There are currently no bicycle facilities provided on B Street through the San Mateo central business district. A buffered bike lane (Class II) is proposed along B Street from 5th Avenue south until the road transitions into South Boulevard.

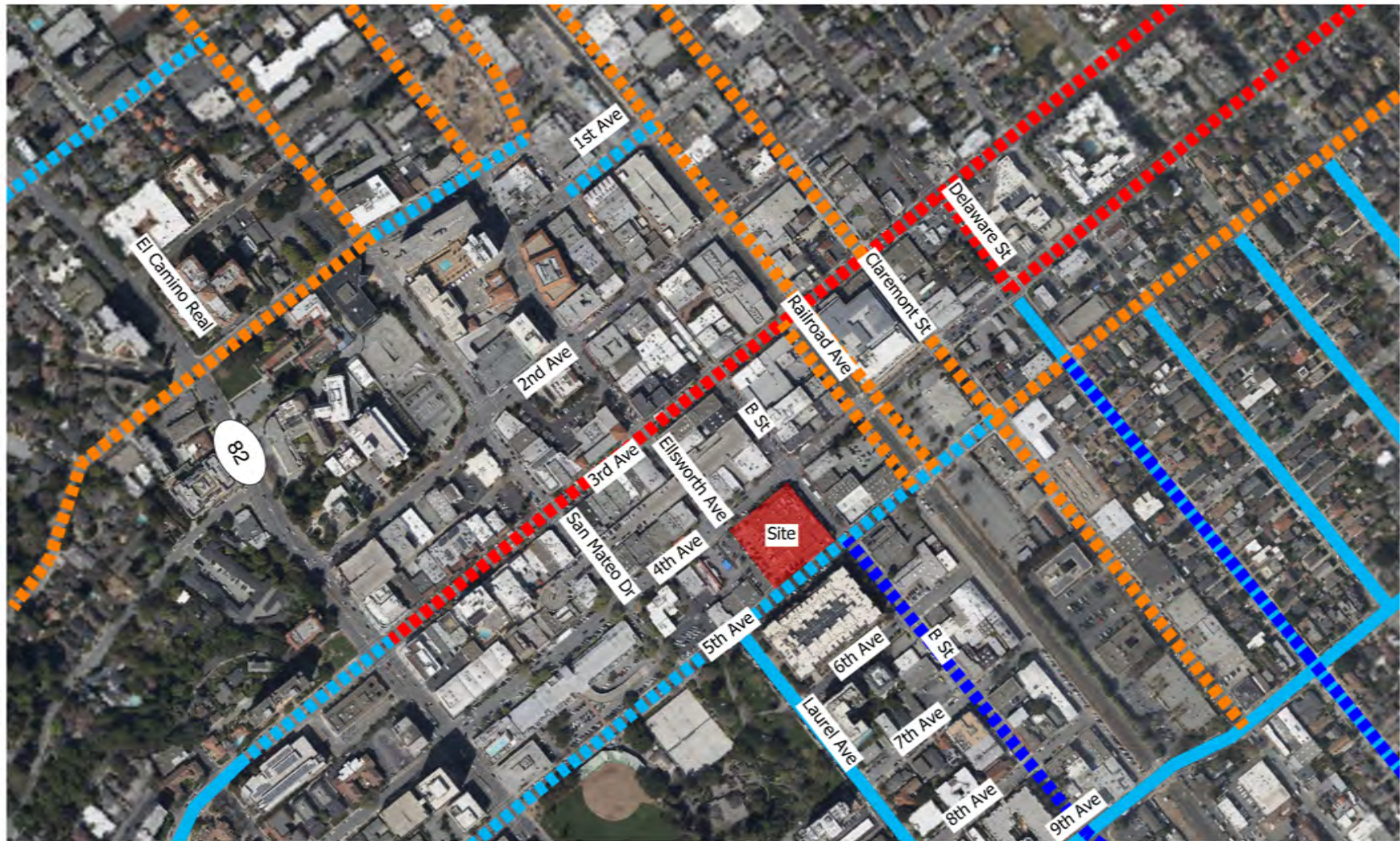
5th Avenue – There are currently no bicycle facilities provided on 5th Avenue through the San Mateo Central Business District. The 2020 Bicycle Master Plan proposes upgrading the corridor from Dartmouth Road to Claremont Street to a bike lane (Class II) and Claremont Street to Amphlett Boulevard to a bicycle boulevard (Class III).

3rd Avenue – There are currently no bicycle facilities provided on 3rd Avenue through the San Mateo Central Business District. Notably, bike lanes exist in both directions west of Dartmouth Road, but they are not connected to the central business district. The 2020 Bicycle Master Plan proposes making that connection from Dartmouth Road to El Camino Real with a bike lane (Class II) and El Camino Real to the US-101 interchange to a separated bike lane (Class IV).






⁵ As detailed in Chapter 1000 of the Highway Design Manual (Caltrans, 2015).

⁶ San Mateo Bicycle Master Plan (2020), <https://www.cityofsanmateo.org/3944/Bicycle-Master-Plan-2020>

⁷ As proposed in City of San Mateo Bicycle Master Plan, 2020.



Legend:

- | | | |
|--|---|--|
|  Existing Bike Lane (Class II) |  Proposed Separated Bike Lane (Class I) |  Proposed Bike Lane (Class II) |
|  Proposed Buffered Bike Lane (Class II) |  Proposed Bicycle Boulevard (Class III) | |

Existing and Proposed
Bicycle Network

Figure
7

Laurel Avenue – There is currently a Class II bike lane provided south of 5th Avenue on Laurel Avenue. This is notable because it is the only current existing bicycle infrastructure in close proximity to the site. The 2020 Bicycle Master Plan does not propose any upgrades or changes to the existing configuration.

TRANSIT SERVICE

The existing transit service to the study area is provided by the San Mateo County Transit District (SamTrans) and Caltrain.

SamTrans Service

The project site has five bus routes nearby (Route 397, 250, 292, 295, and ECR), operated by SamTrans with the nearest bus stops located at the intersections of 4th Avenue/Ellsworth Avenue and 4th Avenue/San Mateo Drive. Three additional bus routes (school-day only) Route 53, 55, and 59 operate in the vicinity of the project site. The bus routes that provide the peak-hour services near the project site are described in Table 3 and are shown in Figure 8. Access to transit facilities will not change with the proposed site plan.

Caltrain Service

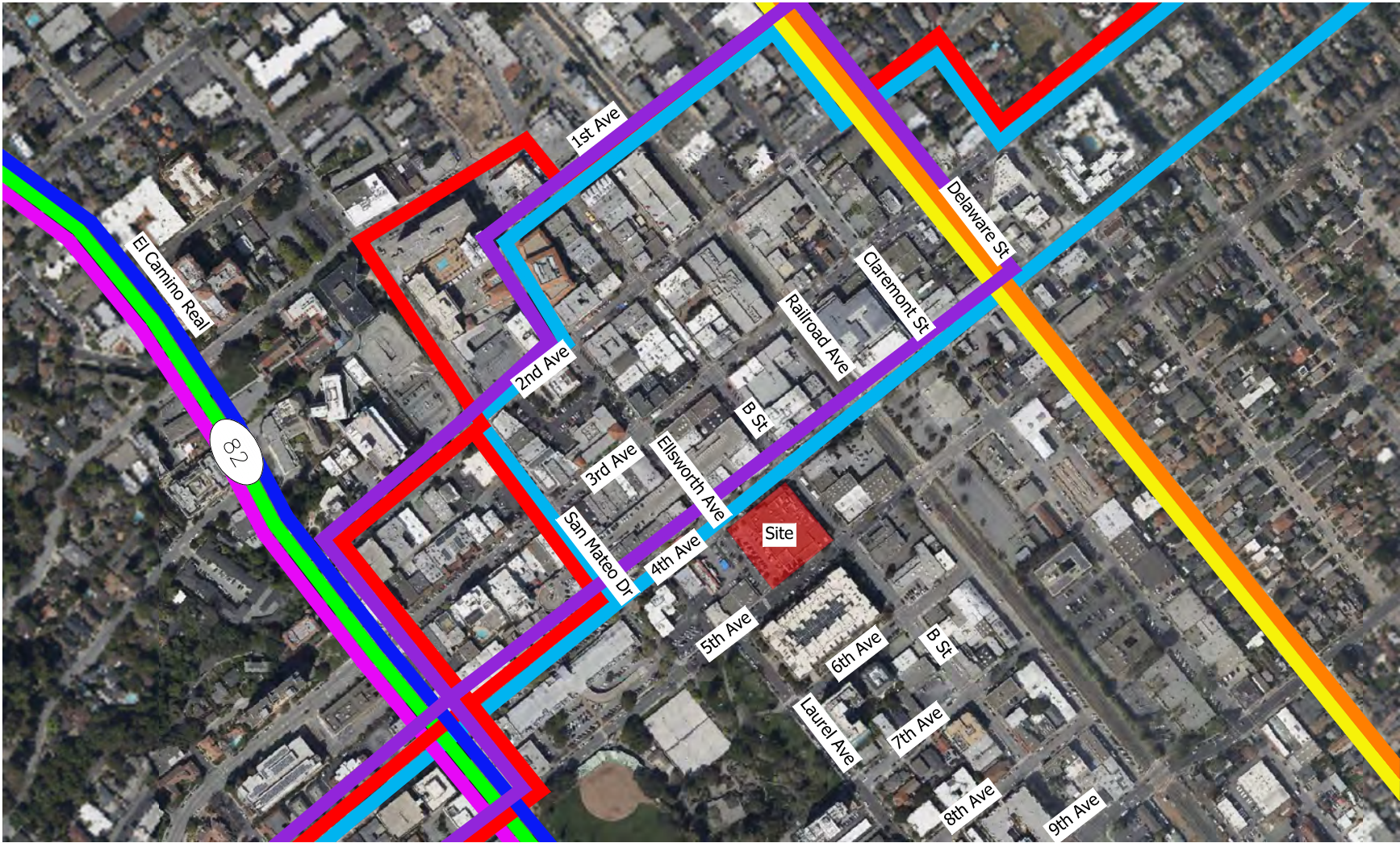
Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The project site is located approximately 0.4 miles away from the San Mateo Downtown Caltrain Station. Currently, Caltrain provides northbound and southbound service at this station at a half-hour frequency during the weekday and weekend AM and PM commute hours, midday, and at nights. Per the City of San Mateo Rail Corridor Transit-Oriented Development Plan⁸, the proposed project site is an ideal location for a transit village.

⁸San Mateo Rail Corridor Transit-Oriented Development Plan, 2005. <https://www.cityofsanmateo.org/1899/Rail-Corridor-Transit-Oriented-Development> , Accessed 2022.

Table 3: Existing Transit Service

Operator	Route	Description	Operating Hours	Peak-Hour Headway	Closest Bus Stop
SamTrans	53	Borel Middle School – Peninsula/Humboldt (School-day only)	7:30 AM – 8:00 AM, 1:00 PM – 1:30 PM (W), and 3:00 PM – 3:30 PM (M,T,TH,F)	N/A	3 rd Avenue/Delaware Street
SamTrans	55	Borel Middle School – Clark/El Camino Real (School-day only)	7:30 AM – 8:00 AM, 1:00 PM – 1:30 PM (W), and 3:00 PM – 3:30 PM (M,T,TH,F)	N/A	4 th Avenue/El Camino Real
SamTrans	59	Aragon High School – Hillsdale/Norfolk (School-day only)	7:30 AM – 8:15 AM, 3:45 PM – 4:15 PM (M), 3:00 PM – 3:30 PM (T,TH), and 4:00 PM – 4:30 PM (W,F)	N/A	4 th Avenue/Ellsworth Avenue
SamTrans	250	5 th /El Camino - College of San Mateo	5:30 AM – 11:00 PM	30 minutes	4 th Avenue/San Mateo Drive
SamTrans	292	San Francisco – Hillsdale Mall – Serves SF Airport	24 hours	30 minutes	3 rd Avenue/Delaware Street
SamTrans	295	San Mateo Caltrain – Redwood City Transit Center	6:30 AM – 5:45 PM	120 minutes	4 th Avenue/Ellsworth Avenue
SamTrans	397	San Francisco – Palo Alto Transit Center – Serves SF Airport	12:45 AM – 6:30 AM	60 minutes	2 nd Avenue/El Camino Real
SamTrans	ECR	El Camino Real – Palo Alto Transit Center to Daly City BART Station	24 hours	15 minutes	2 nd Avenue/El Camino Real
Caltrain	-	Northbound: Gilroy to San Francisco	5:30 AM – 12:15 AM	30 minutes	San Mateo Station
Caltrain	-	Southbound: San Francisco to Gilroy	5:30 AM – 12:40 AM	30 minutes	San Mateo Station

H:\24\24837 - San Mateo On-Call TIA\009 - San Mateo Draeger's (222 E 4th Ave) TIA\report\figs\24837.009-Figures.dwg Aug 29, 2022 - 5:05pm - dbowers Layout Tab: Existing Transit Services



Legend:

- | | | |
|-----------|----------|-----------|
| Route 55 | ECR | Route 292 |
| Route 397 | Route 59 | Route 295 |
| Route 250 | Route 53 | |

Existing Transit Services

Figure
8

EMERGENCY VEHICLE ACCESS

The nearest fire station (San Mateo Fire Department Station #21) is located approximately 0.2 miles west of the project site at 120 S Ellsworth Ave. The proposed plans indicate that the bulb outs at each intersection surrounding the project site can accommodate the turning radius of a fire truck.

INTERSECTION LEVEL OF SERVICE

The estimated traffic volumes due to COVID-19 conditions for four of the study intersections and collected traffic counts at Laurel Avenue/5th Avenue, lane configurations, and traffic controls for each study intersection were used to assess the Existing Conditions LOS and delay. The projected turning movement volumes for each peak hour under Existing Conditions are provided in Figure 10 and Figure 11. Detailed calculation worksheets for the Existing Conditions are provided in Appendix B. These delay and LOS values can be compared to the City of San Mateo thresholds outlined in the Circulation Element of the 2030 General Plan, discussed in the previous section.

As mentioned in the previous section, intersection analyses for the four study intersections were conducted using the operational methodologies outlined in the Highway Capacity Manual (HCM) 6th Edition methodology, calculated with Synchro 11 software.

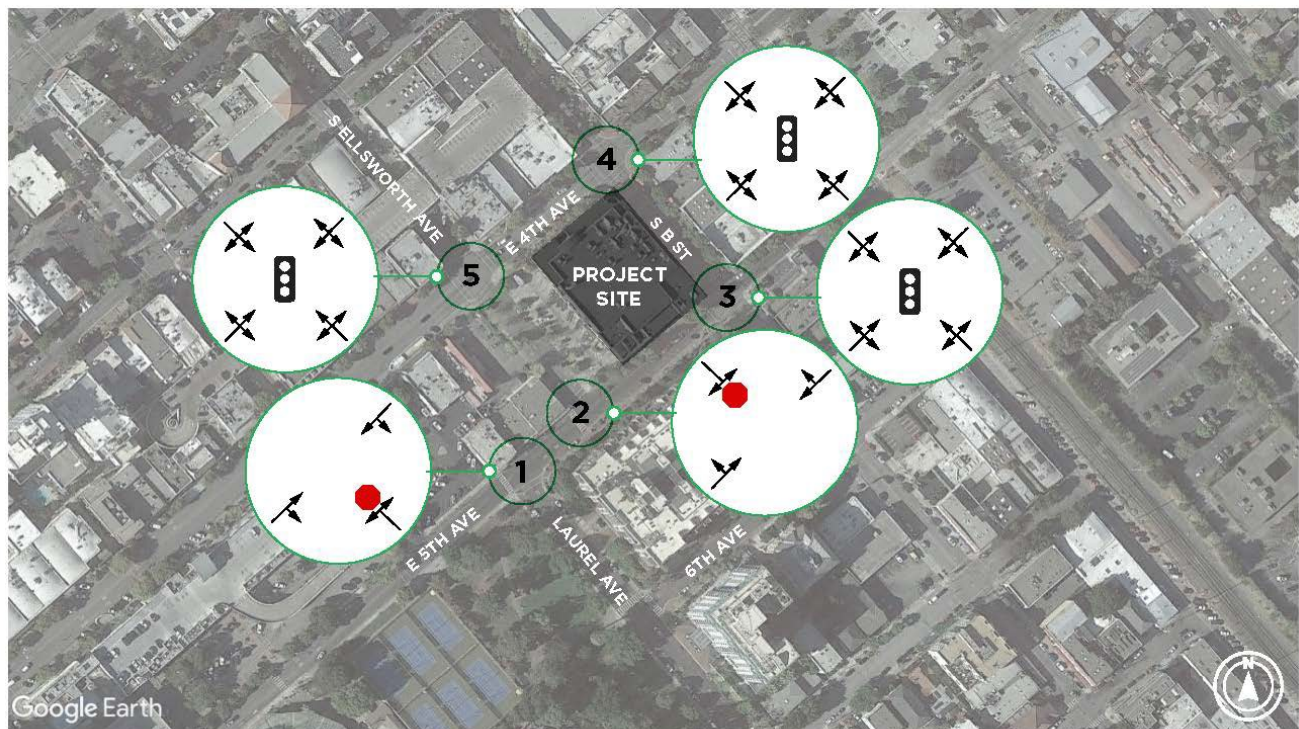
Table 4 demonstrates that all intersections operate to the City's standards under existing conditions for both the AM and PM peak hours.

Table 4: Existing Conditions Intersection Operations Results

#	Location	Control	AM		PM	
			Delay	LOS	Delay	LOS
1	E 5 th Avenue/Laurel Avenue	TWSC	15.1	C	15.3	C
2	E 5 th Avenue/Ellsworth Avenue	TWSC	12.2	B	12.7	B
3	E 5 th Avenue/B Street	Signal	14.2	B	14.9	B
4	E 4 th Avenue/B Street	Signal	9.7	A	9.5	A
5	E 4 th Avenue/Ellsworth Avenue	Signal	10.1	B	12.4	B

Notes: Bold lettering indicates an intersection that does not meet the City's minimum acceptable design level of service (LOS D for Signalized intersections); TWSC = Two-Way Stop Control; AM = weekday a.m. peak hour; PM = weekday p.m. peak hour; LOS = Level of Service; Delay reported in seconds per vehicle; No = intersection number. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022

Figure 9: Existing and Baseline (Opening Year) Lane Configurations and Traffic Control at Study Intersections



SAN MATEO LANE CONFIGURATION AND TRAFFIC CONTROL

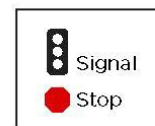
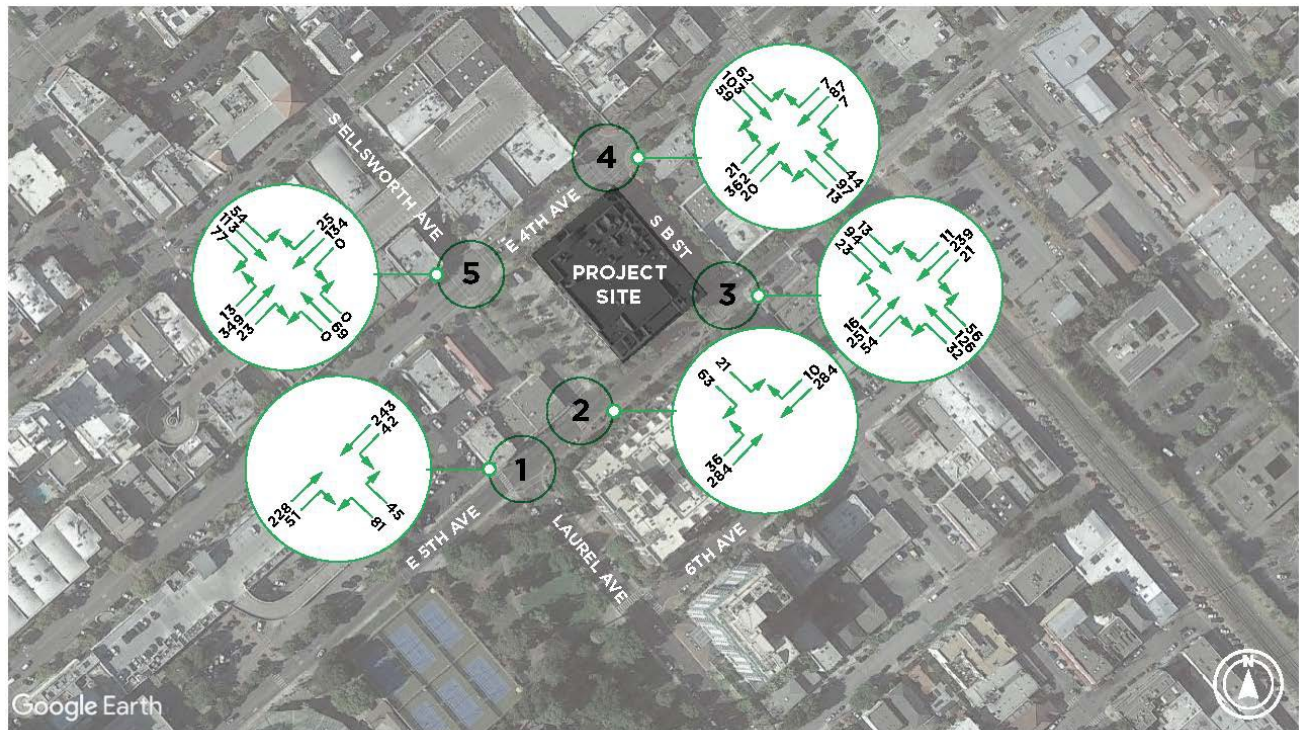
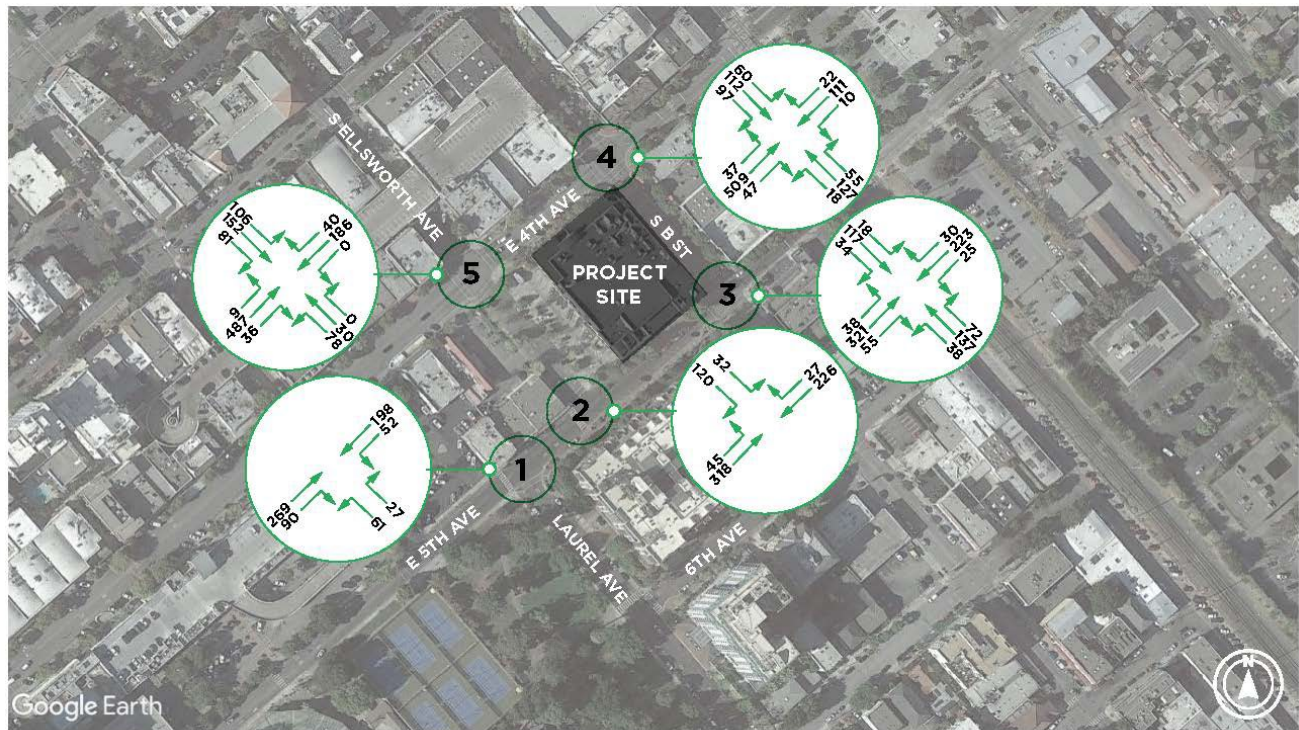


Figure 10: Existing Conditions Peak Hour (AM) Turning Movement Volumes



SAN MATEO EXISTING VOLUMES AM

Figure 11: Existing Conditions Peak Hour (PM) Turning Movement Volumes



SAN MATEO EXISTING VOLUMES PM

BASELINE (OPENING YEAR) CONDITIONS

This section presents Baseline (Opening Year) traffic conditions, which are defined as conditions just prior to the completion of the proposed project. Traffic volumes for the Baseline (Opening Year) Conditions comprise volumes from existing traffic counts and traffic generated by other approved developments in the project vicinity.

