Appendix A

Baseline Conditions Analysis

Introduction

The purpose of this memorandum is to evaluate the existing conditions of the Watertown transportation system. This consisted of a review of the existing roadway network, bike and pedestrian systems, transit service, intercity transportation, freight system, and traffic volumes and operations. Ultimately, this evaluation will assist in the identification of transportation system and traffic operations issues and aid in the development of recommendations for the final master transportation plan report.

Existing Roadway Network

The existing Watertown City roadway network comprises approximately 197 miles of streets (as of June 2015)[1]. The network is largely laid out in a rectilinear grid system with some non-conforming areas in the northeastern and northwestern sections of the City as well as south of US 212 (9th Avenue S)[1].

Primary routes throughout the city and surrounding area are identified in the current City major street plan. In this plan, roads are defined by roadway classification which indicates the level of mobility or access. These classifications range from major arterials with the greatest degree of mobility to local streets with the greatest degree of access. According to the major street plan, roadways are classified as major arterials, minor arterials, major collectors, alternative major collectors, minor collectors, and alternative minor collectors. An adapted version of this plan depicting existing roadway classification is shown in **Figure 1**. The primary routes within the City and surrounding area include:

- Major Arterials
    - **Interstate 29** is a north-south route that runs along the eastern fringe of the City with interchanges at US 212 (9th Street S) and US 81 (26th Avenue NE). 2019 daily traffic volumes on Interstate mainline segments are around 4,100 vehicles per day (vpd) at the US 212 interchange (Exit 177) and around 4,000 vpd at the US 81 interchange (Exit 180). Exit 177 interchange ramp daily volumes ranged between 1,400 and 2,200 vpd while Exit 180 interchange ramp daily volumes ranged between around 300 to 500 vpd.