TRANSPORTATION NETWORK

The Baseline (Opening Year) Conditions analysis assumes the same lane configuration and traffic control at all the study intersections as the existing conditions, as shown in Figure 9.

INTERSECTION LEVEL OF SERVICE

Traffic volumes for the Baseline (Opening Year) Conditions were calculated using the existing estimated traffic volumes, shown in Figure 10 and Figure 11, plus the traffic volumes generated by new developments within the site vicinity. Through conversations with the city, the new developments added to the existing volumes are as follows:

- 406 E 3rd Avenue Office & Residential Mixed-Use Development
- 480 E 4th Avenue Residential Development
- 405 E 4th Avenue (mixed-use office and residential)

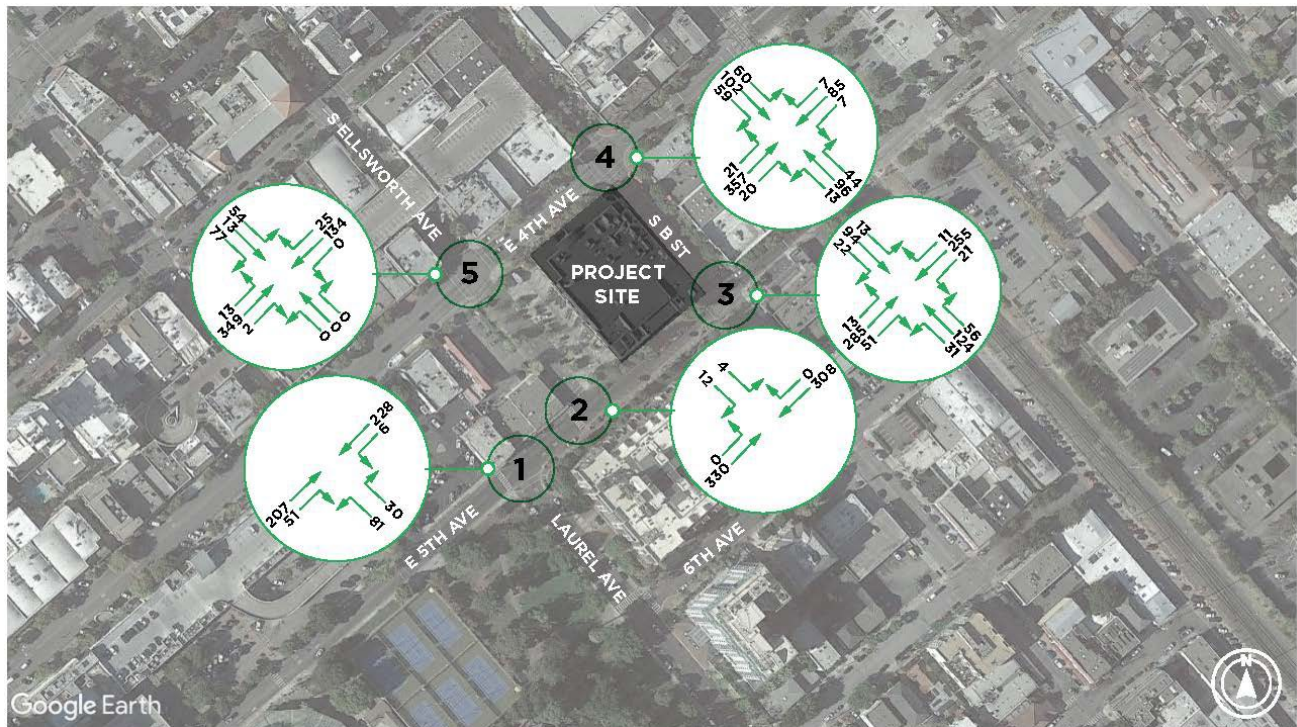
The projected turning movement volumes for each peak hour under Baseline (Opening Year) Conditions are provided in Figure 12 and Figure 13. Table 5 shows the Baseline (Opening Year) intersection operations for the AM and PM peak hours, respectively. Detailed calculation worksheets for the Baseline (Opening Year) Conditions are provided in Appendix C. All intersections operate to the City's standards under Baseline (Opening Year) conditions under both the AM and PM peak hours.

Table 5: Baseline (Opening Year) Conditions Intersection Operations Results

#	Location	Control	AM		PM	
			Delay	LOS	Delay	LOS
1	E 5 th Avenue/Laurel Avenue	TWSC	13.3	B	13.0	B
2	E 5 th Avenue/Ellsworth Avenue	TWSC	11.3	B	11.2	B
3	E 5 th Avenue/B Street	Signal	14.3	B	15.3	B
4	E 4 th Avenue/B Street	Signal	9.7	A	10.2	B
5	E 4 th Avenue/Ellsworth Avenue	Signal	7.1	A	9.2	A

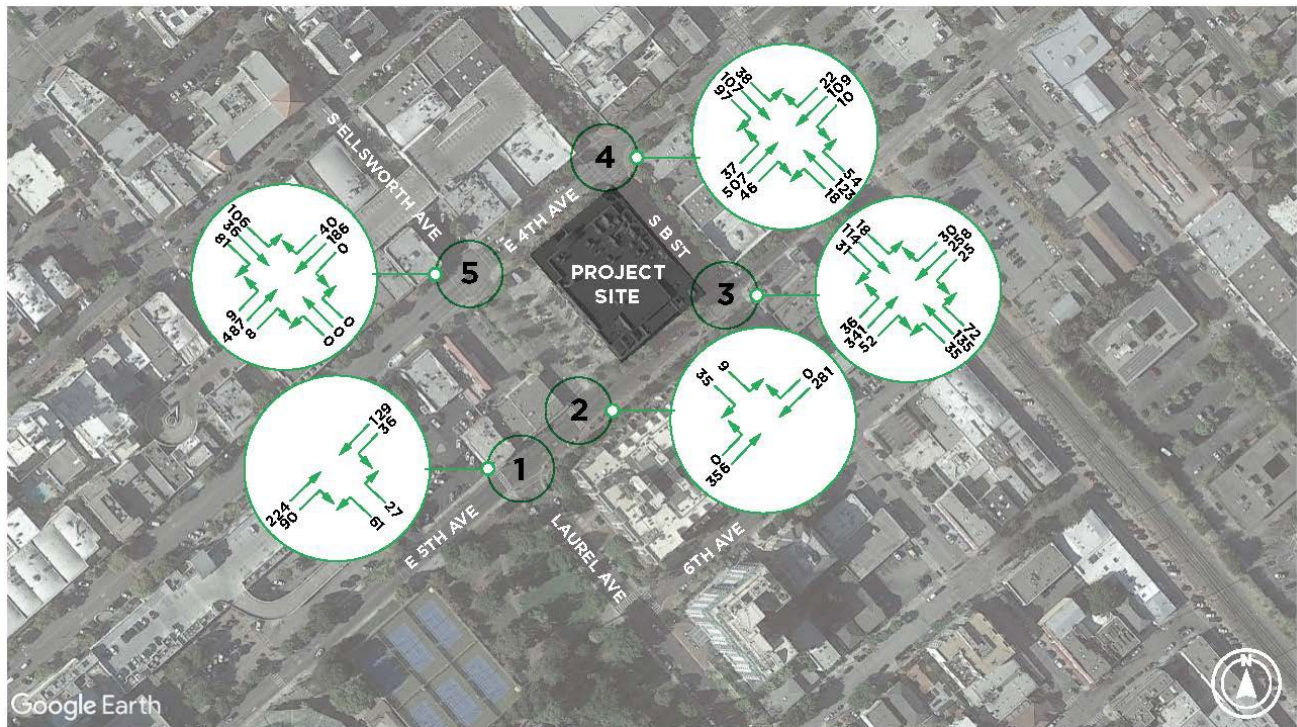
Notes: Bold lettering indicates an intersection that does not meet the City's minimum acceptable design level of service (LOS D for Signalized intersections); TWSC = Two-Way Stop Control; AM = weekday a.m. peak hour; PM = weekday p.m. peak hour; LOS = Level of Service; Delay reported in seconds per vehicle; No = intersection number. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022

Figure 12: Baseline (Opening Year) Conditions Peak Hour (AM) Turning Movement Volumes



SAN MATEO BASELINE (OPENING YEAR) VOLUMES AM

Figure 13: Baseline (Opening Year) Conditions Peak Hour (PM) Turning Movement Volumes



SAN MATEO BASELINE (OPENING YEAR) VOLUMES PM

PROJECT TRAVEL DEMAND

TRIP GENERATION

Trip generation is a key consideration for determining local effects of the project on the transportation network. Trip generation rates published in the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition were used to estimate the number of trips the mixed-use proposed project would generate. ITE trip estimates are tied to specific land use codes. The ITE land use codes found to be most applicable to the Project are listed below.

- Supermarket (ITE 850)
- General Office Building (ITE 710)
- Affordable Housing (ITE 223)

In addition, this Project is assumed to be in the '**Dense Multi-Use Urban**' context, considered by ITE to be an area that has diverse and interacting complementary land uses with good pedestrian connectivity, and convenient and frequent transit service. This is consistent with the Transit Oriented Development overlay and CBD zoning for the project site for which the San Mateo Municipal code promotes mixed-uses and pedestrian activity.

As summarized in Table 6, the proposed project is estimated to generate 169 vehicle trips (120 inbound, 49 outbound) during the weekday AM peak hour and 201 vehicle trips (70 inbound, 131 outbound) during the weekday PM peak hour. The existing Draeger's supermarket is estimated to generate 304 vehicle trips (167 inbound, 137 outbound) during the weekday AM peak hour and 432 vehicle trips (216 inbound, 216 outbound) during the weekday PM peak hour. The proposed project generates less AM and PM peak hour trips when compared to the AM and PM peak hour trips currently being generated by the existing Draeger's supermarket.

TRIP DISTRIBUTION AND ASSIGNMENT

The vehicle trip distribution assumptions are based on the existing counts and proximity to the major arterials, state routes, and freeways. As noted above, the proposed project would generate less peak hour trips with a reduction of 135 trips in the morning peak hour and 231 trips in the afternoon peak hour when compared to the trips generated from the existing site. The driveways for the existing site are situated on Ellsworth Avenue, and the driveway for the proposed project site is situated on 5th Avenue. Vehicle traffic going to/from the existing and proposed project site are distributed at each intersection according to the turning movement proportions consistent with the existing counts and the vehicle trip distribution percentages are determined for AM and PM peak hour. The complete project travel demand memorandum submitted to the City is provided in Appendix A.

Table 6: Project Trip Generation

Land Use	Size	Weekday Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Proposed Project								
Retail (Supermarket)	17.6 KSF	1,891	48	40	88	82	82	164
Office Space	104.7 KSF	1,208	77	11	88	15	76	91
Affordable Housing	10 DU	38	1	4	5	2	2	4
Internal Capture		-233	-6	-6	-12	-11	-11	-22
Pass-by reduction (24% PM only)		0	0	0	0	-18	-18	-36
Total Proposed Project Trips		2,904	120	49	169	70	131	201
Existing Project								
Retail (Supermarket)	61 KSF	6,549	167	137	304	284	284	568
Pass-by reduction (24% PM only)		0	0	0	0	-68	-68	-136
Total Existing Trips		6,549	167	137	304	216	216	432
Net New Project Trips		-3,645	-47	-88	-135	-146	-84	-231

Updated square footage for the retail portion of the proposed project from 104.7 KSF to 104.5 KSF did not change the proposed project trips generated.

BASELINE PLUS PROJECT CONDITIONS

INTERSECTION LEVEL OF SERVICE

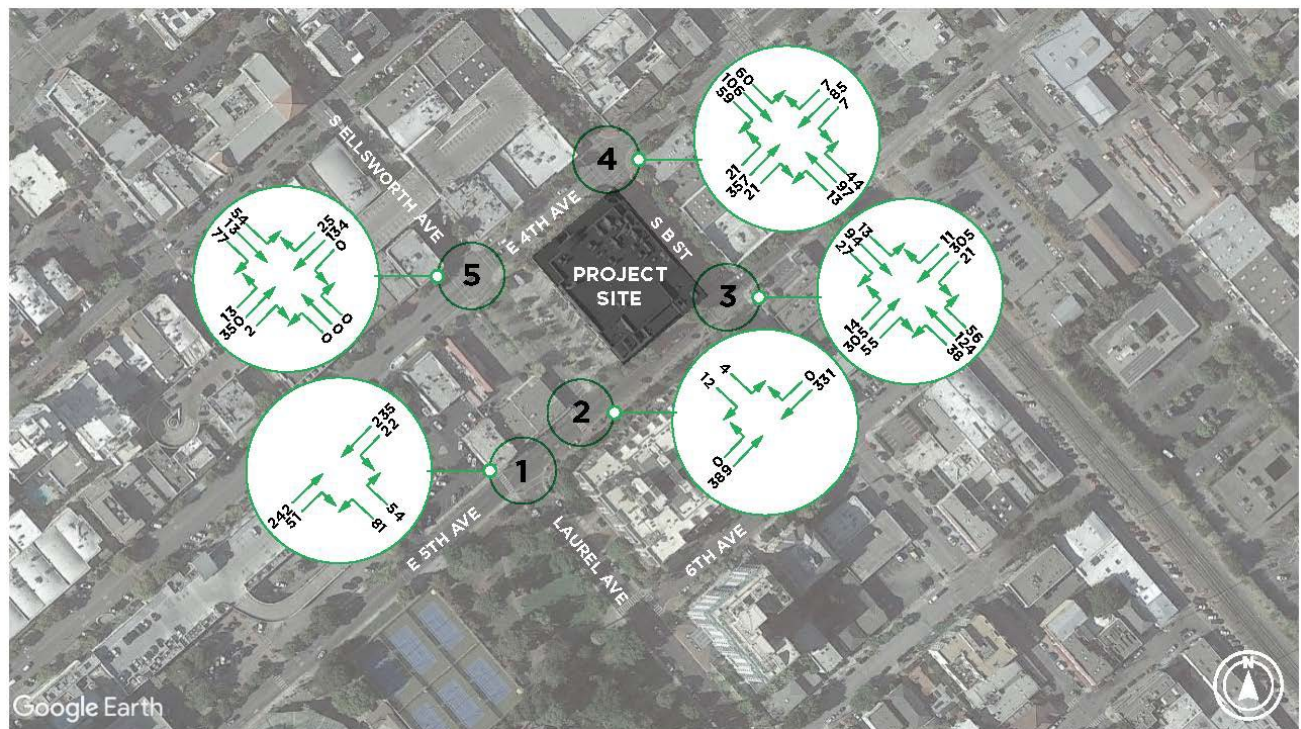
Traffic volumes for the Baseline (Opening Year) Plus Project Conditions were developed by combining the Baseline estimated traffic volumes with the project only volumes. The resulting Baseline Plus Project turning movement volumes are shown in Figure 14 and Figure 15. Table 7 shows the Baseline Plus Project intersection operations for the AM and PM peak hours, respectively. Detailed calculation worksheets are provided in Appendix D. All intersections operate to the City's standards under Baseline Plus Project conditions under both the AM and PM peak hours.

Table 7: Baseline (Opening Year) Plus Project Conditions Intersection Operations Results

#	Location	Control	AM		PM	
			Delay	LOS	Delay	LOS
1	E 5th Avenue/Laurel Avenue	TWSC	14.4	B	14.3	B
2	E 5th Avenue/Ellsworth Avenue	TWSC	11.7	B	11.9	B
3	E 5th Avenue/B Street	Signal	14.6	B	15.6	B
4	E 4th Avenue/B Street	Signal	9.7	A	10.3	B
5	E 4th Avenue/Ellsworth Avenue	Signal	7.1	A	9.2	A

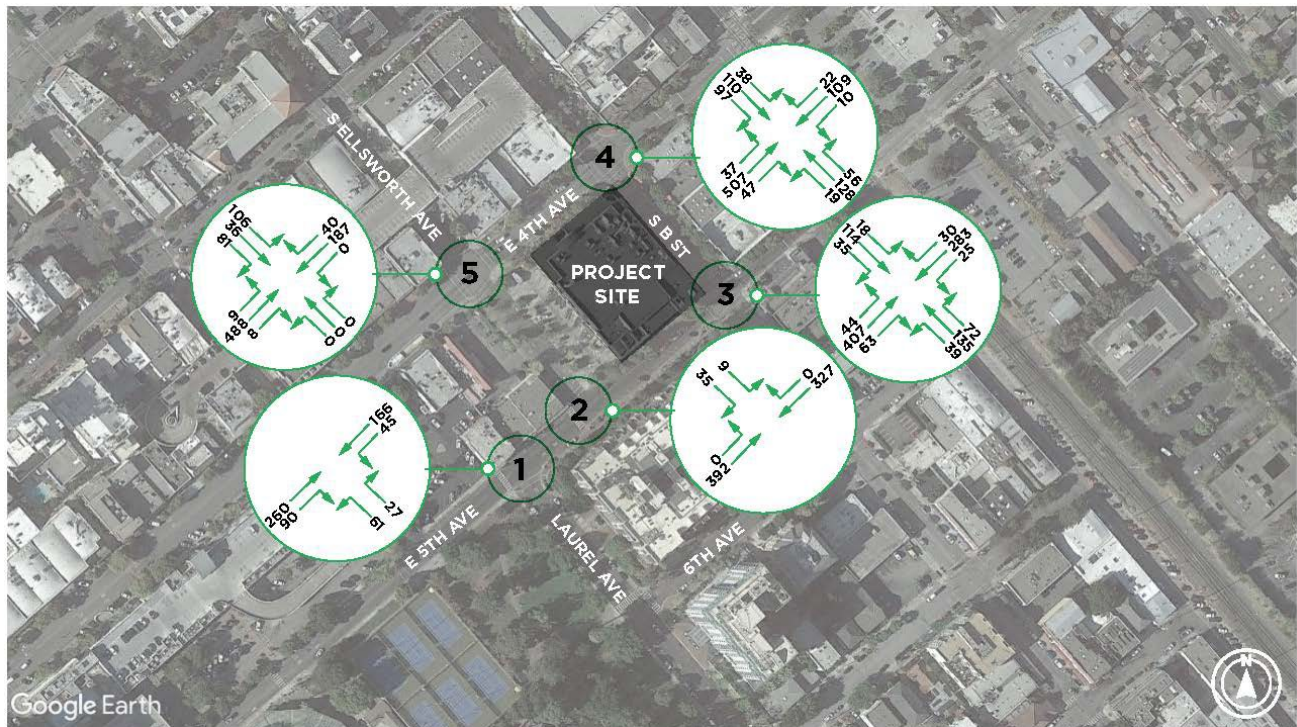
Notes: Bold lettering indicates an intersection that does not meet the City's minimum acceptable design level of service (LOS D for Signalized intersections); TWSC = Two-Way Stop Control; AM = weekday a.m. peak hour; PM = weekday p.m. peak hour; LOS = Level of Service; Delay reported in seconds per vehicle; No = intersection number. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022

Figure 14: Baseline (Opening Year) Plus Project Conditions Peak Hour (AM) Turning Movement Volumes



SAN MATEO BASELINE (OPENING YEAR) PLUS VOLUMES AM

Figure 15: Baseline (Opening Year) Plus Project Conditions Peak Hour (PM) Turning Movement Volumes



SAN MATEO BASELINE PLUS (OPENING YEAR) VOLUMES PM

CUMULATIVE CONDITIONS

This section presents the anticipated Cumulative conditions for the study intersections for the year 2040 and the effect the addition of the project trips would have on them.

LAND USE DEVELOPMENT AND TRANSPORTATION NETWORK CHANGES

The C/CAG San Mateo County Travel Demand Model was used to develop the future volume forecast for Cumulative Conditions. The model includes future development throughout the region. The 2040 cumulative forecasts are consistent with regional growth totals projected by the Association of Bay Area Governments (ABAG) Plan Bay Area⁹. Therefore, the traffic forecasts reflect traffic reflecting both growth in 222 East 4th Avenue mixed use project and increases in traffic volumes on State Route 82 and US 101 due to regional growth. Base year (Year 2019) and future year (Year 2040) forecasts were extracted from the model and linearly interpolated to develop growth between the estimated existing traffic counts (2019) and the current model horizon year (2040). The intersection lane configurations under cumulative conditions were assumed to be the same as described under the existing conditions.

INTERSECTION LEVEL OF SERVICE

The projected turning movement volumes for each peak hour under Cumulative Conditions are provided in Figure 16 and Figure 17. Based on these volumes and lane configurations, the cumulative operations at the study intersections are shown in Table 8. Detailed calculation worksheets for the Cumulative Conditions are provided in Appendix E. All intersections operate to the City's standards under Cumulative conditions under both the AM and PM peak hours.

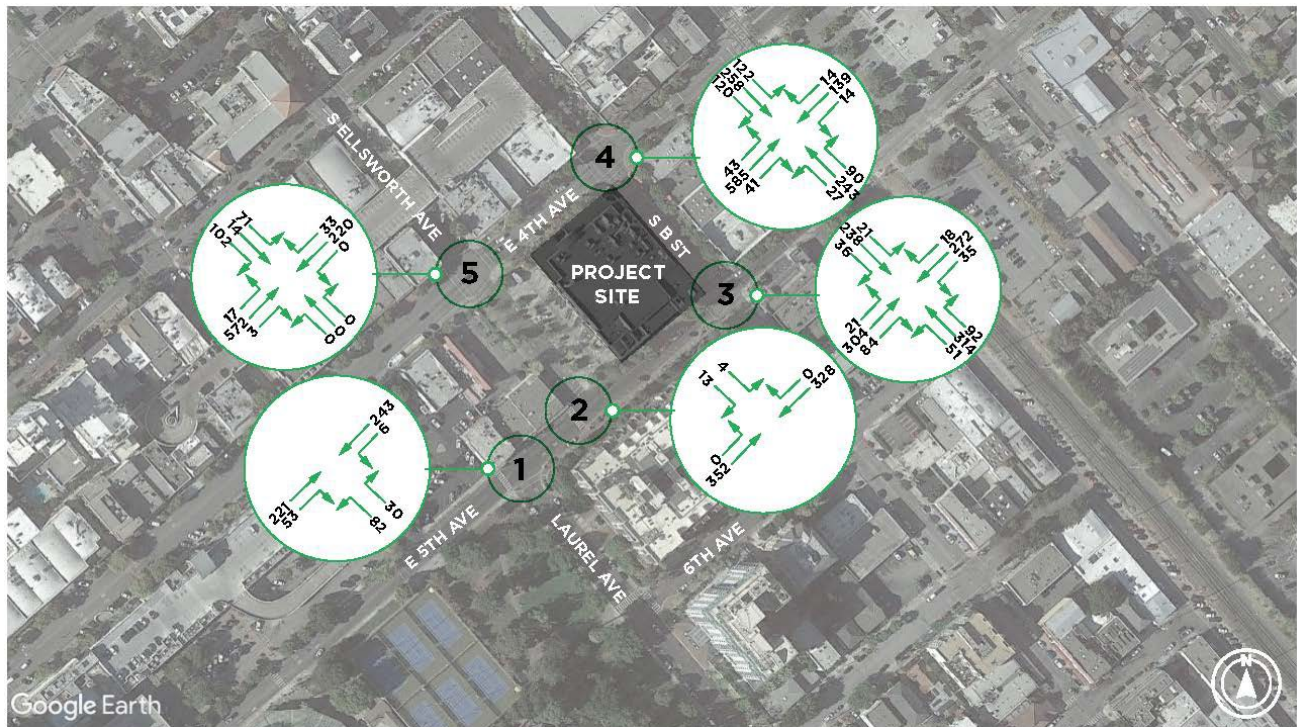
Table 8: Cumulative Conditions Intersection Operations Results

#	Location	Control	AM		PM	
			Delay	LOS	Delay	LOS
1	E 5 th Avenue/Laurel Avenue	TWSC	13.7	B	13.5	B
2	E 5 th Avenue/Ellsworth Avenue	TWSC	11.5	B	11.7	B
3	E 5 th Avenue/B Street	Signal	11.5	B	14.1	B
4	E 4 th Avenue/B Street	Signal	10.8	B	11.5	B
5	E 4 th Avenue/Ellsworth Avenue	Signal	7.6	A	10.7	B

Notes: Bold lettering indicates an intersection that does not meet the City's minimum acceptable design level of service (LOS D for Signalized intersections); TWSC = Two-Way Stop Control; AM = weekday a.m. peak hour; PM = weekday p.m. peak hour; LOS = Level of Service; Delay reported in seconds per vehicle; No = intersection number. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022

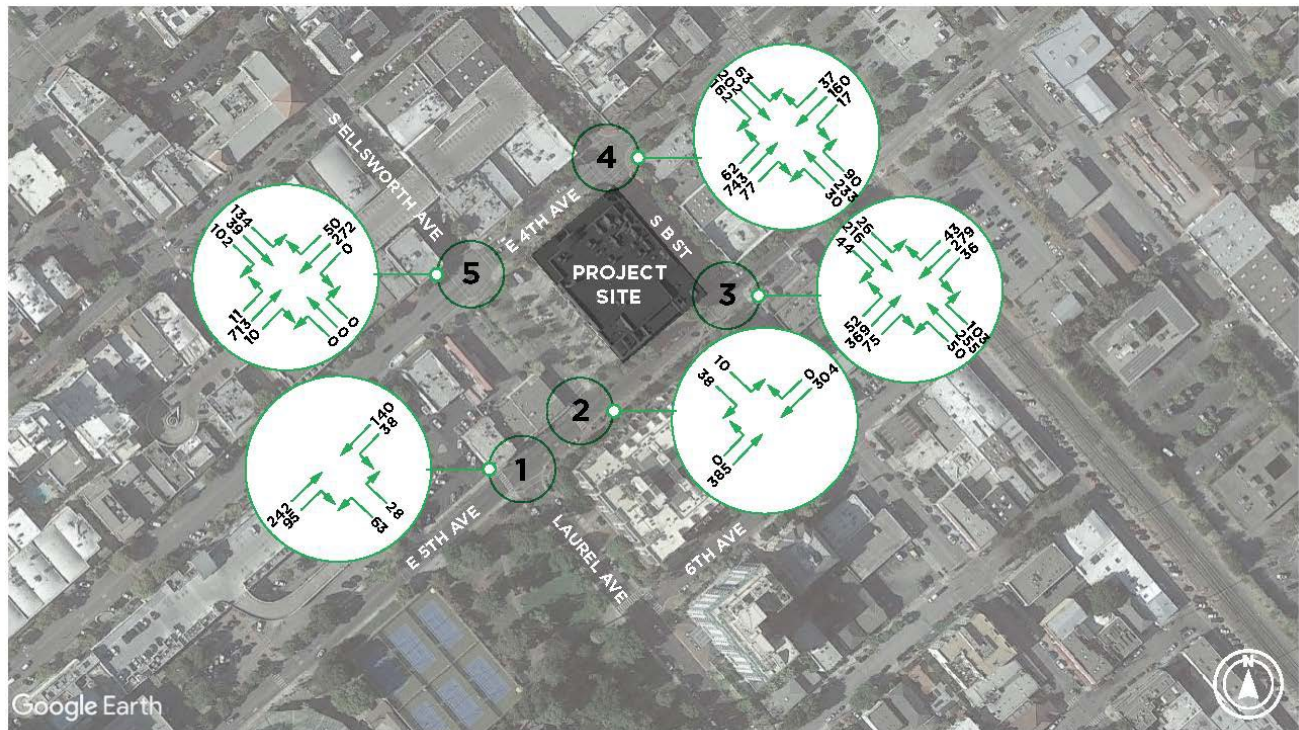
⁹ <https://mtc.ca.gov/our-work/plans-projects/plan-bay-area-2040>

Figure 16: Cumulative Conditions Peak Hour (AM) Turning Movement Volumes



SAN MATEO CUMULATIVE VOLUMES AM

Figure 17: Cumulative Conditions Peak Hour (PM) Turning Movement Volumes



SAN MATEO CUMULATIVE VOLUMES PM

CUMULATIVE PLUS PROJECT CONDITIONS

This section discusses the effect of proposed project on traffic operations under Cumulative Conditions. Traffic volumes for the Cumulative Plus Project Conditions were developed using the same additive approach used for the Baseline (Opening Year) Plus Project volumes.

INTERSECTION LEVEL OF SERVICE

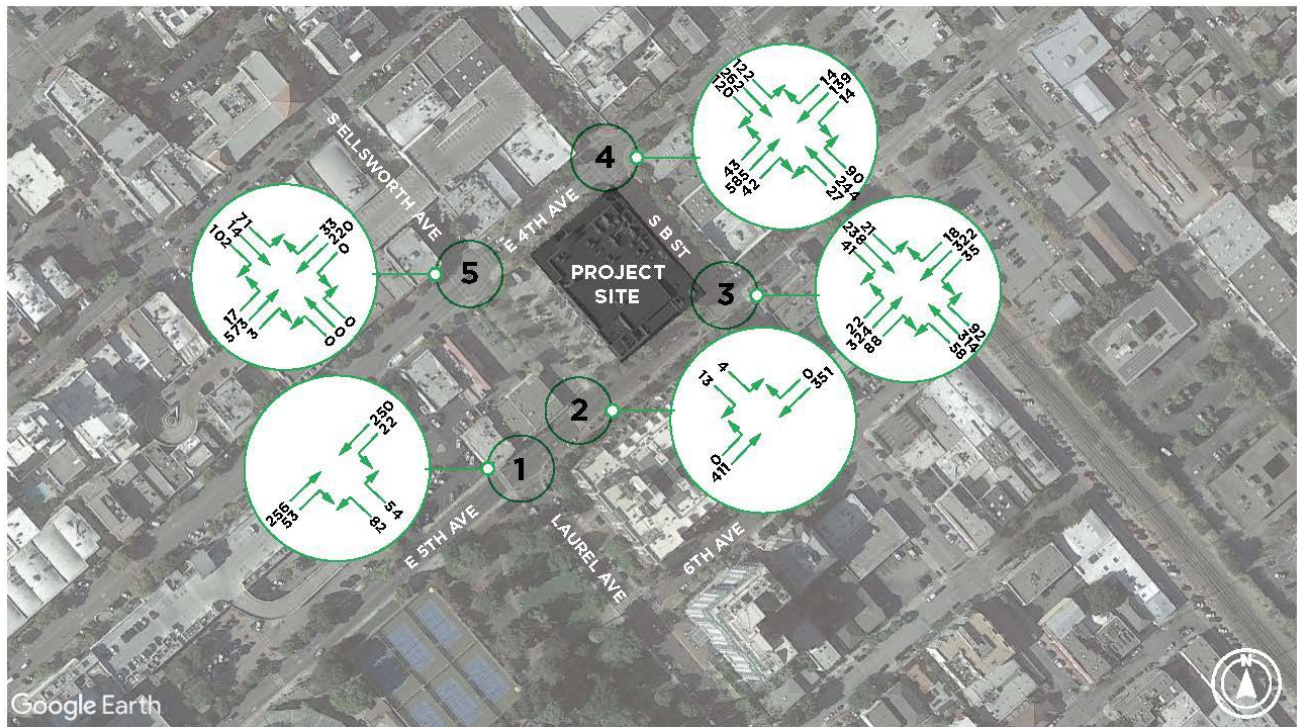
Based on these volumes and lane configurations, the Cumulative Plus Project volumes are shown in Figure 18 and Figure 19 and the operations at the study intersections are shown in Table 9. Detailed calculation worksheets for the Cumulative Plus Project Conditions are provided in Appendix F. Based on the significance criteria previously described the proposed project would not cause operational deficiencies at any of the study intersections.

Table 9: Cumulative Plus Project Intersection Operations Results

#	Location	Control	AM		PM	
			Delay	LOS	Delay	LOS
1	E 5 th Avenue/Laurel Avenue	TWSC	15.0	C	15.0	C
2	E 5 th Avenue/Ellsworth Avenue	TWSC	12.0	B	12.3	B
3	E 5 th Avenue/B Street	Signal	11.9	B	14.8	B
4	E 4 th Avenue/B Street	Signal	11.0	B	11.7	B
5	E 4 th Avenue/Ellsworth Avenue	Signal	7.6	A	10.7	B

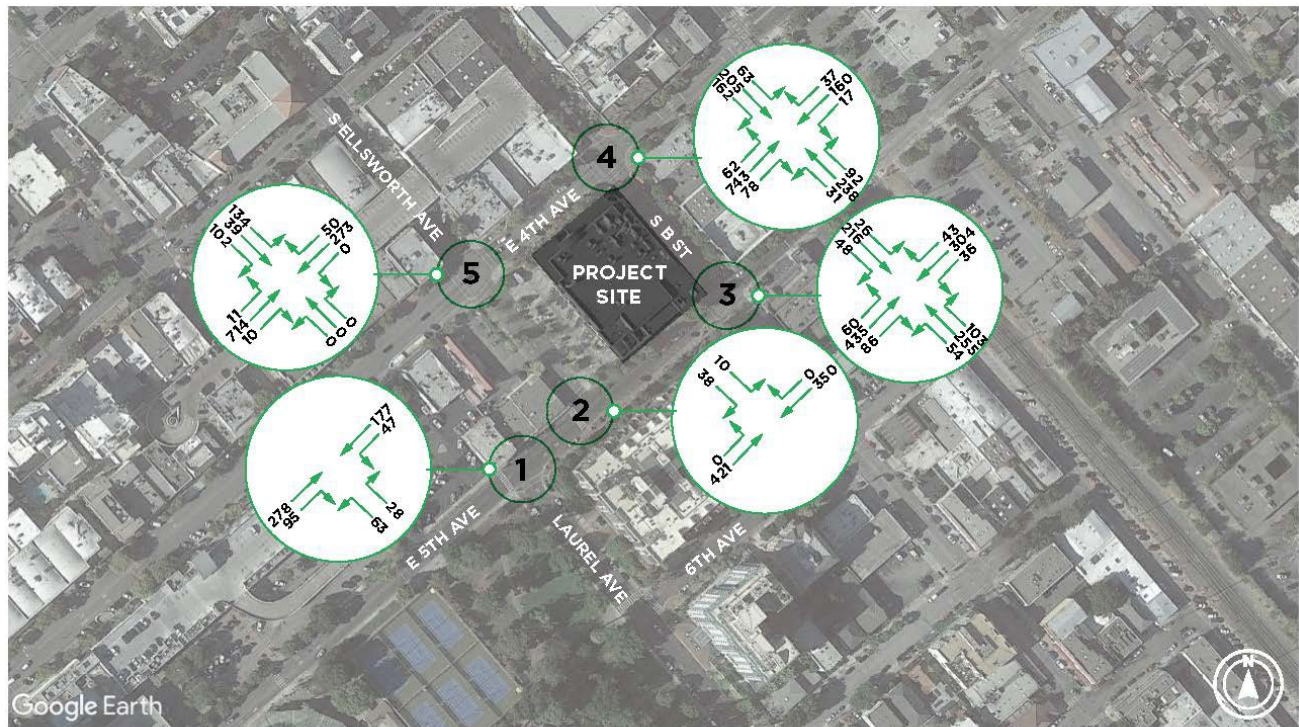
Notes: Bold lettering indicates an intersection that does not meet the City's minimum acceptable design level of service (LOS D for Signalized intersections); TWSC = Two-Way Stop Control; AM = weekday a.m. peak hour; PM = weekday p.m. peak hour; LOS = Level of Service; Delay reported in seconds per vehicle; No = intersection number. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022

Figure 18: Cumulative Conditions Plus Project Peak Hour (AM) Turning Movement Volumes



SAN MATEO CUMULATIVE PLUS VOLUMES AM

Figure 19: Cumulative Conditions Plus Project Peak Hour (PM) Turning Movement Volumes



SAN MATEO CUMULATIVE PLUS VOLUMES PM

ADDITIONAL TRANSPORTATION ANALYSIS

This section describes additional transportation analysis related to site access and circulation of the proposed project based on a review of the proposed site plan. This section includes analysis of the following characteristics and scenarios:

- Vehicular access and on-site circulation
 - Vehicle parking
 - Driveway sight distance
- Pedestrian, Bicycle, and Transit access
- Loading zone and garbage truck circulation and access
- Emergency vehicle access
- 95th percentile queue analysis

The analysis in the following sections, while informed by adopted State and local standards, is driven by professional judgement. Citations are provided where applicable and available. References to the proposed project characteristics and geometric features are per the most recent site plan published February 2022.¹⁰

VEHICULAR ACCESS AND ON-SITE CIRCULATION

Site access and on-site circulation were evaluated using commonly accepted transportation design, planning principles and professional judgment. The site access and circulation were evaluated to determine the adequacy of site's driveways with regard to traffic volumes, delays, vehicle queues, geometric design, site distance, and truck access. In general, the site plan shows adequate site access at the project driveways and circulation within the site.

The proposed project would replace the existing Draeger's market with a mixed-use building. The project proposes to construct a parking garage with a 24 ft wide driveway fronting the north side of 5th Avenue. The drive aisle in the garage level would be 24 ft wide, which is adequate for two-way circulation of vehicular traffic and complies with the width requirement for two-way turning aisles or ramps.

In detail, the project proposes to construct a three-level parking garage with ground floor including 12,392 square feet of covered parking area and two levels (89,519 square feet) below grade for a total of 221 parking spaces. Vehicle parking will include a mix of compact, standard, accessible (standard), accessible (van), and EV charging stations. Angled parking will be retained along the project frontage on Ellsworth Avenue and 4th Avenue. There is angled on-street parking on the south side on 5th Avenue which is being restriped to parallel stalls. A review of City Standard Drawings for parking stalls¹¹ found that the project's proposed parking dimensions are in compliance with City specifications for accessible, compact, and standard stall types.

Vehicle Parking

As noted in a prior section in this report, the project is proposing to provide fewer spaces (221) than minimally required by City parking regulations (320). A parking study conducted concluded that the Project is expected to generate demand for 208 parking spaces, indicating that the parking provided at the Project site will meet parking demand.

¹⁰ <https://www.cityofsanmateo.org/4386/222-E-4th-Ave-Draegers> (Accessed October 2022)

¹¹ [Standard Drawings | San Mateo, CA - Official Website \(cityofsanmateo.org\)](#)

Driveway Sight Distance

The project proposes to construct a parking garage with a 24 ft wide driveway fronting the north side of 5th Avenue. This width is in compliance with City standards (12') when serving more than two off-street parking spaces (Chapter 27.64). The 5th Avenue roadway segments that approach the garage ingress/egress do not have severe grade or curves.

Sight distance is the continuous length of the roadway ahead, visible to the roadway user. Sight distance requirements vary depending on roadway speeds. The posted limit on 5th Avenue is 25 mph (i.e., design speed of 30 mph). Per the California Department of Transportation (Caltrans) Highway Design Manual 405.1 (2)(d), the corner sight distance requirements do not apply to urban driveways, unless they are signalized. Since this project proposes an unsignalized driveway, per the Caltrans Manual on Uniform Traffic Control Devices (CA MUTCD 2014, Revision 6), a clearance of 6 feet measured from the curb return should be provided at alleys and driveways (Section 3B.19). No on-street parking is proposed on 5th Avenue, leaving clear sight lines into and out of the driveway.

This project proposes project driveways that least interfere with traffic movements and vulnerable users per City off-street parking standards (Chapter 27.64). The project proposes to plant Silverleaf Oak trees along 5th Avenue, including on either side of the garage entrance and exit. Landscaping must be maintained properly to ensure it does not impede roadway visibility. There are no existing bike lanes on the roadway, however the 2020 Bicycle Master Plan proposes a class II bike lane which would pass by the project driveway. No major conflicts and concerns pertaining to driveway access are evident in the proposed site plan.

PEDESTRIAN ACCESS

Pedestrians can access the site from entries on Ellsworth Avenue (to the office), B Street (to the public parking, residences, or retail use), or through the 4th Ave building frontage (retail use). The project site proposes sidewalks along all the parcel boundaries as well as a pedestrian plaza and parklets at 4th Avenue and Ellsworth Avenue. The project would not generate activities that would interfere with access or circulation for people walking to, from, or passing by the site.

BICYCLE ACCESS

The proposed project would promote accessibility for people biking to the site by providing bicycle parking and a bike lane (Class II) along both sides of 5th Avenue between Ellsworth Avenue and B Street. The project would not generate activities that would interfere with access or circulation for people biking.

BIKE PARKING

The project proposes to provide 38 bicycle parking spaces which includes short- and long-term parking split among the different parcel land uses. A 292 SF bike room will be provided on the ground floor and a 134 SF bike storage facility is located on the fifth floor. Bike racks are proposed along the site on all four sides of the building.

- Long Term Bike Parking
 - Commercial – 10
 - Residential – 10
 - Retail – 1
- Short Term Bike Parking
 - Commercial – 5
 - Residential – 1
 - Retail – 14

The ground floor bike room is accessible from the Ellsworth Avenue entrance, separating cyclists from vehicle traffic in the garage and minimizing conflicts between the modes.

TRANSIT ACCESS

Access to transit facilities and services outlined in the Existing Conditions section will not change with the proposed site plan.

HAZARDS AND EMERGENCY VEHICLE ACCESS

Loading Zone and Garbage Trucks

The project proposes to expand the existing 105 ft commercial loading zone on B Street to 120 ft. The project site plans show three trash rooms: a grocery trash room with access on B Street, an office/cafeteria trash room on Ellsworth Avenue, and a residential trash room. Garbage trucks would access trash collector areas via B Street and Ellsworth Avenue.

The project should ensure that access to and from the trash area on B street for garbage trucks does not create or increase conflict with bikes through inadequate site lines or staging within the bike lane. In addition, trash bins should not encroach the public right of way, including the bike lane. The trash bins should be removed from the public right-of-way immediately after garbage pickup as to not impact AM or PM peak hour traffic conditions.

Emergency Vehicle Access

The nearest fire station (San Mateo Fire Department Station #21) is located approximately 0.2 miles west of the project site at 120 S Ellsworth Ave. The proposed plans indicate that the bulb outs at each intersection surrounding the project site can accommodate the turning radius of a fire truck. Per City requirements, all driveways and drive aisles are at least 20 feet wide and would accommodate Emergency Vehicle access. Therefore, smaller emergency trucks and vans would also be able to access the parking garage.

95TH PERCENTILE QUEUE ANALYSIS

In addition to the operations analysis, Kittelson also reviewed the changes in 95th percentile queue lengths for the study intersections. Queue lengths are typically evaluated as part of the network-level or design-related considerations (i.e., to gauge interaction between nearby intersections). The 95th percentile queue lengths are reported to provide an appropriate storage for all but the worst 5% of traffic scenarios. This report provides queue lengths, which are derived from the outputs of the Synchro traffic analysis software and are representative of the 95th percentile traffic volumes¹². The 95th percentile queue length worksheets are provided in Appendix G.

Table 10 through Table 12 show the 95th percentile queue lengths for the Existing, Baseline (Opening Year), Baseline (Opening Year) Plus Project, Cumulative, and Cumulative Plus Project conditions. Movements where the expected 95th percentile queue length exceeds storage capacity during the weekday peak hours are highlighted in grey in each of the tables shown below.

Storage capacity is exceeded for the following scenarios:

- E 4th Ave/B Street, EB and SB approaches – Cumulative Conditions (AM)
- E 4th Ave/B Street, EB and SB approaches – Cumulative Conditions (PM)
- E 4th Ave/B Street, EB and SB approaches – Cumulative Plus Project Conditions (AM)

¹² Microsimulation of queues using SimTraffic, another analysis software package, was not performed because this model is typically used in the design phase of a project. For a planning level study, industry practice is to use the Synchro outputs.

- E 4th Ave/B Street, EB and SB approaches – Cumulative Plus Project Conditions (PM)
- E 4th Ave/Ellsworth Avenue, EB approach – Cumulative Conditions (PM)
- E 4th Ave/Ellsworth Avenue, EB approach – Cumulative Plus Project Conditions (PM)

Although storage capacity is exceeded in these scenarios, queue lengths do not increase with respect to plus project scenarios when compared to no project scenarios. Thus, the proposed project does not impact the status quo.

Table 10: 95th Percentile Queue Lengths for Existing Conditions

#	Location	Scenario	95 th Percentile Queue Length (number of vehicles)											
			EB Approach			WB Approach			NB Approach			SB Approach		
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Weekday AM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	1	-	-	2	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	1	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	6	-	-	5	-	-	3	-	-	1	-
4	E 4 th Avenue/B Street	No Project	-	3	-	-	2	-	-	2	-	-	5	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	6	-	-	3	-	-	2	-	-	5	-
Weekday PM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	1	-	-	1	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	1	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	9	-	-	6	-	-	4	-	-	2	-
4	E 4 th Avenue/B Street	No Project	-	4	-	-	3	-	-	3	-	-	6	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	11	-	-	4	-	-	3	-	-	8	-

Notes: EBL = Eastbound Left; EBT = Eastbound Through; EBR = Eastbound Right; similar for W = Westbound, N = Northbound, and S = Southbound movements; AWSC: All-Way Stop Control
 '-' = Particular movement is not relevant to the intersection, Bold cells are 95th percentile queue lengths greater than existing storage. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022.

Table 11: 95th Percentile Queue Lengths for Baseline (Opening Year) and Baseline (Opening Year) Plus Project Conditions

#	Location (Control)	Scenario	95th Percentile Queue Length (number of vehicles)											
			EB Approach			WB Approach			NB Approach			SB Approach		
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Weekday AM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	0	-	-	1	-	-	-	-	-
		Plus Project	-	-	-	1	-	-	2	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	0	-	-	-	-	-	-	-	1	-	-
		Plus Project	-	0	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	6	-	-	6	-	-	3	-	-	1	-
		Plus Project	-	7	-	-	6	-	-	3	-	-	1	-
4	E 4 th Avenue/B Street	No Project	-	3	-	-	2	-	-	2	-	-	5	-
		Plus Project	-	3	-	-	2	-	-	2	-	-	5	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	4	-	-	2	-	-	0	-	-	3	-
		Plus Project	-	4	-	-	2	-	-	0	-	-	3	-
Weekday PM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	1	-	-	1	-	-	-	-	-
		Plus Project	-	-	-	1	-	-	1	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	0	-	-	-	-	-	-	-	1	-	-
		Plus Project	-	0	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	9	-	-	6	-	-	4	-	-	2	-
		Plus Project	-	10	-	-	6	-	-	5	-	-	2	-
4	E 4 th Avenue/B Street	No Project	-	4	-	-	2	-	-	3	-	-	6	-
		Plus Project	-	4	-	-	2	-	-	4	-	-	6	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	8	-	-	4	-	-	0	-	-	5	-
		Plus Project	-	8	-	-	4	-	-	0	-	-	5	-

Notes: EBL = Eastbound Left; EBT = Eastbound Through; EBR = Eastbound Right; similar for W = Westbound, N = Northbound, and S = Southbound movements; AWSC: All-Way Stop Control
 '-' = Particular movement is not relevant to the intersection, Bold cells are 95th percentile queue lengths greater than existing storage. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022.

Table 12: 95th Percentile Queue Lengths for Cumulative and Cumulative Plus Project Conditions

#	Location (Control)	Scenario	95 th Percentile Queue Length (number of vehicles)											
			EB Approach			WB Approach			NB Approach			SB Approach		
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Weekday AM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	0	-	-	1	-	-	-	-	-
		Plus Project	-	-	-	1	-	-	2	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	0	-	-	-	-	-	-	-	1	-	-
		Plus Project	-	0	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	7	-	-	6	-	-	9	-	-	2	-
		Plus Project	-	7	-	-	7	-	-	9	-	-	2	-
4	E 4 th Avenue/B Street	No Project	-	17	-	-	3	-	-	4	-	-	14	-
		Plus Project	-	17	-	-	3	-	-	5	-	-	14	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	8	-	-	2	-	-	0	-	-	3	-
		Plus Project	-	8	-	-	2	-	-	0	-	-	3	-
Weekday PM Peak Hour														
1	E 5 th Avenue/Laurel Avenue	No Project	-	-	-	1	-	-	1	-	-	-	-	-
		Plus Project	-	-	-	1	-	-	1	-	-	-	-	-
2	E 5 th Avenue/Ellsworth Avenue	No Project	-	0	-	-	-	-	-	-	-	1	-	-
		Plus Project	-	0	-	-	-	-	-	-	-	1	-	-
3	E 5 th Avenue/B Street	No Project	-	10	-	-	7	-	-	9	-	-	3	-
		Plus Project	-	12	-	-	7	-	-	9	-	-	3	-
4	E 4 th Avenue/B Street	No Project	-	25	-	-	4	-	-	6	-	-	12	-
		Plus Project	-	25	-	-	4	-	-	6	-	-	12	-
5	E 4 th Avenue/Ellsworth Avenue	No Project	-	19	-	-	6	-	-	0	-	-	6	-
		Plus Project	-	19	-	-	6	-	-	0	-	-	6	-

Notes: EBL = Eastbound Left; EBT = Eastbound Through; EBR = Eastbound Right; similar for W = Westbound, N = Northbound, and S = Southbound movements; AWSC: All-Way Stop Control
 '-' = Particular movement is not relevant to the intersection, Bold cells are 95th percentile queue lengths greater than existing storage. Source: Highway Capacity Manual 6th Edition; Kittelson & Associates, 2022.

TECHNICAL APPENDIX

Appendix A Travel Demand Memo



Technical Memorandum

August 22, 2022

Project# 24837.009

To: Wendy Lao
City of San Mateo
330 West 20th Avenue
San Mateo, California 94403

From: Anusha Musunuru, PhD; Allison Woodworth; Mychal Loomis, PE

CC: Mike Kato, Bethany Lopez, Sue-Ellen Atkinson

RE: **San Mateo Draeger's Traffic Impact Analysis – Project Travel Demand DRAFT**

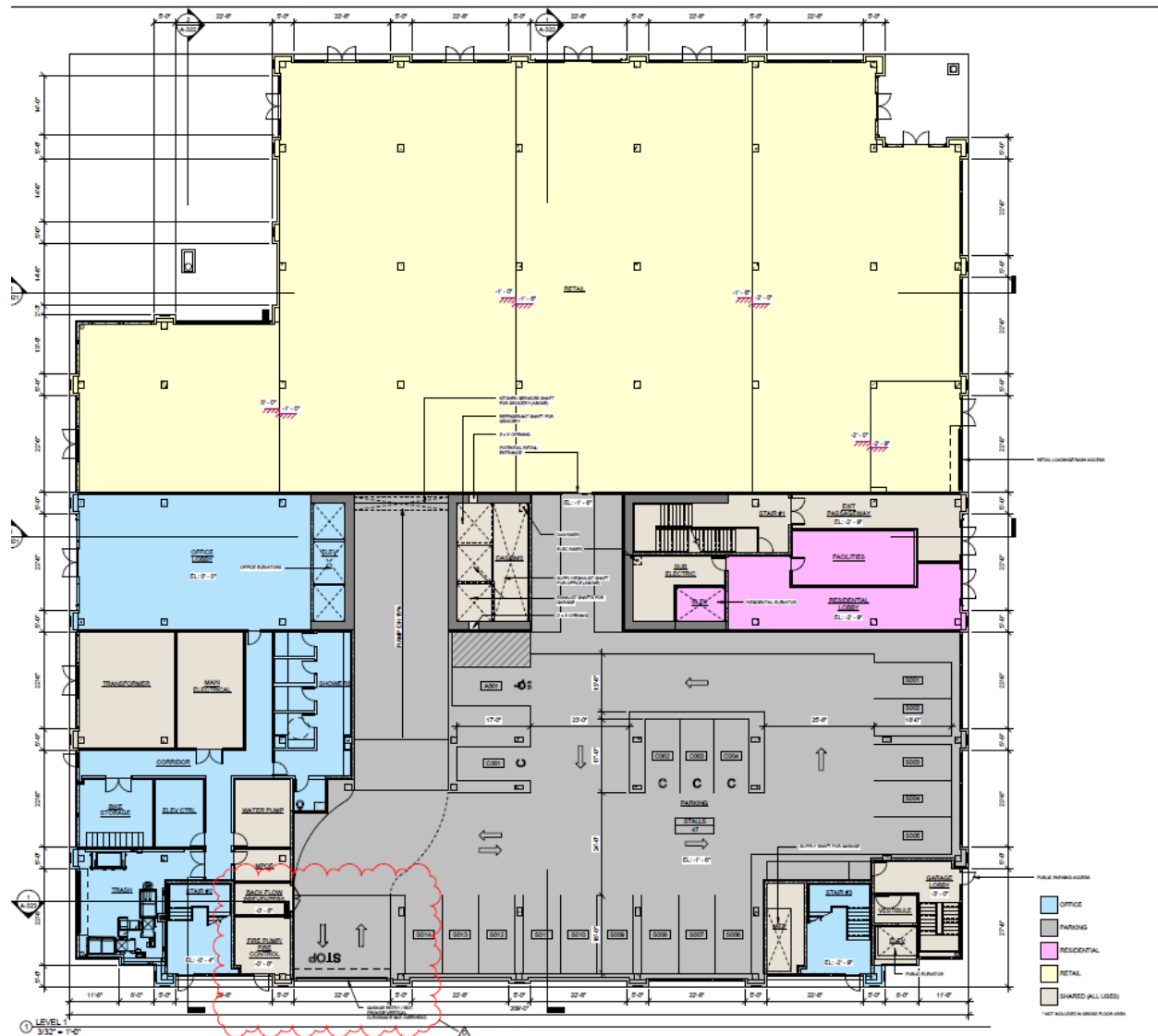
Kittelson & Associates, Inc. (Kittelson) prepared this memorandum for the 222 East 4th Avenue Project at the existing Draeger's site in San Mateo, California (Project). The Project proposes to redevelop the existing Draeger Market into a mixed-use building with office, residential, and retail space. Site access will be accommodated for personal and delivery vehicles, bicycles, pedestrians.

Project Description

Lane Partners is proposing to replace the existing 60,965 square feet Draeger's market located at 222 East 4th Avenue with a 5-story, approximately 152,533 square feet mixed-use building with two levels of below grade parking. The building would consist of approximately 104,554 square feet of office space, 17,658 square feet of retail space, and 8,997 square feet of residential space for 10 below-market-rate units at the lower income level. The retail floor would be located on the ground floor, the office space would be spread throughout the first four floors, and the residential space would be split between the ground floor (i.e., residential lobby/elevator) and the fifth floor living areas. The ground floor would also include 12,392 square feet of covered parking area and two levels (89,519 square feet) below grade for a total of 221 parking spaces. The Project site plan is shown in Figure 1.

The Project site is in downtown San Mateo and is zoned as Central Business District/Residential Overlay District – Mixed Use (CBD). The site is also in a designated "Transit Oriented Development" area as it is within a half mile of the San Mateo Caltrain station.

Figure 1: Proposed Mixed-Use Project Site Plan



Source: <https://www.cityofsanmateo.org/4386/222-E-4th-Ave-Draegers>

Existing Conditions

Kittelson obtained the multimodal intersection turning movement counts at three of the five study intersections from the City for the weekday a.m. (7-9 am) and p.m. (4-6 pm) peak period when the existing project site generated trips. The multimodal intersection turning movement counts for the remaining two study intersections were obtained using the Streetlight data. These turning movement counts obtained from Streetlight data were adjusted so that the intersection entry and exit volumes match the adjacent counts collected at the other study intersections.

1. Laurel Avenue/5th Avenue (Streetlight data)
2. Ellsworth Avenue/5th Avenue (Field collected data)
3. B Street/5th Avenue (Field collected data)
4. B Street/4th Avenue (Field collected data)

5. Ellsworth Avenue/4th Avenue (Streetlight data)

Figure 1 illustrates the locations of the five study intersections. Based on the collected counts and adjusted streetlight data at all five intersections, peak hours were 7:45 – 8:45 am and 5:00 – 6:00 pm. The existing volumes (and counts) are summarized in Table 1 and Table 2 for the AM and PM peak hours, respectively.

Figure 1: Study Intersections

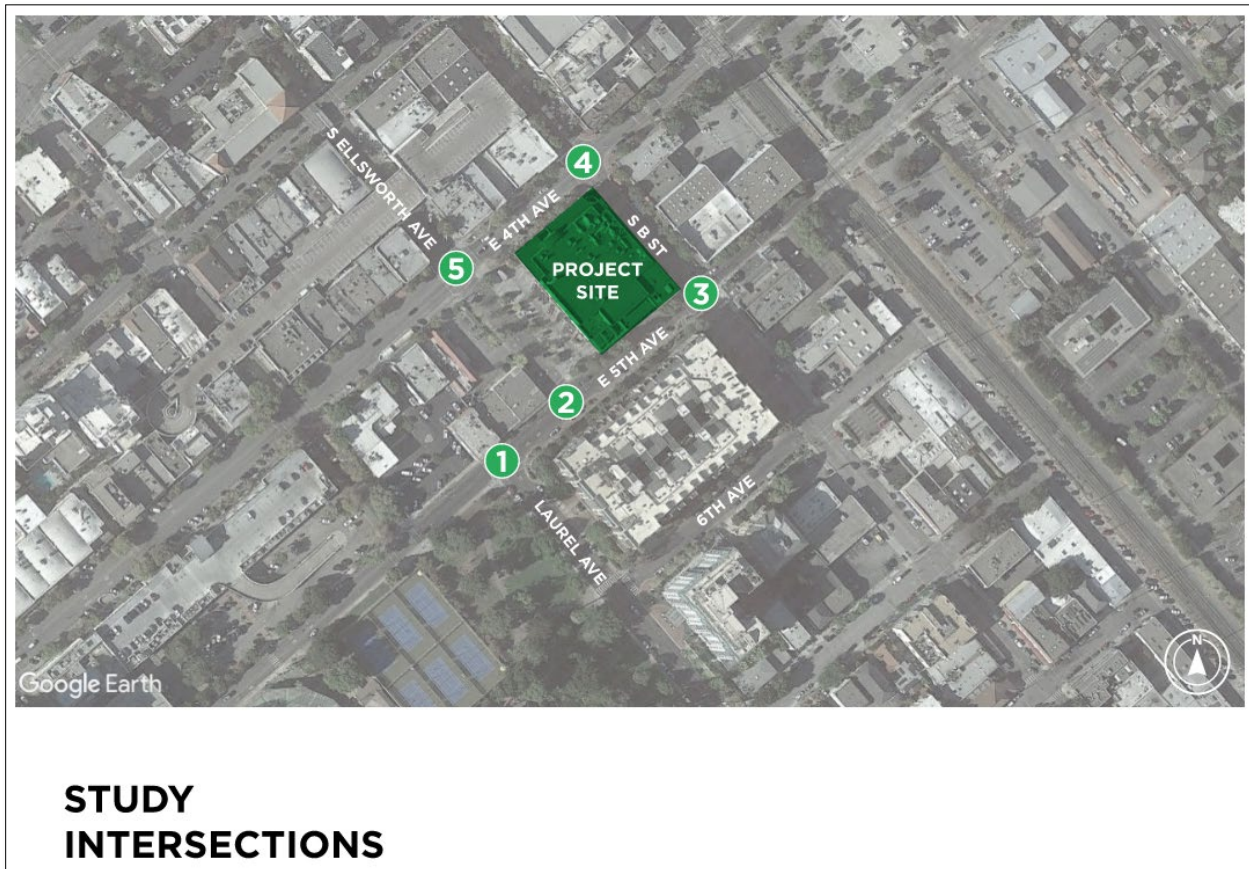


Table 1: Existing Intersection Volumes (AM peak hour)*

Intersection	Northbound			Southbound			Eastbound			Westbound		
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Laurel Ave/5 th Ave	186	-	131	-	-	-	-	189	162	244	103	-
Ellsworth Ave/5 th Ave	-	-	-	21	-	63	36	284	-	-	284	10
B Street/5 th Ave	32	126	56	13	94	23	16	251	54	21	239	11
B Street/4 th Ave	13	97	44	62	103	59	21	362	20	7	87	7
Ellsworth Ave/4 th Ave	0	69	0	54	113	77	13	349	23	0	134	25

*Note: These volumes include existing site generated trips

Table 2: Existing Intersection Volumes (PM peak hour)*

Intersection	Northbound			Southbound			Eastbound			Westbound		
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Laurel Ave/5 th Ave	95	-	0	-	-	-	-	363	139	66	280	-
Ellsworth Ave/5 th Ave	-	-	-	32	-	120	45	318	-	-	226	27
B Street/5 th Ave	38	137	72	18	117	34	38	321	55	25	223	30
B Street/4 th Ave	18	127	55	60	112	97	37	509	47	10	111	22
Ellsworth Ave/4 th Ave	78	30	0	106	152	81	9	487	36	0	186	40

*Note: These volumes include existing site generated trips

Vehicle Trip Generation

ITE DEVELOPMENT LAND USE CODES

Trip generation is a key consideration for determining local effects of the project on the transportation network. Trip generation rates published in the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition were used to estimate the number of trips the mixed-use proposed project would generate. ITE trip estimates are tied to specific land use codes. The ITE land use codes found to be most applicable to the Project are listed below.

- Supermarket (ITE 850)
- General Office Building (ITE 710)
- Affordable Housing (ITE 223)

In addition, this Project is assumed to be in the '**Dense Multi-Use Urban**' context, considered by ITE to be an area that has diverse and interacting complementary land uses with good pedestrian connectivity, and convenient and frequent transit service. This is consistent with the Transit Oriented Development overlay and CBD zoning for the project site for which the San Mateo Municipal code promotes mixed-uses and pedestrian activity. Table 2 below shows the trip generation rates used for the analysis.

Table 3: Trip Generation Rates, ITE Trip Generation Manual 11th Edition

Land Use	ITE Code	Land Use Context	Units*	Weekday Daily Rate	Weekday AM Peak Hour			Weekday PM Peak Hour		
					Rate	In %	Out %	Rate	In %	Out %
Retail (Supermarket)	850	Dense Multi-Use Urban	1000 SF GFA	107.42	4.99	55%	45%	9.32	50%	50%
Office Space	710	Dense Multi-Use Urban	1000 SF GFA	none provided	0.84	87%	13%	0.87	16%	84%
Office Space	710	General Urban/Suburban ¹	1000 SF GFA	Fitted Curve ²						
Affordable Housing	223	Dense Multi-Use Urban	DU	3.83	0.5	29%	71%	0.36	61%	39%

*: GFA – Gross Floor Area, SF – Square Feet, DU – Dwelling Units

¹: The weekday daily rate for General Urban/Suburban land use was used for Office Space (ITE 710) as no vehicle rate was provided for the Dense Multi-Use Urban land use context.

²: ITE 710 (General Urban/Suburban) daily rate fitted curve equation: $\ln(T) = 0.87 \ln(X) + 3.05$

TRIP GENERATION CALCULATION

Trip generation estimates for this Project took into consideration three types of trips:

- **Primary or New:** These are the trips whose specific purpose was to visit the site. Primary trip rates were generated using ITE Trip Generation Manual 11th Edition.
- **Pass-by:** Drivers already on their way to a destination that stop temporarily at the Project Site without a major roadway diversion are considered making "pass-by" trips. Supermarket 850 is the only land use code in ITE Trip Generation Manual 11th Edition for which a pass-by rate was supplied. The 24% average pass-by rate for this land use was only applicable for Weekday PM Peak, resulting in a reduction of 39 trips.
- **Internal:** Trips that occur between land-uses on a multi-use project site and which can be made without using the off-site street network are considered "internal trips". Internal trips for this project can be made by walking between uses. Internal capture was estimated using methodology from NCHRP Report 684 – Enhancing Internal Trip Capture for Mixed-Use Developments.

The existing Draeger's market was included as existing trip credits as it currently generates trips to and from the site. Pass-by trips were also applied to the existing supermarket use.

Table 3 provides a summary of the proposed project's trip generation. As shown in the table, the net new trip generation would be a reduction of 3,645 average daily weekday trips with a reduction of 135 new trips occurring the morning peak and a reduction of 231 new trips occurring the afternoon peak.

Table 4: Proposed Project Net Trip Generation Calculations

Land Use	Size	Weekday Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Proposed Project								
Retail (Supermarket)	17.6 KSF	1,891	48	40	88	82	82	164
Office Space	104.7 KSF	1,208	77	11	88	15	76	91
Affordable Housing	10 DU	38	1	4	5	2	2	4
Internal Capture		-233	-6	-6	-12	-11	-11	-22
Pass-by reduction (24% PM only)		0	0	0	0	-18	-18	-36
Total Proposed Project Trips		2,904	120	49	169	70	131	201
Existing Project								
Retail (Supermarket)	61 KSF	6,549	167	137	304	284	284	568
Pass-by reduction (24% PM only)		0	0	0	0	-68	-68	-136
Total Existing Trips		6,549	167	137	304	216	216	432
Net New Project Trips		-3,645	-47	-88	-135	-146	-84	-231

Note: Updated square footage for the office space portion of the proposed project from 104.7 KSF to 104.5 KSF did not change the proposed project trips generated.

Vehicle Trip Distribution

The vehicle trip distribution assumptions are based on the existing counts and proximity to the major arterials and freeways. As shown above, the proposed project would generate less peak hour trips with a reduction of 135 trips in the morning peak hour and 231 trips in the afternoon peak hour when compared to

the trips generated from the existing site. The driveways for the existing site are situated on Ellsworth Avenue, and the driveway for the proposed project site is situated on 5th Avenue. Vehicle traffic going to/from the existing and proposed project site are distributed at each intersection according to the turning movement proportions consistent with the existing counts. Existing project vehicle trip distribution percentages are illustrated in Figure 2 and Figure 3 for AM and PM, and proposed project vehicle trip distribution percentages are illustrated in Figure 4 and Figure 5 for AM and PM, respectively. Table 5 and Table 6 illustrate the existing plus project intersection volumes during the weekday AM and weekday PM peak hours, respectively.

Figure 2: Existing Project Vehicle Trip Distribution (AM)



Figure 3: Existing Project Vehicle Trip Distribution (PM)



Figure 4: Proposed Project Vehicle Trip Distribution (AM)



Figure 5: Proposed Project Vehicle Trip Distribution (PM)



Table 5: Existing plus Project Intersection Volumes (AM Peak Hour)*

Intersection	Northbound			Southbound			Eastbound			Westbound		
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Laurel Ave/5 th Ave	186	-	140	-	-	-	-	203	162	224	95	-
Ellsworth Ave/5 th Ave	-	-	-	4	-	12	0	343	-	-	307	0
B Street/5 th Ave	38	126	56	13	94	27	16	258	55	21	281	11
B Street/4 th Ave	13	97	44	62	106	59	21	362	21	7	87	7
Ellsworth Ave/4 th Ave	0	0	0	54	13	77	13	350	2	0	134	25

*Note: These volumes do not include existing site generated trips (i.e., existing site generated trips were subtracted from the existing volumes and proposed site generated trips are added to get existing plus project volumes).

Table 6: Existing plus Project Intersection Volumes (PM Peak Hour)*

Intersection	Northbound			Southbound			Eastbound			Westbound		
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Laurel Ave/5 th Ave	95	-	0	-	-	-	-	354	139	59	248	-
Ellsworth Ave/5 th Ave	-	-	-	9	-	35	0	354	-	-	272	0
B Street/5 th Ave	39	137	72	18	117	35	44	369	63	25	228	30
B Street/4 th Ave	19	131	56	60	113	97	37	509	47	10	111	22
Ellsworth Ave/4 th Ave	0	0	0	106	36	81	9	488	8	0	187	40




*Note: These volumes do not include existing site generated trips (i.e., existing site generated trips were subtracted from the existing volumes and proposed site generated trips are added to get existing plus project volumes).

Next Steps

Pending City's review of this memorandum, a determination has to be made whether further traffic analysis is required or not, based on the existing and proposed vehicle trip distribution and intersection volumes.

Appendix B Existing Conditions Synchro Worksheets






















Intersection						
Int Delay, s/veh	3.3					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	45	228	51	42	243
Future Vol, veh/h	81	45	228	51	42	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	49	248	55	46	264
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	632	276	0	0	303	0
Stage 1	276	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	429	757	-	-	1258	-
Stage 1	759	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	411	757	-	-	1258	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	15.1	0	1.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	491	1258	-	
HCM Lane V/C Ratio	-	-	0.279	0.036	-	
HCM Control Delay (s)	-	-	15.1	8	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	54	113	77	0	69	0	13	349	23	0	134	25
Future Volume (veh/h)	54	113	77	0	69	0	13	349	23	0	134	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	59	123	84	0	75	0	14	379	25	0	146	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	178	107	0	380	0	81	1119	72	0	1002	185
Arrive On Green	0.20	0.20	0.20	0.00	0.20	0.00	0.63	0.63	0.63	0.00	1.00	1.00
Sat Flow, veh/h	264	876	526	0	1870	0	21	1777	114	0	1592	294
Grp Volume(v), veh/h	266	0	0	0	75	0	418	0	0	0	0	173
Grp Sat Flow(s),veh/h/ln	1667	0	0	0	1870	0	1913	0	0	0	0	1886
Q Serve(g_s), s	5.2	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.2	0.0	0.0	0.0	1.8	0.0	5.7	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.22		0.32	0.00		0.00	0.03		0.06	0.00		0.16
Lane Grp Cap(c), veh/h	419	0	0	0	380	0	1272	0	0	0	0	1187
V/C Ratio(X)	0.64	0.00	0.00	0.00	0.20	0.00	0.33	0.00	0.00	0.00	0.00	0.15
Avail Cap(c_a), veh/h	810	0	0	0	830	0	1272	0	0	0	0	1187
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	20.7	0.0	0.0	0.0	18.2	0.0	4.8	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.1	0.0	0.7	0.0	0.0	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	0.0	0.8	0.0	1.7	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	0.0	0.0	0.0	18.3	0.0	5.5	0.0	0.0	0.0	0.0	0.3
LnGrp LOS	C	A	A	A	B	A	A	A	A	A	A	A
Approach Vol, veh/h		266			75			418				173
Approach Delay, s/veh		21.3			18.3			5.5				0.3
Approach LOS		C			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		15.8		39.2		15.8		39.2				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.4		21.4		24.4		21.4				
Max Q Clear Time (g_c+I1), s		10.2		2.0		3.8		7.7				
Green Ext Time (p_c), s		0.9		0.6		0.2		1.5				
Intersection Summary												
HCM 6th Ctrl Delay				10.1								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	1.9					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	21	63	36	284	284	10
Future Vol, veh/h	21	63	36	284	284	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	23	68	39	309	309	11
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	702	315	320	0	-	0
Stage 1	315	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	392	724	1251	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	377	724	1251	-	-	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Approach	SE	NE	SW			
HCM Control Delay, s	12.2	0.9	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1251	-	589	-	-	
HCM Lane V/C Ratio	0.031	-	0.155	-	-	
HCM Control Delay (s)	8	0	12.2	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	13	94	23	32	126	56	16	251	54	21	239	11
Future Volume (veh/h)	13	94	23	32	126	56	16	251	54	21	239	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1856	1707	1900	1870	1841	1884	1976	1945	1899	1961	1976
Adj Flow Rate, veh/h	14	102	25	35	137	61	17	273	59	23	260	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	3	13	0	2	4	6	0	2	5	1	0
Cap, veh/h	133	859	198	188	695	286	78	355	74	88	409	18
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	96	1339	309	175	1084	447	42	1533	321	76	1765	78
Grp Volume(v), veh/h	141	0	0	233	0	0	349	0	0	295	0	0
Grp Sat Flow(s),veh/h/ln	1744	0	0	1706	0	0	1896	0	0	1919	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.0	0.0	3.0	0.0	0.0	9.5	0.0	0.0	7.5	0.0	0.0
Prop In Lane	0.10		0.18	0.15		0.26	0.05		0.17	0.08		0.04
Lane Grp Cap(c), veh/h	1191	0	0	1169	0	0	508	0	0	515	0	0
V/C Ratio(X)	0.12	0.00	0.00	0.20	0.00	0.00	0.69	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	1191	0	0	1169	0	0	939	0	0	941	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.8	0.0	0.0	4.1	0.0	0.0	19.9	0.0	0.0	19.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.9	0.0	0.0	4.0	0.0	0.0	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.0	0.0	0.0	4.5	0.0	0.0	20.5	0.0	0.0	19.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		141			233			349			295	
Approach Delay, s/veh		4.0			4.5			20.5			19.5	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		38.8		16.2		38.8		16.2				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		22.5		25.5		22.5		25.5				
Max Q Clear Time (g_c+I1), s		3.7		9.5		5.0		11.5				
Green Ext Time (p_c), s		0.5		1.1		0.9		1.3				
Intersection Summary												
HCM 6th Ctrl Delay				14.2								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	62	103	59	13	97	44	21	362	20	7	87	7
Future Volume (veh/h)	62	103	59	13	97	44	21	362	20	7	87	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1870	1900	1885	1796	1899	1930	1899	1976	1930	1976
Adj Flow Rate, veh/h	67	112	64	14	105	48	23	393	22	8	95	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	2	0	1	7	5	3	5	0	3	0
Cap, veh/h	148	163	82	84	230	98	96	1161	63	110	1093	88
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	1.00	1.00	1.00	0.66	0.66	0.66
Sat Flow, veh/h	340	857	428	70	1204	514	41	1759	95	61	1655	133
Grp Volume(v), veh/h	243	0	0	167	0	0	438	0	0	111	0	0
Grp Sat Flow(s),veh/h/ln	1625	0	0	1789	0	0	1894	0	0	1849	0	0
Q Serve(g_s), s	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.6	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Prop In Lane	0.28		0.26	0.08		0.29	0.05		0.05	0.07		0.07
Lane Grp Cap(c), veh/h	393	0	0	412	0	0	1320	0	0	1291	0	0
V/C Ratio(X)	0.62	0.00	0.00	0.41	0.00	0.00	0.33	0.00	0.00	0.09	0.00	0.00
Avail Cap(c_a), veh/h	765	0	0	831	0	0	1320	0	0	1291	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.98	0.00	0.00	0.95	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.0	0.0	0.0	19.9	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	1.8	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	0.0	20.1	0.0	0.0	0.6	0.0	0.0	3.5	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		243			167			438			111	
Approach Delay, s/veh		21.6			20.1			0.6			3.5	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		23.9		22.9		23.9		22.9				
Max Q Clear Time (g_c+I1), s		9.6		3.2		6.6		2.0				
Green Ext Time (p_c), s		0.9		0.3		0.6		1.8				
Intersection Summary												
HCM 6th Ctrl Delay				9.7								
HCM 6th LOS				A								

Intersection

Int Delay, s/veh 2.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	269	90	52	198
Future Vol, veh/h	61	27	269	90	52	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	292	98	57	215

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	670	341	0
Stage 1	341	-	-
Stage 2	329	-	-
Critical Hdwy	6.62	6.32	-
Critical Hdwy Stg 1	5.62	-	-
Critical Hdwy Stg 2	5.62	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	407	695	-
Stage 1	707	-	-
Stage 2	716	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	385	695	-
Mov Cap-2 Maneuver	385	-	-
Stage 1	707	-	-
Stage 2	677	-	-

















Approach	NW	NE	SW
HCM Control Delay, s	15.3	0	1.7
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT
Capacity (veh/h)	-	-	446	1169
HCM Lane V/C Ratio	-	-	0.214	0.048
HCM Control Delay (s)	-	-	15.3	8.2
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	106	152	81	78	30	0	9	487	36	0	186	40
Future Volume (veh/h)	106	152	81	78	30	0	9	487	36	0	186	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	115	165	88	85	33	0	10	529	39	0	202	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	188	212	103	273	91	0	62	1073	78	0	937	199
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.00	0.60	0.60	0.60	0.00	1.00	1.00
Sat Flow, veh/h	453	835	405	700	360	0	10	1776	129	0	1550	330
Grp Volume(v), veh/h	368	0	0	118	0	0	578	0	0	0	0	245
Grp Sat Flow(s),veh/h/ln	1693	0	0	1060	0	0	1915	0	0	0	0	1880
Q Serve(g_s), s	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.3	0.0	0.0	6.0	0.0	0.0	11.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.31		0.24	0.72		0.00	0.02		0.07	0.00		0.18
Lane Grp Cap(c), veh/h	503	0	0	365	0	0	1214	0	0	0	0	1136
V/C Ratio(X)	0.73	0.00	0.00	0.32	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.22
Avail Cap(c_a), veh/h	749	0	0	557	0	0	1214	0	0	0	0	1136
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	22.9	0.0	0.0	20.1	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.2	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	0.0	1.4	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	0.0	20.3	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.4
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		368			118			578				245
Approach Delay, s/veh		23.6			20.3			8.6				0.4
Approach LOS		C			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.1		43.9		21.1		43.9				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		26.4		29.4		26.4		29.4				
Max Q Clear Time (g_c+I1), s		15.3		2.0		8.0		13.1				
Green Ext Time (p_c), s		1.2		0.9		0.4		2.3				
Intersection Summary												
HCM 6th Ctrl Delay				12.4								
HCM 6th LOS				B								

Intersection

Int Delay, s/veh 3

Movement SEL SER NEL NET SWT SWR

Lane Configurations 

Traffic Vol, veh/h 32 120 45 318 226 27

Future Vol, veh/h 32 120 45 318 226 27

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 1 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 1 0 0 0 0

Mvmt Flow 35 130 49 346 246 29

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 705 261 275 0 - 0

Stage 1 261 - - - - -

Stage 2 444 - - - - -

Critical Hdwy 6.6 6.31 4.1 - - -

Critical Hdwy Stg 1 5.6 - - - - -

Critical Hdwy Stg 2 5.6 - - - - -

Follow-up Hdwy 3.5 3.309 2.2 - - -

Pot Cap-1 Maneuver 390 774 1300 - - -

Stage 1 776 - - - - -

Stage 2 635 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 372 774 1300 - - -

Mov Cap-2 Maneuver 372 - - - - -

Stage 1 740 - - - - -

Stage 2 635 - - - - -

Approach SE NE SW

HCM Control Delay, s 12.7 1 0

HCM LOS B

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

Capacity (veh/h) 1300 - 631 - -

HCM Lane V/C Ratio 0.038 - 0.262 - -

HCM Control Delay (s) 7.9 0 12.7 - -

















HCM Lane LOS A A B - -

HCM 95th %tile Q(veh) 0.1 - 1 - -

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	18	117	34	38	137	72	38	321	55	25	223	30
Future Volume (veh/h)	18	117	34	38	137	72	38	321	55	25	223	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1885	1900	1976	1961	1945	1976	1976	1976
Adj Flow Rate, veh/h	20	127	37	41	149	78	41	349	60	27	242	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	1	0	0	1	2	0	0	0
Cap, veh/h	133	785	216	177	619	300	90	429	70	85	453	59
Arrive On Green	1.00	1.00	1.00	0.61	0.61	0.61	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	117	1291	355	186	1018	494	103	1508	248	87	1594	206
Grp Volume(v), veh/h	184	0	0	268	0	0	450	0	0	302	0	0
Grp Sat Flow(s),veh/h/ln	1763	0	0	1698	0	0	1858	0	0	1887	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	4.5	0.0	0.0	14.7	0.0	0.0	8.6	0.0	0.0
Prop In Lane	0.11		0.20	0.15		0.29	0.09		0.13	0.09		0.11
Lane Grp Cap(c), veh/h	1133	0	0	1096	0	0	589	0	0	597	0	0
V/C Ratio(X)	0.16	0.00	0.00	0.24	0.00	0.00	0.76	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	1133	0	0	1096	0	0	922	0	0	929	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	5.9	0.0	0.0	21.8	0.0	0.0	19.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.5	0.0	0.0	6.2	0.0	0.0	3.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	0.0	0.0	6.4	0.0	0.0	22.6	0.0	0.0	20.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		184			268			450			302	
Approach Delay, s/veh		0.2			6.4			22.6			20.0	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.0		22.0		43.0		22.0				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		27.5		30.5		27.5		30.5				
Max Q Clear Time (g_c+I1), s		2.0		10.6		6.5		16.7				
Green Ext Time (p_c), s		0.7		1.2		1.1		1.8				
Intersection Summary												
HCM 6th Ctrl Delay				14.9								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	60	112	97	18	127	55	37	509	47	10	111	22
Future Volume (veh/h)	60	112	97	18	127	55	37	509	47	10	111	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1811	1885	1841	1976	1945	1976	1976	1976	1976
Adj Flow Rate, veh/h	65	122	105	20	138	60	40	553	51	11	121	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	6	1	4	0	2	0	0	0	0
Cap, veh/h	127	167	127	78	253	103	101	1114	99	102	995	189
Arrive On Green	0.21	0.21	0.21	0.42	0.42	0.42	1.00	1.00	1.00	0.67	0.67	0.67
Sat Flow, veh/h	283	804	611	85	1218	495	64	1673	149	64	1494	283
Grp Volume(v), veh/h	292	0	0	218	0	0	644	0	0	156	0	0
Grp Sat Flow(s),veh/h/ln	1699	0	0	1798	0	0	1886	0	0	1842	0	0
Q Serve(g_s), s	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.5	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
Prop In Lane	0.22		0.36	0.09		0.28	0.06		0.08	0.07		0.15
Lane Grp Cap(c), veh/h	421	0	0	434	0	0	1315	0	0	1286	0	0
V/C Ratio(X)	0.69	0.00	0.00	0.50	0.00	0.00	0.49	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	724	0	0	759	0	0	1315	0	0	1286	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.97	0.00	0.00	0.85	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.4	0.0	0.0	16.8	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.3	0.0	0.0	1.1	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	2.1	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	0.0	17.1	0.0	0.0	1.1	0.0	0.0	4.1	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		292			218			644			156	
Approach Delay, s/veh		25.2			17.1			1.1			4.1	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.6		47.4		17.6		47.4				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		25.9		30.9		25.9		30.9				
Max Q Clear Time (g_c+I1), s		12.5		3.9		8.1		2.0				
Green Ext Time (p_c), s		1.1		0.6		0.8		3.1				
Intersection Summary												
HCM 6th Ctrl Delay				9.5								
HCM 6th LOS				A								

Appendix C Baseline (Opening Year) Conditions Synchro Worksheets






















Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	30	207	51	6	228
Future Vol, veh/h	81	30	207	51	6	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	33	225	55	7	248
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	515	253	0	0	280	0
Stage 1	253	-	-	-	-	-
Stage 2	262	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	505	780	-	-	1283	-
Stage 1	778	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	502	780	-	-	1283	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.3	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	556	1283	-	
HCM Lane V/C Ratio	-	-	0.217	0.005	-	
HCM Control Delay (s)	-	-	13.3	7.8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.8	0	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/10/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	54	13	77	0	0	0	13	349	2	0	134	25
Future Volume (veh/h)	54	13	77	0	0	0	13	349	2	0	134	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	59	14	84	0	0	0	14	379	2	0	146	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	54	154	0	340	0	82	1236	6	0	1036	192
Arrive On Green	0.18	0.18	0.18	0.00	0.00	0.00	0.65	0.65	0.65	0.00	1.00	1.00
Sat Flow, veh/h	435	299	845	0	1870	0	23	1899	10	0	1592	294
Grp Volume(v), veh/h	157	0	0	0	0	0	395	0	0	0	0	173
Grp Sat Flow(s), veh/h/ln	1579	0	0	0	1870	0	1931	0	0	0	0	1886
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.8	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.38		0.54	0.00		0.00	0.04		0.01	0.00		0.16
Lane Grp Cap(c), veh/h	377	0	0	0	340	0	1325	0	0	0	0	1228
V/C Ratio(X)	0.42	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.14
Avail Cap(c_a), veh/h	780	0	0	0	830	0	1325	0	0	0	0	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.2
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		157			0			395			173	
Approach Delay, s/veh		20.6			0.0			4.8			0.2	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.4		21.4		24.4		21.4				
Max Q Clear Time (g_c+I1), s		6.8		2.0		0.0		6.9				
Green Ext Time (p_c), s		0.5		0.6		0.0		1.4				
Intersection Summary												
HCM 6th Ctrl Delay				7.1								
HCM 6th LOS				A								
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	12	0	330	308	0
Future Vol, veh/h	4	12	0	330	308	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	13	0	359	335	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	694	335	335	0	-	0
Stage 1	335	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	396	705	1236	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	396	705	1236	-	-	-
Mov Cap-2 Maneuver	396	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.3	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1236	-	590	-	-	
HCM Lane V/C Ratio	-	-	0.029	-	-	
HCM Control Delay (s)	0	-	11.3	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/10/2022




												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	13	94	22	31	124	56	13	285	51	21	255	11
Future Volume (veh/h)	13	94	22	31	124	56	13	285	51	21	255	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1856	1707	1900	1870	1841	1884	1976	1945	1899	1961	1976
Adj Flow Rate, veh/h	14	102	24	34	135	61	14	310	55	23	277	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	3	13	0	2	4	6	0	2	5	1	0
Cap, veh/h	132	845	187	181	679	283	75	395	68	88	439	18
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	96	1351	299	170	1085	453	30	1600	277	71	1776	74
Grp Volume(v), veh/h	140	0	0	230	0	0	379	0	0	312	0	0
Grp Sat Flow(s),veh/h/ln	1746	0	0	1708	0	0	1906	0	0	1921	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.0	0.0	3.0	0.0	0.0	10.2	0.0	0.0	7.9	0.0	0.0
Prop In Lane	0.10		0.17	0.15		0.27	0.04		0.15	0.07		0.04
Lane Grp Cap(c), veh/h	1165	0	0	1143	0	0	539	0	0	545	0	0
V/C Ratio(X)	0.12	0.00	0.00	0.20	0.00	0.00	0.70	0.00	0.00	0.57	0.00	0.00
Avail Cap(c_a), veh/h	1165	0	0	1143	0	0	945	0	0	942	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.2	0.0	0.0	4.4	0.0	0.0	19.4	0.0	0.0	18.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.9	0.0	0.0	4.3	0.0	0.0	3.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.3	0.0	0.0	4.8	0.0	0.0	20.0	0.0	0.0	18.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		140			230			379			312	
Approach Delay, s/veh		4.3			4.8			20.0			18.9	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		37.9		17.1		37.9		17.1				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		22.5		25.5		22.5		25.5				
Max Q Clear Time (g_c+I1), s		3.7		9.9		5.0		12.2				
Green Ext Time (p_c), s		0.5		1.2		0.9		1.4				
Intersection Summary												
HCM 6th Ctrl Delay				14.3								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

11: E 4th Ave & S B St

10/10/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	60	102	59	13	96	44	21	357	20	7	85	7
Future Volume (veh/h)	60	102	59	13	96	44	21	357	20	7	85	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1870	1900	1885	1796	1899	1930	1899	1976	1930	1976
Adj Flow Rate, veh/h	65	111	64	14	104	48	23	388	22	8	92	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	2	0	1	7	5	3	5	0	3	0
Cap, veh/h	146	162	82	84	226	97	96	1164	64	113	1090	91
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	1.00	1.00	1.00	0.66	0.66	0.66
Sat Flow, veh/h	332	861	434	71	1200	517	41	1757	96	64	1646	137
Grp Volume(v), veh/h	240	0	0	166	0	0	433	0	0	108	0	0
Grp Sat Flow(s),veh/h/ln	1627	0	0	1788	0	0	1894	0	0	1847	0	0
Q Serve(g_s), s	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.5	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Prop In Lane	0.27		0.27	0.08		0.29	0.05		0.05	0.07		0.07
Lane Grp Cap(c), veh/h	390	0	0	408	0	0	1324	0	0	1293	0	0
V/C Ratio(X)	0.62	0.00	0.00	0.41	0.00	0.00	0.33	0.00	0.00	0.08	0.00	0.00
Avail Cap(c_a), veh/h	765	0	0	830	0	0	1324	0	0	1293	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.98	0.00	0.00	0.96	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	1.8	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	0.0	20.2	0.0	0.0	0.6	0.0	0.0	3.4	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		240			166			433			108	
Approach Delay, s/veh		21.6			20.2			0.6			3.4	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.5		40.5		14.5		40.5				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		23.9		22.9		23.9		22.9				
Max Q Clear Time (g_c+I1), s		9.5		3.1		6.6		2.0				
Green Ext Time (p_c), s		0.9		0.3		0.6		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				9.7								
HCM 6th LOS				A								




Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	224	90	36	129
Future Vol, veh/h	61	27	224	90	36	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	243	98	39	140
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	510	292	0	0	341	0
Stage 1	292	-	-	-	-	-
Stage 2	218	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	509	741	-	-	1218	-
Stage 1	746	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	491	741	-	-	1218	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13	0	1.8			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	548	1218	-	
HCM Lane V/C Ratio	-	-	0.175	0.032	-	
HCM Control Delay (s)	-	-	13	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	106	36	81	0	0	0	9	487	8	0	186	40
Future Volume (veh/h)	106	36	81	0	0	0	9	487	8	0	186	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	115	39	88	0	0	0	10	529	9	0	202	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	63	109	0	359	0	63	1260	21	0	1033	220
Arrive On Green	0.19	0.19	0.19	0.00	0.00	0.00	0.67	0.67	0.67	0.00	1.00	1.00
Sat Flow, veh/h	660	331	566	0	1870	0	10	1890	32	0	1550	330
Grp Volume(v), veh/h	242	0	0	0	0	0	548	0	0	0	0	245
Grp Sat Flow(s),veh/h/ln	1557	0	0	0	1870	0	1933	0	0	0	0	1880
Q Serve(g_s), s	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.48		0.36	0.00		0.00	0.02		0.02	0.00		0.18
Lane Grp Cap(c), veh/h	380	0	0	0	359	0	1345	0	0	0	0	1253
V/C Ratio(X)	0.64	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.20
Avail Cap(c_a), veh/h	710	0	0	0	760	0	1345	0	0	0	0	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.3
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		242			0			548			245	
Approach Delay, s/veh		25.7			0.0			5.9			0.3	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.1		47.9		17.1		47.9				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		26.4		29.4		26.4		29.4				
Max Q Clear Time (g_c+I1), s		11.6		2.0		0.0		10.5				
Green Ext Time (p_c), s		0.8		0.9		0.0		2.3				
Intersection Summary												
HCM 6th Ctrl Delay				9.2								
HCM 6th LOS				A								

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	9	35	0	356	281	0
Future Vol, veh/h	9	35	0	356	281	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	10	38	0	387	305	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	692	305	305	0	-	0
Stage 1	305	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	397	731	1267	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	397	731	1267	-	-	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.2	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1267	-	624	-	-	
HCM Lane V/C Ratio	-	-	0.077	-	-	
HCM Control Delay (s)	0	-	11.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	18	114	31	35	135	72	36	341	52	25	258	30
Future Volume (veh/h)	18	114	31	35	135	72	36	341	52	25	258	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1885	1900	1976	1961	1945	1976	1976	1976
Adj Flow Rate, veh/h	20	124	34	38	147	78	39	371	57	27	280	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	1	0	0	1	2	0	0	0
Cap, veh/h	135	783	202	166	617	303	87	452	67	82	477	54
Arrive On Green	1.00	1.00	1.00	0.60	0.60	0.60	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	123	1304	337	172	1027	506	93	1548	228	77	1633	184
Grp Volume(v), veh/h	178	0	0	263	0	0	467	0	0	340	0	0
Grp Sat Flow(s),veh/h/ln	1763	0	0	1705	0	0	1869	0	0	1894	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	4.5	0.0	0.0	15.2	0.0	0.0	9.8	0.0	0.0
Prop In Lane	0.11		0.19	0.14		0.30	0.08		0.12	0.08		0.10
Lane Grp Cap(c), veh/h	1120	0	0	1086	0	0	606	0	0	613	0	0
V/C Ratio(X)	0.16	0.00	0.00	0.24	0.00	0.00	0.77	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	1120	0	0	1086	0	0	926	0	0	933	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	6.1	0.0	0.0	21.6	0.0	0.0	19.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	0.9	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.6	0.0	0.0	6.4	0.0	0.0	4.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	0.0	0.0	6.6	0.0	0.0	22.4	0.0	0.0	20.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		178			263			467			340	
Approach Delay, s/veh		0.2			6.6			22.4			20.0	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		42.5		22.5		42.5		22.5				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		27.5		30.5		27.5		30.5				
Max Q Clear Time (g_c+I1), s		2.0		11.8		6.5		17.2				
Green Ext Time (p_c), s		0.7		1.4		1.1		1.8				
Intersection Summary												
HCM 6th Ctrl Delay				15.3								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	107	97	18	123	54	37	507	46	10	109	22
Future Volume (veh/h)	38	107	97	18	123	54	37	507	46	10	109	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1811	1885	1841	1976	1945	1976	1976	1976	1976
Adj Flow Rate, veh/h	41	116	105	20	134	59	40	551	50	11	118	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	6	1	4	0	2	0	0	0	0
Cap, veh/h	98	161	130	77	226	93	103	1152	101	106	1018	198
Arrive On Green	0.19	0.19	0.19	0.25	0.25	0.25	1.00	1.00	1.00	0.69	0.69	0.69
Sat Flow, veh/h	182	860	697	89	1209	497	64	1676	147	67	1482	288
Grp Volume(v), veh/h	262	0	0	213	0	0	641	0	0	153	0	0
Grp Sat Flow(s),veh/h/ln	1739	0	0	1796	0	0	1887	0	0	1837	0	0
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.16		0.40	0.09		0.28	0.06		0.08	0.07		0.16
Lane Grp Cap(c), veh/h	389	0	0	396	0	0	1355	0	0	1322	0	0
V/C Ratio(X)	0.67	0.00	0.00	0.54	0.00	0.00	0.47	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	735	0	0	756	0	0	1355	0	0	1322	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.97	0.00	0.00	0.91	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.2	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.4	0.0	0.0	1.1	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	2.7	0.0	0.0	0.4	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.9	0.0	0.0	22.9	0.0	0.0	1.1	0.0	0.0	3.6	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		262			213			641			153	
Approach Delay, s/veh		25.9			22.9			1.1			3.6	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.2		48.8		16.2		48.8				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		25.9		30.9		25.9		30.9				
Max Q Clear Time (g_c+I1), s		11.2		3.8		8.8		2.0				
Green Ext Time (p_c), s		1.0		0.6		0.8		3.1				
Intersection Summary												
HCM 6th Ctrl Delay				10.2								
HCM 6th LOS				B								

Appendix D Baseline (Opening Year) Conditions Plus Project Synchro Worksheets






















Intersection						
Int Delay, s/veh	3.1					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	54	242	51	22	235
Future Vol, veh/h	81	54	242	51	22	235
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	59	263	55	24	255
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	594	291	0	0	318	0
Stage 1	291	-	-	-	-	-
Stage 2	303	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	452	742	-	-	1242	-
Stage 1	746	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	442	742	-	-	1242	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	14.4	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	527	1242	-	
HCM Lane V/C Ratio	-	-	0.278	0.019	-	
HCM Control Delay (s)	-	-	14.4	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	54	13	77	0	0	0	13	350	2	0	134	25
Future Volume (veh/h)	54	13	77	0	0	0	13	350	2	0	134	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	59	14	84	0	0	0	14	380	2	0	146	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	54	154	0	340	0	82	1236	6	0	1036	192
Arrive On Green	0.18	0.18	0.18	0.00	0.00	0.00	0.65	0.65	0.65	0.00	1.00	1.00
Sat Flow, veh/h	435	299	845	0	1870	0	23	1899	10	0	1592	294
Grp Volume(v), veh/h	157	0	0	0	0	0	396	0	0	0	0	173
Grp Sat Flow(s),veh/h/ln	1579	0	0	0	1870	0	1931	0	0	0	0	1886
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.8	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.38		0.54	0.00		0.00	0.04		0.01	0.00		0.16
Lane Grp Cap(c), veh/h	377	0	0	0	340	0	1325	0	0	0	0	1228
V/C Ratio(X)	0.42	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.14
Avail Cap(c_a), veh/h	780	0	0	0	830	0	1325	0	0	0	0	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.2
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		157			0			396				173
Approach Delay, s/veh		20.6			0.0			4.8				0.2
Approach LOS		C						A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.4		21.4		24.4		21.4				
Max Q Clear Time (g_c+I1), s		6.8		2.0		0.0		6.9				
Green Ext Time (p_c), s		0.5		0.6		0.0		1.4				
Intersection Summary												
HCM 6th Ctrl Delay				7.1								
HCM 6th LOS				A								
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	12	0	389	331	0
Future Vol, veh/h	4	12	0	389	331	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	13	0	423	360	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	783	360	360	0	-	0
Stage 1	360	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	350	682	1210	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	350	682	1210	-	-	-
Mov Cap-2 Maneuver	350	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.7	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1210	-	551	-	-	
HCM Lane V/C Ratio	-	-	0.032	-	-	
HCM Control Delay (s)	0	-	11.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022




												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	13	94	27	38	124	56	14	305	55	21	305	11
Future Volume (veh/h)	13	94	27	38	124	56	14	305	55	21	305	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1856	1707	1900	1870	1841	1884	1976	1945	1899	1961	1976
Adj Flow Rate, veh/h	14	102	29	41	135	61	15	332	60	23	332	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	3	13	0	2	4	6	0	2	5	1	0
Cap, veh/h	126	797	213	204	640	266	76	418	74	85	472	16
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	89	1304	348	208	1048	435	30	1599	282	59	1803	63
Grp Volume(v), veh/h	145	0	0	237	0	0	407	0	0	367	0	0
Grp Sat Flow(s),veh/h/ln	1741	0	0	1691	0	0	1910	0	0	1926	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.9	0.0	0.0	3.3	0.0	0.0	10.9	0.0	0.0	9.4	0.0	0.0
Prop In Lane	0.10		0.20	0.17		0.26	0.04		0.15	0.06		0.03
Lane Grp Cap(c), veh/h	1136	0	0	1110	0	0	567	0	0	573	0	0
V/C Ratio(X)	0.13	0.00	0.00	0.21	0.00	0.00	0.72	0.00	0.00	0.64	0.00	0.00
Avail Cap(c_a), veh/h	1136	0	0	1110	0	0	946	0	0	947	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.5	0.0	0.0	4.8	0.0	0.0	19.0	0.0	0.0	18.5	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.0	0.0	0.0	4.6	0.0	0.0	4.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	0.0	0.0	5.2	0.0	0.0	19.7	0.0	0.0	18.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		145			237			407			367	
Approach Delay, s/veh		4.7			5.2			19.7			18.9	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		37.1		17.9		37.1		17.9				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		22.5		25.5		22.5		25.5				
Max Q Clear Time (g_c+I1), s		3.9		11.4		5.3		12.9				
Green Ext Time (p_c), s		0.5		1.4		0.9		1.5				
Intersection Summary												
HCM 6th Ctrl Delay				14.6								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

11: E 4th Ave & S B St

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	60	106	59	13	97	44	21	357	21	7	85	7
Future Volume (veh/h)	60	106	59	13	97	44	21	357	21	7	85	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1870	1900	1885	1796	1899	1930	1899	1976	1930	1976
Adj Flow Rate, veh/h	65	115	64	14	105	48	23	388	23	8	92	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	2	0	1	7	5	3	5	0	3	0
Cap, veh/h	145	167	82	84	230	98	96	1156	66	112	1086	90
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	1.00	1.00	1.00	0.66	0.66	0.66
Sat Flow, veh/h	326	875	427	70	1204	514	41	1752	100	64	1646	137
Grp Volume(v), veh/h	244	0	0	167	0	0	434	0	0	108	0	0
Grp Sat Flow(s),veh/h/ln	1628	0	0	1788	0	0	1893	0	0	1847	0	0
Q Serve(g_s), s	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.6	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Prop In Lane	0.27		0.26	0.08		0.29	0.05		0.05	0.07		0.07
Lane Grp Cap(c), veh/h	394	0	0	413	0	0	1318	0	0	1289	0	0
V/C Ratio(X)	0.62	0.00	0.00	0.40	0.00	0.00	0.33	0.00	0.00	0.08	0.00	0.00
Avail Cap(c_a), veh/h	766	0	0	831	0	0	1318	0	0	1289	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.98	0.00	0.00	0.96	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.0	0.0	0.0	19.8	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	1.8	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	0.0	20.1	0.0	0.0	0.6	0.0	0.0	3.5	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		244			167			434			108	
Approach Delay, s/veh		21.6			20.1			0.6			3.5	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		23.9		22.9		23.9		22.9				
Max Q Clear Time (g_c+I1), s		9.6		3.1		6.6		2.0				
Green Ext Time (p_c), s		0.9		0.3		0.6		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				9.7								
HCM 6th LOS				A								




Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	260	90	45	166
Future Vol, veh/h	61	27	260	90	45	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	283	98	49	180
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	610	332	0	0	381	0
Stage 1	332	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	442	703	-	-	1177	-
Stage 1	714	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	703	-	-	1177	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	14.3	0	1.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	481	1177	-	
HCM Lane V/C Ratio	-	-	0.199	0.042	-	
HCM Control Delay (s)	-	-	14.3	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	106	36	81	0	0	0	9	488	8	0	187	40
Future Volume (veh/h)	106	36	81	0	0	0	9	488	8	0	187	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	115	39	88	0	0	0	10	530	9	0	203	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	63	109	0	359	0	63	1260	21	0	1034	219
Arrive On Green	0.19	0.19	0.19	0.00	0.00	0.00	0.67	0.67	0.67	0.00	1.00	1.00
Sat Flow, veh/h	660	331	566	0	1870	0	10	1890	32	0	1551	329
Grp Volume(v), veh/h	242	0	0	0	0	0	549	0	0	0	0	246
Grp Sat Flow(s),veh/h/ln	1557	0	0	0	1870	0	1933	0	0	0	0	1880
Q Serve(g_s), s	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.48		0.36	0.00		0.00	0.02		0.02	0.00		0.17
Lane Grp Cap(c), veh/h	380	0	0	0	359	0	1345	0	0	0	0	1253
V/C Ratio(X)	0.64	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.20
Avail Cap(c_a), veh/h	710	0	0	0	760	0	1345	0	0	0	0	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.4
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		242			0			549			246	
Approach Delay, s/veh		25.7			0.0			6.0			0.4	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.1		47.9		17.1		47.9				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		26.4		29.4		26.4		29.4				
Max Q Clear Time (g_c+I1), s		11.6		2.0		0.0		10.6				
Green Ext Time (p_c), s		0.8		0.9		0.0		2.3				
Intersection Summary												
HCM 6th Ctrl Delay				9.2								
HCM 6th LOS				A								

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	9	35	0	392	327	0
Future Vol, veh/h	9	35	0	392	327	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	10	38	0	426	355	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	781	355	355	0	-	0
Stage 1	355	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	351	684	1215	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	351	684	1215	-	-	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.9	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1215	-	573	-	-	
HCM Lane V/C Ratio	-	-	0.083	-	-	
HCM Control Delay (s)	0	-	11.9	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	18	114	35	39	135	72	44	407	63	25	283	30
Future Volume (veh/h)	18	114	35	39	135	72	44	407	63	25	283	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1885	1900	1976	1961	1945	1976	1976	1976
Adj Flow Rate, veh/h	20	124	38	42	147	78	48	442	68	27	308	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	1	0	0	1	2	0	0	0
Cap, veh/h	124	705	202	167	558	273	94	524	77	83	564	58
Arrive On Green	1.00	1.00	1.00	0.55	0.55	0.55	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	114	1281	368	187	1015	496	99	1529	226	69	1649	169
Grp Volume(v), veh/h	182	0	0	267	0	0	558	0	0	368	0	0
Grp Sat Flow(s),veh/h/ln	1763	0	0	1697	0	0	1855	0	0	1886	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	5.1	0.0	0.0	18.2	0.0	0.0	10.0	0.0	0.0
Prop In Lane	0.11		0.21	0.16		0.29	0.09		0.12	0.07		0.09
Lane Grp Cap(c), veh/h	1031	0	0	998	0	0	695	0	0	705	0	0
V/C Ratio(X)	0.18	0.00	0.00	0.27	0.00	0.00	0.80	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	1031	0	0	998	0	0	923	0	0	934	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	7.7	0.0	0.0	19.9	0.0	0.0	17.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	2.8	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.9	0.0	0.0	7.8	0.0	0.0	4.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	0.0	0.0	8.4	0.0	0.0	22.7	0.0	0.0	17.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		182			267			558			368	
Approach Delay, s/veh		0.2			8.4			22.7			17.6	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.3		25.7		39.3		25.7				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		27.5		30.5		27.5		30.5				
Max Q Clear Time (g_c+I1), s		2.0		12.0		7.1		20.2				
Green Ext Time (p_c), s		0.7		1.5		1.1		2.0				
Intersection Summary												
HCM 6th Ctrl Delay				15.6								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	110	97	19	128	56	37	507	47	10	109	22
Future Volume (veh/h)	38	110	97	19	128	56	37	507	47	10	109	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1811	1885	1841	1976	1945	1976	1976	1976	1976
Adj Flow Rate, veh/h	41	120	105	21	139	61	40	551	51	11	118	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	6	1	4	0	2	0	0	0	0
Cap, veh/h	98	165	130	78	228	93	102	1147	103	105	1016	198
Arrive On Green	0.19	0.19	0.19	0.25	0.25	0.25	1.00	1.00	1.00	0.69	0.69	0.69
Sat Flow, veh/h	179	876	689	92	1209	496	64	1673	150	67	1482	288
Grp Volume(v), veh/h	266	0	0	221	0	0	642	0	0	153	0	0
Grp Sat Flow(s),veh/h/ln	1744	0	0	1796	0	0	1886	0	0	1837	0	0
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.15		0.39	0.10		0.28	0.06		0.08	0.07		0.16
Lane Grp Cap(c), veh/h	393	0	0	399	0	0	1352	0	0	1319	0	0
V/C Ratio(X)	0.68	0.00	0.00	0.55	0.00	0.00	0.47	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	736	0	0	756	0	0	1352	0	0	1319	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.96	0.00	0.00	0.91	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.1	0.0	0.0	22.4	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.4	0.0	0.0	1.1	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	2.8	0.0	0.0	0.4	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.9	0.0	0.0	22.9	0.0	0.0	1.1	0.0	0.0	3.7	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		266			221			642			153	
Approach Delay, s/veh		25.9			22.9			1.1			3.7	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.4		48.6		16.4		48.6				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		25.9		30.9		25.9		30.9				
Max Q Clear Time (g_c+I1), s		11.3		3.8		9.1		2.0				
Green Ext Time (p_c), s		1.0		0.6		0.8		3.1				
Intersection Summary												
HCM 6th Ctrl Delay				10.3								
HCM 6th LOS				B								

Appendix E Cumulative Conditions Synchro Worksheets



















Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	82	30	221	53	6	243
Future Vol, veh/h	82	30	221	53	6	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	33	240	58	7	264
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	547	269	0	0	298	0
Stage 1	269	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	483	764	-	-	1263	-
Stage 1	765	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	480	764	-	-	1263	-
Mov Cap-2 Maneuver	480	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.7	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	533	1263	-	
HCM Lane V/C Ratio	-	-	0.228	0.005	-	
HCM Control Delay (s)	-	-	13.7	7.9	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.9	0	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	71	14	102	0	0	0	17	572	3	0	220	33
Future Volume (veh/h)	71	14	102	0	0	0	17	572	3	0	220	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	77	15	111	0	0	0	18	622	3	0	239	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	43	156	0	340	0	80	1237	6	0	1072	161
Arrive On Green	0.18	0.18	0.18	0.00	0.00	0.00	0.65	0.65	0.65	0.00	1.00	1.00
Sat Flow, veh/h	474	236	856	0	1870	0	20	1901	9	0	1646	248
Grp Volume(v), veh/h	203	0	0	0	0	0	643	0	0	0	0	275
Grp Sat Flow(s),veh/h/ln	1565	0	0	0	1870	0	1930	0	0	0	0	1894
Q Serve(g_s), s	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.6	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.38		0.55	0.00		0.00	0.03		0.00	0.00		0.13
Lane Grp Cap(c), veh/h	375	0	0	0	340	0	1323	0	0	0	0	1233
V/C Ratio(X)	0.54	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.22
Avail Cap(c_a), veh/h	776	0	0	0	830	0	1323	0	0	0	0	1233
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.98
Uniform Delay (d), s/veh	21.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.4
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		203			0			643			275	
Approach Delay, s/veh		21.5			0.0			6.3			0.4	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.4		21.4		24.4		21.4				
Max Q Clear Time (g_c+I1), s		8.6		2.0		0.0		11.5				
Green Ext Time (p_c), s		0.7		1.0		0.0		2.2				
Intersection Summary												
HCM 6th Ctrl Delay				7.6								
HCM 6th LOS				A								
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection

Int Delay, s/veh 0.3

Movement SEL SER NEL NET SWT SWR

Lane Configurations 

Traffic Vol, veh/h 4 13 0 352 328 0

Future Vol, veh/h 4 13 0 352 328 0

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 1 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 0 0 0 1 0

Mvmt Flow 4 14 0 383 357 0

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 740 357 357 0 - 0

Stage 1 357 - - - - -

Stage 2 383 - - - - -

Critical Hdwy 6.6 6.3 4.1 - - -

Critical Hdwy Stg 1 5.6 - - - - -

Critical Hdwy Stg 2 5.6 - - - - -

Follow-up Hdwy 3.5 3.3 2.2 - - -

Pot Cap-1 Maneuver 371 685 1213 - - -

Stage 1 699 - - - - -

Stage 2 679 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 371 685 1213 - - -

Mov Cap-2 Maneuver 371 - - - - -

Stage 1 699 - - - - -

Stage 2 679 - - - - -

Approach SE NE SW

HCM Control Delay, s 11.5 0 0

HCM LOS B

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

Capacity (veh/h) 1213 - 571 - -

HCM Lane V/C Ratio - - 0.032 - -

HCM Control Delay (s) 0 - 11.5 - -

















HCM Lane LOS A - B - -

HCM 95th %tile Q(veh) 0 - 0.1 - -

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022




												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	238	36	51	314	92	21	304	84	35	272	18
Future Volume (veh/h)	21	238	36	51	314	92	21	304	84	35	272	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1856	1707	1900	1870	1841	1884	1976	1945	1976	1930	1976
Adj Flow Rate, veh/h	23	259	39	55	341	100	23	330	91	38	296	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	3	13	0	2	4	6	0	2	0	3	0
Cap, veh/h	102	881	126	138	746	205	82	412	110	104	462	30
Arrive On Green	1.00	1.00	1.00	0.59	0.59	0.59	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	54	1497	214	111	1267	348	47	1449	386	113	1625	104
Grp Volume(v), veh/h	321	0	0	496	0	0	444	0	0	354	0	0
Grp Sat Flow(s),veh/h/ln	1765	0	0	1727	0	0	1881	0	0	1841	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	8.6	0.0	0.0	12.0	0.0	0.0	9.1	0.0	0.0
Prop In Lane	0.07		0.12	0.11		0.20	0.05		0.20	0.11		0.06
Lane Grp Cap(c), veh/h	1108	0	0	1089	0	0	604	0	0	596	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.46	0.00	0.00	0.74	0.00	0.00	0.59	0.00	0.00
Avail Cap(c_a), veh/h	1108	0	0	1089	0	0	933	0	0	908	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.20	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	6.4	0.0	0.0	18.4	0.0	0.0	17.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.4	0.0	0.0	0.7	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.9	0.0	0.0	4.9	0.0	0.0	3.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	0.0	0.0	7.8	0.0	0.0	19.0	0.0	0.0	17.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		321			496			444			354	
Approach Delay, s/veh		0.1			7.8			19.0			17.7	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.9		19.1		35.9		19.1				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		22.5		25.5		22.5		25.5				
Max Q Clear Time (g_c+I1), s		2.0		11.1		10.6		14.0				
Green Ext Time (p_c), s		1.3		1.4		1.9		1.6				
Intersection Summary												
HCM 6th Ctrl Delay				11.5								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

11: E 4th Ave & S B St

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	122	258	120	27	243	90	43	585	41	14	139	14
Future Volume (veh/h)	122	258	120	27	243	90	43	585	41	14	139	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1870	1900	1885	1796	1899	1930	1899	1976	1930	1976
Adj Flow Rate, veh/h	133	280	130	29	264	98	47	636	45	15	151	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	2	0	1	7	5	3	5	0	3	0
Cap, veh/h	199	333	142	95	495	174	102	776	53	98	740	69
Arrive On Green	0.39	0.39	0.39	0.78	0.78	0.78	0.92	0.92	0.92	0.46	0.46	0.46
Sat Flow, veh/h	300	853	363	64	1268	446	69	1687	116	59	1607	151
Grp Volume(v), veh/h	543	0	0	391	0	0	728	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1515	0	0	1778	0	0	1872	0	0	1817	0	0
Q Serve(g_s), s	13.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.5	0.0	0.0	4.6	0.0	0.0	7.1	0.0	0.0	3.1	0.0	0.0
Prop In Lane	0.24		0.24	0.07		0.25	0.06		0.06	0.08		0.08
Lane Grp Cap(c), veh/h	674	0	0	765	0	0	931	0	0	907	0	0
V/C Ratio(X)	0.81	0.00	0.00	0.51	0.00	0.00	0.78	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	737	0	0	839	0	0	931	0	0	907	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.84	0.00	0.00	0.86	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.5	0.0	0.0	4.2	0.0	0.0	1.5	0.0	0.0	8.9	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.0	0.0	0.2	0.0	0.0	5.6	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	1.0	0.0	0.0	2.1	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	0.0	0.0	4.3	0.0	0.0	7.1	0.0	0.0	9.4	0.0	0.0
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		543			391			728			181	
Approach Delay, s/veh		20.9			4.3			7.1			9.4	
Approach LOS		C			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.6		29.4		25.6		29.4				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		23.9		22.9		23.9		22.9				
Max Q Clear Time (g_c+I1), s		20.5		5.1		6.6		9.1				
Green Ext Time (p_c), s		1.0		0.6		1.7		3.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.8								
HCM 6th LOS				B								




Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	63	28	242	95	38	140
Future Vol, veh/h	63	28	242	95	38	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	30	263	103	41	152
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	549	315	0	0	366	0
Stage 1	315	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	482	719	-	-	1193	-
Stage 1	727	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	464	719	-	-	1193	-
Mov Cap-2 Maneuver	464	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.5	0	1.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	521	1193	-	
HCM Lane V/C Ratio	-	-	0.19	0.035	-	
HCM Control Delay (s)	-	-	13.5	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	134	39	102	0	0	0	11	713	10	0	272	50
Future Volume (veh/h)	134	39	102	0	0	0	11	713	10	0	272	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	146	42	111	0	0	0	12	775	11	0	296	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	242	64	132	0	431	0	62	1191	17	0	1002	183
Arrive On Green	0.23	0.23	0.23	0.00	0.00	0.00	0.63	0.63	0.63	0.00	1.00	1.00
Sat Flow, veh/h	693	279	574	0	1870	0	9	1897	27	0	1596	291
Grp Volume(v), veh/h	299	0	0	0	0	0	798	0	0	0	0	350
Grp Sat Flow(s),veh/h/ln	1546	0	0	0	1870	0	1933	0	0	0	0	1887
Q Serve(g_s), s	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	0.0	0.0	0.0	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.49		0.37	0.00		0.00	0.02		0.01	0.00		0.15
Lane Grp Cap(c), veh/h	438	0	0	0	431	0	1270	0	0	0	0	1185
V/C Ratio(X)	0.68	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.30
Avail Cap(c_a), veh/h	707	0	0	0	760	0	1270	0	0	0	0	1185
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.98
Uniform Delay (d), s/veh	23.8	0.0	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.6
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		299			0			798			350	
Approach Delay, s/veh		24.5			0.0			10.0			0.6	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		19.6		45.4		19.6		45.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		26.4		29.4		26.4		29.4				
Max Q Clear Time (g_c+I1), s		14.0		2.0		0.0		18.9				
Green Ext Time (p_c), s		1.0		1.4		0.0		3.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.7								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	0.8					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	10	38	0	385	304	0
Future Vol, veh/h	10	38	0	385	304	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	11	41	0	418	330	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	748	330	330	0	-	0
Stage 1	330	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	367	707	1241	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	707	1241	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.7	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1241	-	593	-	-	
HCM Lane V/C Ratio	-	-	0.088	-	-	
HCM Control Delay (s)	0	-	11.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	26	216	44	50	255	103	52	369	75	36	279	43
Future Volume (veh/h)	26	216	44	50	255	103	52	369	75	36	279	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1885	1900	1976	1961	1945	1976	1976	1976
Adj Flow Rate, veh/h	28	235	48	54	277	112	57	401	82	39	303	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	1	0	0	1	2	0	0	0
Cap, veh/h	107	792	153	135	643	242	104	479	93	96	502	74
Arrive On Green	1.00	1.00	1.00	0.56	0.56	0.56	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	84	1419	274	130	1152	434	129	1433	280	104	1503	221
Grp Volume(v), veh/h	311	0	0	443	0	0	540	0	0	389	0	0
Grp Sat Flow(s),veh/h/ln	1777	0	0	1715	0	0	1842	0	0	1828	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	9.4	0.0	0.0	17.7	0.0	0.0	11.2	0.0	0.0
Prop In Lane	0.09		0.15	0.12		0.25	0.11		0.15	0.10		0.12
Lane Grp Cap(c), veh/h	1052	0	0	1019	0	0	677	0	0	672	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.43	0.00	0.00	0.80	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	1052	0	0	1019	0	0	914	0	0	908	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.34	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	8.4	0.0	0.0	20.1	0.0	0.0	18.0	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.4	0.0	0.0	2.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	3.5	0.0	0.0	7.5	0.0	0.0	4.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	0.0	0.0	9.8	0.0	0.0	22.7	0.0	0.0	18.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		311			443			540			389	
Approach Delay, s/veh		0.2			9.8			22.7			18.3	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.8		25.2		39.8		25.2				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		27.5		30.5		27.5		30.5				
Max Q Clear Time (g_c+I1), s		2.0		13.2		11.4		19.7				
Green Ext Time (p_c), s		1.4		1.7		1.9		2.0				
Intersection Summary												
HCM 6th Ctrl Delay				14.1								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	63	202	162	30	233	90	62	743	77	17	160	37
Future Volume (veh/h)	63	202	162	30	233	90	62	743	77	17	160	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1811	1885	1841	1976	1945	1976	1976	1976	1976
Adj Flow Rate, veh/h	68	220	176	33	253	98	67	808	84	18	174	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	6	1	4	0	2	0	0	0	0
Cap, veh/h	118	270	198	86	376	138	108	914	93	96	803	175
Arrive On Green	0.31	0.31	0.31	0.61	0.61	0.61	1.00	1.00	1.00	0.57	0.57	0.57
Sat Flow, veh/h	178	879	646	83	1225	448	87	1614	163	65	1418	309
Grp Volume(v), veh/h	464	0	0	384	0	0	959	0	0	232	0	0
Grp Sat Flow(s),veh/h/ln	1703	0	0	1756	0	0	1864	0	0	1791	0	0
Q Serve(g_s), s	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.6	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Prop In Lane	0.15		0.38	0.09		0.26	0.07		0.09	0.08		0.17
Lane Grp Cap(c), veh/h	587	0	0	599	0	0	1115	0	0	1075	0	0
V/C Ratio(X)	0.79	0.00	0.00	0.64	0.00	0.00	0.86	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	733	0	0	753	0	0	1115	0	0	1075	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.86	0.00	0.00	0.71	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0	0.5	0.0	0.0	6.4	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	0.0	0.0	2.5	0.0	0.0	2.0	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	0.0	10.9	0.0	0.0	6.4	0.0	0.0	7.4	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		464			384			959			232	
Approach Delay, s/veh		24.8			10.9			6.4			7.4	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.1		40.9		24.1		40.9				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		25.9		30.9		25.9		30.9				
Max Q Clear Time (g_c+I1), s		18.6		5.9		11.3		2.0				
Green Ext Time (p_c), s		1.4		1.0		1.5		5.9				
Intersection Summary												
HCM 6th Ctrl Delay				11.5								
HCM 6th LOS				B								

Appendix F Cumulative Plus Project Synchro Worksheets






















Intersection						
Int Delay, s/veh	3.1					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	82	54	256	53	22	250
Future Vol, veh/h	82	54	256	53	22	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	59	278	58	24	272
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	627	307	0	0	336	0
Stage 1	307	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	432	727	-	-	1223	-
Stage 1	733	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	727	-	-	1223	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	706	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	15	0	0.6			
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	506	1223	-	
HCM Lane V/C Ratio	-	-	0.292	0.02	-	
HCM Control Delay (s)	-	-	15	8	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-	

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/10/2022

















												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	71	14	102	0	0	0	17	573	3	0	220	33
Future Volume (veh/h)	71	14	102	0	0	0	17	573	3	0	220	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	77	15	111	0	0	0	18	623	3	0	239	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	43	156	0	340	0	80	1237	6	0	1072	161
Arrive On Green	0.18	0.18	0.18	0.00	0.00	0.00	0.65	0.65	0.65	0.00	1.00	1.00
Sat Flow, veh/h	474	236	856	0	1870	0	20	1901	9	0	1646	248
Grp Volume(v), veh/h	203	0	0	0	0	0	644	0	0	0	0	275
Grp Sat Flow(s),veh/h/ln	1565	0	0	0	1870	0	1930	0	0	0	0	1894
Q Serve(g_s), s	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.6	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.38		0.55	0.00		0.00	0.03		0.00	0.00		0.13
Lane Grp Cap(c), veh/h	375	0	0	0	340	0	1323	0	0	0	0	1233
V/C Ratio(X)	0.54	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.22
Avail Cap(c_a), veh/h	776	0	0	0	830	0	1323	0	0	0	0	1233
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.98
Uniform Delay (d), s/veh	21.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.4
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		203			0			644			275	
Approach Delay, s/veh		21.5			0.0			6.3			0.4	
Approach LOS		C						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.6		40.4		14.6		40.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.4		21.4		24.4		21.4				
Max Q Clear Time (g_c+I1), s		8.6		2.0		0.0		11.5				
Green Ext Time (p_c), s		0.7		1.0		0.0		2.2				
Intersection Summary												
HCM 6th Ctrl Delay				7.6								
HCM 6th LOS				A								
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	13	0	411	351	0
Future Vol, veh/h	4	13	0	411	351	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	14	0	447	382	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	829	382	382	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	328	663	1188	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	328	663	1188	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	12	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1188	-	535	-	-	
HCM Lane V/C Ratio	-	-	0.035	-	-	
HCM Control Delay (s)	0	-	12	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/10/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	238	41	58	314	92	22	324	88	35	322	18
Future Volume (veh/h)	21	238	41	58	314	92	22	324	88	35	322	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1856	1707	1900	1870	1841	1884	1976	1945	1899	1961	1976
Adj Flow Rate, veh/h	23	259	45	63	341	100	24	352	96	38	350	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	3	13	0	2	4	6	0	2	5	1	0
Cap, veh/h	99	844	139	149	713	195	83	434	114	101	503	27
Arrive On Green	1.00	1.00	1.00	0.57	0.57	0.57	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	51	1469	243	131	1242	340	46	1457	384	99	1686	92
Grp Volume(v), veh/h	327	0	0	504	0	0	472	0	0	408	0	0
Grp Sat Flow(s),veh/h/ln	1762	0	0	1712	0	0	1887	0	0	1877	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	9.1	0.0	0.0	12.7	0.0	0.0	10.5	0.0	0.0
Prop In Lane	0.07		0.14	0.12		0.20	0.05		0.20	0.09		0.05
Lane Grp Cap(c), veh/h	1082	0	0	1057	0	0	632	0	0	631	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.48	0.00	0.00	0.75	0.00	0.00	0.65	0.00	0.00
Avail Cap(c_a), veh/h	1082	0	0	1057	0	0	934	0	0	926	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.19	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	6.9	0.0	0.0	18.0	0.0	0.0	17.2	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.5	0.0	0.0	0.8	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	3.1	0.0	0.0	5.2	0.0	0.0	4.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	0.0	0.0	8.4	0.0	0.0	18.7	0.0	0.0	17.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		327			504			472			408	
Approach Delay, s/veh		0.1			8.4			18.7			17.6	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.1		19.9		35.1		19.9				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		22.5		25.5		22.5		25.5				
Max Q Clear Time (g_c+I1), s		2.0		12.5		11.1		14.7				
Green Ext Time (p_c), s		1.4		1.5		1.9		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				11.9								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary




11: E 4th Ave & S B St

10/10/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	122	262	120	27	244	90	43	585	42	14	139	14
Future Volume (veh/h)	122	262	120	27	244	90	43	585	42	14	139	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1870	1900	1885	1796	1899	1930	1899	1976	1930	1976
Adj Flow Rate, veh/h	133	285	130	29	265	98	47	636	46	15	151	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	2	0	1	7	5	3	5	0	3	0
Cap, veh/h	198	338	141	96	500	175	101	770	54	98	735	69
Arrive On Green	0.39	0.39	0.39	0.79	0.79	0.79	0.91	0.91	0.91	0.46	0.46	0.46
Sat Flow, veh/h	297	859	359	64	1269	444	69	1684	118	59	1608	151
Grp Volume(v), veh/h	548	0	0	392	0	0	729	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1515	0	0	1778	0	0	1872	0	0	1817	0	0
Q Serve(g_s), s	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.7	0.0	0.0	4.5	0.0	0.0	7.6	0.0	0.0	3.1	0.0	0.0
Prop In Lane	0.24		0.24	0.07		0.25	0.06		0.06	0.08		0.08
Lane Grp Cap(c), veh/h	678	0	0	770	0	0	925	0	0	902	0	0
V/C Ratio(X)	0.81	0.00	0.00	0.51	0.00	0.00	0.79	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	737	0	0	839	0	0	925	0	0	902	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.82	0.00	0.00	0.86	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.5	0.0	0.0	4.0	0.0	0.0	1.6	0.0	0.0	9.0	0.0	0.0
Incr Delay (d2), s/veh	5.6	0.0	0.0	0.2	0.0	0.0	5.8	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	0.0	1.0	0.0	0.0	2.2	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	0.0	0.0	4.2	0.0	0.0	7.4	0.0	0.0	9.5	0.0	0.0
LnGrp LOS	C	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		548			392			729			181	
Approach Delay, s/veh		21.0			4.2			7.4			9.5	
Approach LOS		C			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.8		29.2		25.8		29.2				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		23.9		22.9		23.9		22.9				
Max Q Clear Time (g_c+I1), s		20.7		5.1		6.5		9.6				
Green Ext Time (p_c), s		0.9		0.6		1.7		3.0				
Intersection Summary												
HCM 6th Ctrl Delay				11.0								
HCM 6th LOS				B								

Intersection

Int Delay, s/veh 2.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	63	28	278	95	47	177
Future Vol, veh/h	63	28	278	95	47	177
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	30	302	103	51	192

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	648	354	0
Stage 1	354	-	-
Stage 2	294	-	-
Critical Hdwy	6.62	6.32	-
Critical Hdwy Stg 1	5.62	-	-
Critical Hdwy Stg 2	5.62	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	420	683	-
Stage 1	697	-	-
Stage 2	744	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	399	683	-
Mov Cap-2 Maneuver	399	-	-
Stage 1	697	-	-
Stage 2	708	-	-

















Approach	NW	NE	SW
HCM Control Delay, s	15	0	1.7
HCM LOS	C		




Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT
Capacity (veh/h)	-	-	458	1154
HCM Lane V/C Ratio	-	-	0.216	0.044
HCM Control Delay (s)	-	-	15	8.3
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1

HCM 6th Signalized Intersection Summary

7: E 4th Ave & Ellsworth Ave

10/07/2022

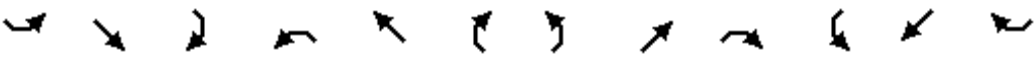
												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	134	39	102	0	0	0	11	714	10	0	273	50
Future Volume (veh/h)	134	39	102	0	0	0	11	714	10	0	273	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1945	1945	1945	1939	1939	1939
Adj Flow Rate, veh/h	146	42	111	0	0	0	12	776	11	0	297	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	242	64	132	0	431	0	62	1191	17	0	1003	182
Arrive On Green	0.23	0.23	0.23	0.00	0.00	0.00	0.63	0.63	0.63	0.00	1.00	1.00
Sat Flow, veh/h	693	279	574	0	1870	0	9	1897	27	0	1597	290
Grp Volume(v), veh/h	299	0	0	0	0	0	799	0	0	0	0	351
Grp Sat Flow(s),veh/h/ln	1546	0	0	0	1870	0	1933	0	0	0	0	1887
Q Serve(g_s), s	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	0.0	0.0	0.0	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.49		0.37	0.00		0.00	0.02		0.01	0.00		0.15
Lane Grp Cap(c), veh/h	438	0	0	0	431	0	1270	0	0	0	0	1185
V/C Ratio(X)	0.68	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.30
Avail Cap(c_a), veh/h	707	0	0	0	760	0	1270	0	0	0	0	1185
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.98
Uniform Delay (d), s/veh	23.8	0.0	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.6
LnGrp LOS	C	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		299			0			799			351	
Approach Delay, s/veh		24.5			0.0			10.0			0.6	
Approach LOS		C						B			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		19.6		45.4		19.6		45.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		26.4		29.4		26.4		29.4				
Max Q Clear Time (g_c+I1), s		14.0		2.0		0.0		18.9				
Green Ext Time (p_c), s		1.0		1.4		0.0		3.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.7								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	10	38	0	421	350	0
Future Vol, veh/h	10	38	0	421	350	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	11	41	0	458	380	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	838	380	380	0	-	0
Stage 1	380	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	324	662	1190	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	662	1190	-	-	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	12.3	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1190	-	544	-	-	
HCM Lane V/C Ratio	-	-	0.096	-	-	
HCM Control Delay (s)	0	-	12.3	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM 6th Signalized Intersection Summary

10: E 5th Ave & S B St

















10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	26	216	48	54	255	103	60	435	86	36	304	43
Future Volume (veh/h)	26	216	48	54	255	103	60	435	86	36	304	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1885	1900	1976	1961	1945	1976	1976	1976
Adj Flow Rate, veh/h	28	235	52	59	277	112	65	473	93	39	330	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	1	0	0	1	2	0	0	0
Cap, veh/h	100	717	150	135	580	218	110	548	103	96	580	78
Arrive On Green	1.00	1.00	1.00	0.51	0.51	0.51	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	78	1406	294	142	1138	427	128	1433	270	94	1515	205
Grp Volume(v), veh/h	315	0	0	448	0	0	631	0	0	416	0	0
Grp Sat Flow(s),veh/h/ln	1778	0	0	1707	0	0	1831	0	0	1814	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	10.5	0.0	0.0	20.8	0.0	0.0	11.1	0.0	0.0
Prop In Lane	0.09		0.17	0.13		0.25	0.10		0.15	0.09		0.11
Lane Grp Cap(c), veh/h	967	0	0	933	0	0	762	0	0	755	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.48	0.00	0.00	0.83	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	967	0	0	933	0	0	914	0	0	905	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.34	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	10.4	0.0	0.0	18.6	0.0	0.0	15.8	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.8	0.0	0.0	4.6	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	4.1	0.0	0.0	9.1	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.3	0.0	0.0	12.2	0.0	0.0	23.2	0.0	0.0	16.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	C	A	A	B	A	A
Approach Vol, veh/h		315			448			631			416	
Approach Delay, s/veh		0.3			12.2			23.2			16.0	
Approach LOS		A			B			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		36.6		28.4		36.6		28.4				
Change Period (Y+Rc), s		3.5		3.5		3.5		3.5				
Max Green Setting (Gmax), s		27.5		30.5		27.5		30.5				
Max Q Clear Time (g_c+I1), s		2.0		13.1		12.5		22.8				
Green Ext Time (p_c), s		1.4		1.8		1.9		2.0				
Intersection Summary												
HCM 6th Ctrl Delay				14.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

11: E 4th Ave & S B St




10/07/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	63	205	162	31	238	92	62	743	78	17	160	37
Future Volume (veh/h)	63	205	162	31	238	92	62	743	78	17	160	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1811	1885	1841	1976	1945	1976	1976	1976	1976
Adj Flow Rate, veh/h	68	223	176	34	259	100	67	808	85	18	174	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	6	1	4	0	2	0	0	0	0
Cap, veh/h	118	273	198	86	378	138	108	911	93	96	801	174
Arrive On Green	0.31	0.31	0.31	0.62	0.62	0.62	1.00	1.00	1.00	0.56	0.56	0.56
Sat Flow, veh/h	176	885	642	84	1222	446	87	1612	165	65	1418	309
Grp Volume(v), veh/h	467	0	0	393	0	0	960	0	0	232	0	0
Grp Sat Flow(s),veh/h/ln	1703	0	0	1753	0	0	1863	0	0	1791	0	0
Q Serve(g_s), s	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.7	0.0	0.0	9.7	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Prop In Lane	0.15		0.38	0.09		0.25	0.07		0.09	0.08		0.17
Lane Grp Cap(c), veh/h	589	0	0	602	0	0	1112	0	0	1072	0	0
V/C Ratio(X)	0.79	0.00	0.00	0.65	0.00	0.00	0.86	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	733	0	0	752	0	0	1112	0	0	1072	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.82	0.00	0.00	0.71	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	0.6	0.0	0.0	6.6	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	0.0	0.0	2.5	0.0	0.0	2.0	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	0.0	11.0	0.0	0.0	6.6	0.0	0.0	7.5	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		467			393			960			232	
Approach Delay, s/veh		24.8			11.0			6.6			7.5	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.2		40.8		24.2		40.8				
Change Period (Y+Rc), s		4.1		4.1		4.1		4.1				
Max Green Setting (Gmax), s		25.9		30.9		25.9		30.9				
Max Q Clear Time (g_c+I1), s		18.7		5.9		11.7		2.0				
Green Ext Time (p_c), s		1.4		1.0		1.6		5.9				
Intersection Summary												
HCM 6th Ctrl Delay				11.7								
HCM 6th LOS				B								

Appendix G 95th Percentile Queue Length Synchro Worksheets



Existing AM/PM 95th Queues

Intersection						
Int Delay, s/veh	3.3					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	45	228	51	42	243
Future Vol, veh/h	81	45	228	51	42	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	49	248	55	46	264
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	632	276	0	0	303	0
Stage 1	276	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	429	757	-	-	1258	-
Stage 1	759	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	411	757	-	-	1258	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	15.1	0	1.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	491	1258	-	
HCM Lane V/C Ratio	-	-	0.279	0.036	-	
HCM Control Delay (s)	-	-	15.1	8	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-	




Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	266	75	418	173
v/c Ratio	0.66	0.18	0.35	0.15
Control Delay	22.3	15.2	7.6	5.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.3	15.2	7.6	5.4
Queue Length 50th (ft)	63	20	56	26
Queue Length 95th (ft)	109	39	135	53
Internal Link Dist (ft)	655	212	1008	209
Turn Bay Length (ft)				
Base Capacity (vph)	703	771	1195	1190
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.10	0.35	0.15
Intersection Summary				

Intersection						
Int Delay, s/veh	1.9					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	21	63	36	284	284	10
Future Vol, veh/h	21	63	36	284	284	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	23	68	39	309	309	11
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	702	315	320	0	-	0
Stage 1	315	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	392	724	1251	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	377	724	1251	-	-	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Approach	SE	NE	SW			
HCM Control Delay, s	12.2	0.9	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1251	-	589	-	-	
HCM Lane V/C Ratio	0.031	-	0.155	-	-	
HCM Control Delay (s)	8	0	12.2	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022

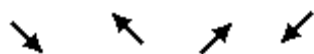


Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	141	233	349	295
v/c Ratio	0.14	0.23	0.65	0.58
Control Delay	2.2	5.5	22.4	21.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.2	5.5	22.4	21.4
Queue Length 50th (ft)	5	22	95	84
Queue Length 95th (ft)	17	66	140	124
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	1028	1033	938	915
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.37	0.32
Intersection Summary				

Queues

11: E 4th Ave & S B St




10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	243	167	438	111
v/c Ratio	0.64	0.39	0.36	0.09
Control Delay	22.8	10.7	4.0	5.5
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	22.8	10.7	4.2	5.5
Queue Length 50th (ft)	60	22	32	11
Queue Length 95th (ft)	103	38	55	36
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	652	724	1212	1201
Starvation Cap Reductn	0	0	213	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.23	0.44	0.09
Intersection Summary				

Intersection

Int Delay, s/veh 2.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	269	90	52	198
Future Vol, veh/h	61	27	269	90	52	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	292	98	57	215

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	670	341	0
Stage 1	341	-	-
Stage 2	329	-	-
Critical Hdwy	6.62	6.32	-
Critical Hdwy Stg 1	5.62	-	-
Critical Hdwy Stg 2	5.62	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	407	695	-
Stage 1	707	-	-
Stage 2	716	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	385	695	-
Mov Cap-2 Maneuver	385	-	-
Stage 1	707	-	-
Stage 2	677	-	-

Approach	NW	NE	SW
HCM Control Delay, s	15.3	0	1.7
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT
Capacity (veh/h)	-	-	446	1169
HCM Lane V/C Ratio	-	-	0.214	0.048
HCM Control Delay (s)	-	-	15.3	8.2
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2

Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	368	118	578	245
v/c Ratio	0.80	0.39	0.51	0.22
Control Delay	31.8	19.7	12.4	10.1
Queue Delay	0.0	0.0	0.0	0.4
Total Delay	31.8	19.7	12.4	10.4
Queue Length 50th (ft)	121	38	129	54
Queue Length 95th (ft)	184	70	261	91
Internal Link Dist (ft)	655	212	1008	209
Turn Bay Length (ft)				
Base Capacity (vph)	610	408	1127	1117
Starvation Cap Reductn	0	0	0	465
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.29	0.51	0.38
Intersection Summary				

Intersection

Int Delay, s/veh 3

Movement SEL SER NEL NET SWT SWR

Lane Configurations 

Traffic Vol, veh/h 32 120 45 318 226 27

Future Vol, veh/h 32 120 45 318 226 27

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 1 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 1 0 0 0 0

Mvmt Flow 35 130 49 346 246 29

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 705 261 275 0 - 0

Stage 1 261 - - - - -

Stage 2 444 - - - - -

Critical Hdwy 6.6 6.31 4.1 - - -

Critical Hdwy Stg 1 5.6 - - - - -

Critical Hdwy Stg 2 5.6 - - - - -

Follow-up Hdwy 3.5 3.309 2.2 - - -

Pot Cap-1 Maneuver 390 774 1300 - - -

Stage 1 776 - - - - -

Stage 2 635 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 372 774 1300 - - -

Mov Cap-2 Maneuver 372 - - - - -

Stage 1 740 - - - - -

Stage 2 635 - - - - -

Approach SE NE SW

HCM Control Delay, s 12.7 1 0

HCM LOS B

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

Capacity (veh/h) 1300 - 631 - -

HCM Lane V/C Ratio 0.038 - 0.262 - -

HCM Control Delay (s) 7.9 0 12.7 - -

HCM Lane LOS A A B - -

HCM 95th %tile Q(veh) 0.1 - 1 - -

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	184	268	450	302
v/c Ratio	0.18	0.27	0.75	0.50
Control Delay	4.3	7.8	26.9	19.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.3	7.8	26.9	19.6
Queue Length 50th (ft)	16	38	153	93
Queue Length 95th (ft)	38	98	205	131
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	1020	989	918	913
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.27	0.49	0.33
Intersection Summary				

Queues




11: E 4th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	292	218	644	156
v/c Ratio	0.75	0.53	0.51	0.12
Control Delay	30.2	16.9	5.0	5.6
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	30.2	16.9	5.0	5.6
Queue Length 50th (ft)	88	47	58	18
Queue Length 95th (ft)	144	71	100	51
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	610	660	1260	1252
Starvation Cap Reductn	0	0	51	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.33	0.53	0.12
Intersection Summary				

Baseline AM/PM 95th Queues

Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	30	207	51	6	228
Future Vol, veh/h	81	30	207	51	6	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	33	225	55	7	248
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	515	253	0	0	280	0
Stage 1	253	-	-	-	-	-
Stage 2	262	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	505	780	-	-	1283	-
Stage 1	778	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	502	780	-	-	1283	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.3	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	556	1283	-	
HCM Lane V/C Ratio	-	-	0.217	0.005	-	
HCM Control Delay (s)	-	-	13.3	7.8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.8	0	-	




Queues

7: E 4th Ave & Ellsworth Ave

10/10/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	157	395	173
v/c Ratio	0.46	0.30	0.13
Control Delay	15.1	5.3	3.6
Queue Delay	0.0	0.0	0.0
Total Delay	15.1	5.3	3.6
Queue Length 50th (ft)	21	45	19
Queue Length 95th (ft)	62	92	34
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	674	1302	1287
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.23	0.30	0.13
Intersection Summary			

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	12	0	330	308	0
Future Vol, veh/h	4	12	0	330	308	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	13	0	359	335	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	694	335	335	0	-	0
Stage 1	335	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	396	705	1236	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	396	705	1236	-	-	-
Mov Cap-2 Maneuver	396	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.3	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1236	-	590	-	-	
HCM Lane V/C Ratio	-	-	0.029	-	-	
HCM Control Delay (s)	0	-	11.3	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Queues

10: E 5th Ave & S B St

10/10/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	140	230	379	312
v/c Ratio	0.14	0.23	0.68	0.58
Control Delay	2.7	5.8	22.7	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.7	5.8	22.7	20.8
Queue Length 50th (ft)	5	23	105	87
Queue Length 95th (ft)	18	67	150	126
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	1008	1013	943	916
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.40	0.34
Intersection Summary				




Queues

11: E 4th Ave & S B St

10/10/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	240	166	433	108
v/c Ratio	0.63	0.40	0.36	0.09
Control Delay	22.6	10.8	4.3	5.4
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	22.6	10.8	4.5	5.4
Queue Length 50th (ft)	59	22	31	11
Queue Length 95th (ft)	102	37	54	35
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	655	724	1216	1205
Starvation Cap Reductn	0	0	257	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.23	0.45	0.09
Intersection Summary				

Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	224	90	36	129
Future Vol, veh/h	61	27	224	90	36	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	243	98	39	140
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	510	292	0	0	341	0
Stage 1	292	-	-	-	-	-
Stage 2	218	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	509	741	-	-	1218	-
Stage 1	746	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	491	741	-	-	1218	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13	0	1.8			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	548	1218	-	
HCM Lane V/C Ratio	-	-	0.175	0.032	-	
HCM Control Delay (s)	-	-	13	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-	




Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	242	548	245
v/c Ratio	0.70	0.42	0.19
Control Delay	28.4	7.9	6.6
Queue Delay	0.0	0.0	0.4
Total Delay	28.4	7.9	7.0
Queue Length 50th (ft)	70	87	50
Queue Length 95th (ft)	121	197	90
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	600	1303	1281
Starvation Cap Reductn	0	0	626
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.40	0.42	0.37
Intersection Summary			

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	9	35	0	356	281	0
Future Vol, veh/h	9	35	0	356	281	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	10	38	0	387	305	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	692	305	305	0	-	0
Stage 1	305	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	397	731	1267	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	397	731	1267	-	-	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.2	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1267	-	624	-	-	
HCM Lane V/C Ratio	-	-	0.077	-	-	
HCM Control Delay (s)	0	-	11.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	178	263	467	340
v/c Ratio	0.18	0.27	0.75	0.55
Control Delay	5.3	8.0	26.7	20.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	8.0	26.7	20.3
Queue Length 50th (ft)	15	38	159	107
Queue Length 95th (ft)	45	98	211	146
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	1005	979	921	920
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.27	0.51	0.37
Intersection Summary				

Queues




11: E 4th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	262	213	641	153
v/c Ratio	0.70	0.58	0.49	0.12
Control Delay	27.5	19.3	4.5	4.6
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	27.5	19.3	4.7	4.6
Queue Length 50th (ft)	74	48	66	15
Queue Length 95th (ft)	127	73	94	45
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	648	656	1315	1306
Starvation Cap Reductn	0	0	109	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.32	0.53	0.12
Intersection Summary				

Baseline Plus Project AM/PM 95th Queues

Intersection						
Int Delay, s/veh	3.1					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	54	242	51	22	235
Future Vol, veh/h	81	54	242	51	22	235
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	59	263	55	24	255
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	594	291	0	0	318	0
Stage 1	291	-	-	-	-	-
Stage 2	303	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	452	742	-	-	1242	-
Stage 1	746	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	442	742	-	-	1242	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	14.4	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	527	1242	-	
HCM Lane V/C Ratio	-	-	0.278	0.019	-	
HCM Control Delay (s)	-	-	14.4	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-	




Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	157	396	173
v/c Ratio	0.46	0.30	0.13
Control Delay	15.1	5.3	3.6
Queue Delay	0.0	0.0	0.0
Total Delay	15.1	5.3	3.6
Queue Length 50th (ft)	21	45	19
Queue Length 95th (ft)	62	92	34
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	674	1302	1287
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.23	0.30	0.13
Intersection Summary			

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	12	0	389	331	0
Future Vol, veh/h	4	12	0	389	331	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	13	0	423	360	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	783	360	360	0	-	0
Stage 1	360	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	350	682	1210	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	350	682	1210	-	-	-
Mov Cap-2 Maneuver	350	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.7	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1210	-	551	-	-	
HCM Lane V/C Ratio	-	-	0.032	-	-	
HCM Control Delay (s)	0	-	11.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	145	237	407	367
v/c Ratio	0.15	0.24	0.70	0.65
Control Delay	2.7	6.5	22.6	21.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.7	6.5	22.6	21.9
Queue Length 50th (ft)	5	26	112	104
Queue Length 95th (ft)	19	74	157	146
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	981	980	942	922
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.43	0.40
Intersection Summary				




Queues

11: E 4th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	244	167	434	108
v/c Ratio	0.64	0.39	0.36	0.09
Control Delay	22.8	10.5	4.4	5.5
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	22.8	10.5	4.6	5.5
Queue Length 50th (ft)	60	22	31	11
Queue Length 95th (ft)	104	37	54	35
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	656	724	1212	1201
Starvation Cap Reductn	0	0	253	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.23	0.45	0.09
Intersection Summary				

Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	61	27	260	90	45	166
Future Vol, veh/h	61	27	260	90	45	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	29	283	98	49	180
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	610	332	0	0	381	0
Stage 1	332	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	442	703	-	-	1177	-
Stage 1	714	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	703	-	-	1177	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	14.3	0	1.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	481	1177	-	
HCM Lane V/C Ratio	-	-	0.199	0.042	-	
HCM Control Delay (s)	-	-	14.3	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	




Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	242	549	246
v/c Ratio	0.70	0.42	0.19
Control Delay	28.4	7.9	6.6
Queue Delay	0.0	0.0	0.4
Total Delay	28.4	7.9	7.0
Queue Length 50th (ft)	70	87	50
Queue Length 95th (ft)	121	197	91
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	600	1303	1281
Starvation Cap Reductn	0	0	626
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.40	0.42	0.38
Intersection Summary			

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	9	35	0	392	327	0
Future Vol, veh/h	9	35	0	392	327	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	10	38	0	426	355	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	781	355	355	0	-	0
Stage 1	355	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	351	684	1215	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	351	684	1215	-	-	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.9	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1215	-	573	-	-	
HCM Lane V/C Ratio	-	-	0.083	-	-	
HCM Control Delay (s)	0	-	11.9	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	182	267	558	368
v/c Ratio	0.20	0.30	0.78	0.51
Control Delay	6.1	9.8	25.7	17.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.1	9.8	25.7	17.4
Queue Length 50th (ft)	16	46	183	106
Queue Length 95th (ft)	47	109	244	145
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	920	893	915	926
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.30	0.61	0.40
Intersection Summary				

Queues

11: E 4th Ave & S B St

10/07/2022






Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	266	221	642	153
v/c Ratio	0.70	0.60	0.49	0.12
Control Delay	27.8	19.9	4.6	4.8
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	27.8	19.9	4.7	4.8
Queue Length 50th (ft)	76	50	66	15
Queue Length 95th (ft)	130	m87	95	46
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	646	655	1308	1300
Starvation Cap Reductn	0	0	108	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.34	0.54	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Cumulative AM/PM 95th Queues

Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	82	30	221	53	6	243
Future Vol, veh/h	82	30	221	53	6	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	33	240	58	7	264
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	547	269	0	0	298	0
Stage 1	269	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	483	764	-	-	1263	-
Stage 1	765	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	480	764	-	-	1263	-
Mov Cap-2 Maneuver	480	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.7	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	533	1263	-	
HCM Lane V/C Ratio	-	-	0.228	0.005	-	
HCM Control Delay (s)	-	-	13.7	7.9	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.9	0	-	

Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	203	643	275
v/c Ratio	0.55	0.50	0.22
Control Delay	15.5	7.5	3.2
Queue Delay	0.0	0.6	0.0
Total Delay	15.5	8.1	3.2
Queue Length 50th (ft)	27	86	17
Queue Length 95th (ft)	72	192	m39
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	686	1281	1271
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	15	284	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.30	0.64	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection

Int Delay, s/veh 0.3

Movement SEL SER NEL NET SWT SWR

Lane Configurations 

Traffic Vol, veh/h 4 13 0 352 328 0

Future Vol, veh/h 4 13 0 352 328 0

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 1 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 0 0 0 1 0

Mvmt Flow 4 14 0 383 357 0

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 740 357 357 0 - 0

Stage 1 357 - - - - -

Stage 2 383 - - - - -

Critical Hdwy 6.6 6.3 4.1 - - -

Critical Hdwy Stg 1 5.6 - - - - -

Critical Hdwy Stg 2 5.6 - - - - -

Follow-up Hdwy 3.5 3.3 2.2 - - -

Pot Cap-1 Maneuver 371 685 1213 - - -

Stage 1 699 - - - - -

Stage 2 679 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 371 685 1213 - - -

Mov Cap-2 Maneuver 371 - - - - -

Stage 1 699 - - - - -

Stage 2 679 - - - - -

Approach SE NE SW

HCM Control Delay, s 11.5 0 0

HCM LOS B

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

Capacity (veh/h) 1213 - 571 - -

HCM Lane V/C Ratio - - 0.032 - -

HCM Control Delay (s) 0 - 11.5 - -

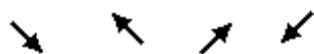
HCM Lane LOS A - B - -

HCM 95th %tile Q(veh) 0 - 0.1 - -

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	321	496	444	354
v/c Ratio	0.34	0.52	0.72	0.63
Control Delay	5.7	10.8	22.0	20.5
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	6.0	10.8	22.0	20.5
Queue Length 50th (ft)	27	80	119	97
Queue Length 95th (ft)	m44	201	165	136
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	952	949	931	860
Starvation Cap Reductn	217	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.52	0.48	0.41

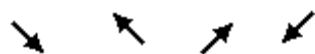
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

11: E 4th Ave & S B St




10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	543	391	728	181
v/c Ratio	0.95	0.57	0.86	0.22
Control Delay	45.7	10.7	22.9	10.6
Queue Delay	0.0	0.2	0.0	0.0
Total Delay	45.7	10.9	22.9	10.6
Queue Length 50th (ft)	149	37	213	34
Queue Length 95th (ft)	#332	98	#409	68
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	590	710	847	824
Starvation Cap Reductn	0	45	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.59	0.86	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	2.5					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	63	28	242	95	38	140
Future Vol, veh/h	63	28	242	95	38	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	30	263	103	41	152
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	549	315	0	0	366	0
Stage 1	315	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	482	719	-	-	1193	-
Stage 1	727	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	464	719	-	-	1193	-
Mov Cap-2 Maneuver	464	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	13.5	0	1.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	521	1193	-	
HCM Lane V/C Ratio	-	-	0.19	0.035	-	
HCM Control Delay (s)	-	-	13.5	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	

Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022






Lane Group	SET	NET	SWT
Lane Group Flow (vph)	299	798	350
v/c Ratio	0.75	0.65	0.29
Control Delay	29.4	13.8	7.4
Queue Delay	0.0	1.2	0.5
Total Delay	29.4	15.0	7.9
Queue Length 50th (ft)	89	179	70
Queue Length 95th (ft)	143	#454	m126
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	599	1224	1209
Starvation Cap Reductn	0	0	472
Spillback Cap Reductn	5	218	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.50	0.79	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection						
Int Delay, s/veh	0.8					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	10	38	0	385	304	0
Future Vol, veh/h	10	38	0	385	304	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	11	41	0	418	330	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	748	330	330	0	-	0
Stage 1	330	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	367	707	1241	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	707	1241	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	11.7	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1241	-	593	-	-	
HCM Lane V/C Ratio	-	-	0.088	-	-	
HCM Control Delay (s)	0	-	11.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	311	443	540	389
v/c Ratio	0.34	0.50	0.79	0.57
Control Delay	7.0	12.9	26.0	18.6
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	7.3	12.9	26.0	18.6
Queue Length 50th (ft)	35	96	177	114
Queue Length 95th (ft)	m72	211	235	156
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	918	892	892	891
Starvation Cap Reductn	235	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.46	0.50	0.61	0.44

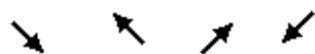
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

11: E 4th Ave & S B St

10/07/2022






Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	464	384	959	232
v/c Ratio	0.89	0.71	0.90	0.23
Control Delay	37.6	19.4	23.4	8.9
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	37.6	19.8	23.4	8.9
Queue Length 50th (ft)	146	72	348	41
Queue Length 95th (ft)	#279	135	#607	85
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	618	647	1065	1031
Starvation Cap Reductn	0	46	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.75	0.64	0.90	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Cumulative Plus Project AM/PM 95th Queues

Intersection						
Int Delay, s/veh	3.1					
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	82	54	256	53	22	250
Future Vol, veh/h	82	54	256	53	22	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	59	278	58	24	272
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	627	307	0	0	336	0
Stage 1	307	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Critical Hdwy	6.62	6.32	-	-	4.12	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	432	727	-	-	1223	-
Stage 1	733	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	727	-	-	1223	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	706	-	-	-	-	-
Approach	NW	NE	SW			
HCM Control Delay, s	15	0	0.6			
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT		
Capacity (veh/h)	-	-	506	1223	-	
HCM Lane V/C Ratio	-	-	0.292	0.02	-	
HCM Control Delay (s)	-	-	15	8	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-	

Queues

7: E 4th Ave & Ellsworth Ave




10/10/2022



Lane Group	SET	NET	SWT
Lane Group Flow (vph)	203	644	275
v/c Ratio	0.55	0.50	0.22
Control Delay	15.5	7.5	3.1
Queue Delay	0.0	0.6	0.0
Total Delay	15.5	8.1	3.1
Queue Length 50th (ft)	27	86	16
Queue Length 95th (ft)	72	193	m39
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	686	1281	1271
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	15	284	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.30	0.65	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	13	0	411	351	0
Future Vol, veh/h	4	13	0	411	351	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	4	14	0	447	382	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	829	382	382	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Critical Hdwy	6.6	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	328	663	1188	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	328	663	1188	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	12	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1188	-	535	-	-	
HCM Lane V/C Ratio	-	-	0.035	-	-	
HCM Control Delay (s)	0	-	12	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Queues

10: E 5th Ave & S B St

10/10/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	327	504	472	408
v/c Ratio	0.35	0.55	0.73	0.68
Control Delay	6.0	11.9	22.1	21.3
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	6.3	11.9	22.1	21.3
Queue Length 50th (ft)	29	86	126	113
Queue Length 95th (ft)	m45	215	173	155
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	928	917	930	880
Starvation Cap Reductn	200	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.55	0.51	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

11: E 4th Ave & S B St

10/10/2022






Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	548	392	729	181
v/c Ratio	0.96	0.57	0.86	0.22
Control Delay	46.4	10.8	23.3	10.6
Queue Delay	0.0	0.2	0.0	0.0
Total Delay	46.4	11.0	23.3	10.6
Queue Length 50th (ft)	150	37	213	34
Queue Length 95th (ft)	#336	105	#410	68
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	591	710	844	822
Starvation Cap Reductn	0	48	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.93	0.59	0.86	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection

Int Delay, s/veh 2.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	63	28	278	95	47	177
Future Vol, veh/h	63	28	278	95	47	177
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	1	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	30	302	103	51	192

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	648	354	0
Stage 1	354	-	-
Stage 2	294	-	-
Critical Hdwy	6.62	6.32	-
Critical Hdwy Stg 1	5.62	-	-
Critical Hdwy Stg 2	5.62	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	420	683	-
Stage 1	697	-	-
Stage 2	744	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	399	683	-
Mov Cap-2 Maneuver	399	-	-
Stage 1	697	-	-
Stage 2	708	-	-

Approach	NW	NE	SW
HCM Control Delay, s	15	0	1.7
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NERNWLn1	SWL	SWT
Capacity (veh/h)	-	-	458	1154
HCM Lane V/C Ratio	-	-	0.216	0.044
HCM Control Delay (s)	-	-	15	8.3
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1

Queues

7: E 4th Ave & Ellsworth Ave

10/07/2022






Lane Group	SET	NET	SWT
Lane Group Flow (vph)	299	799	351
v/c Ratio	0.75	0.65	0.29
Control Delay	29.4	13.8	7.4
Queue Delay	0.0	1.2	0.5
Total Delay	29.4	15.0	7.9
Queue Length 50th (ft)	89	179	67
Queue Length 95th (ft)	143	#454	m126
Internal Link Dist (ft)	655	1008	209
Turn Bay Length (ft)			
Base Capacity (vph)	599	1224	1209
Starvation Cap Reductn	0	0	472
Spillback Cap Reductn	5	220	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.50	0.80	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

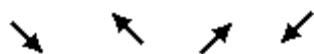
m Volume for 95th percentile queue is metered by upstream signal.

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	10	38	0	421	350	0
Future Vol, veh/h	10	38	0	421	350	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	11	41	0	458	380	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	838	380	380	0	-	0
Stage 1	380	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Critical Hdwy	6.6	6.31	4.1	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	324	662	1190	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	662	1190	-	-	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Approach	SE	NE		SW		
HCM Control Delay, s	12.3	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR	
Capacity (veh/h)	1190	-	544	-	-	
HCM Lane V/C Ratio	-	-	0.096	-	-	
HCM Control Delay (s)	0	-	12.3	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Queues

10: E 5th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	315	448	631	416
v/c Ratio	0.37	0.55	0.83	0.55
Control Delay	7.7	15.0	26.9	16.7
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	8.1	15.0	26.9	16.7
Queue Length 50th (ft)	40	110	204	114
Queue Length 95th (ft)	m72	214	296	169
Internal Link Dist (ft)	214	547	208	235
Turn Bay Length (ft)				
Base Capacity (vph)	852	822	892	894
Starvation Cap Reductn	202	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.55	0.71	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

11: E 4th Ave & S B St

10/07/2022



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	467	393	960	232
v/c Ratio	0.89	0.72	0.90	0.23
Control Delay	38.0	19.6	23.8	8.9
Queue Delay	0.0	0.4	0.0	0.0
Total Delay	38.0	20.0	23.8	8.9
Queue Length 50th (ft)	148	73	350	41
Queue Length 95th (ft)	#283	m142	#608	85
Internal Link Dist (ft)	667	214	209	237
Turn Bay Length (ft)				
Base Capacity (vph)	617	645	1062	1029
Starvation Cap Reductn	0	47	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.76	0.66	0.90	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.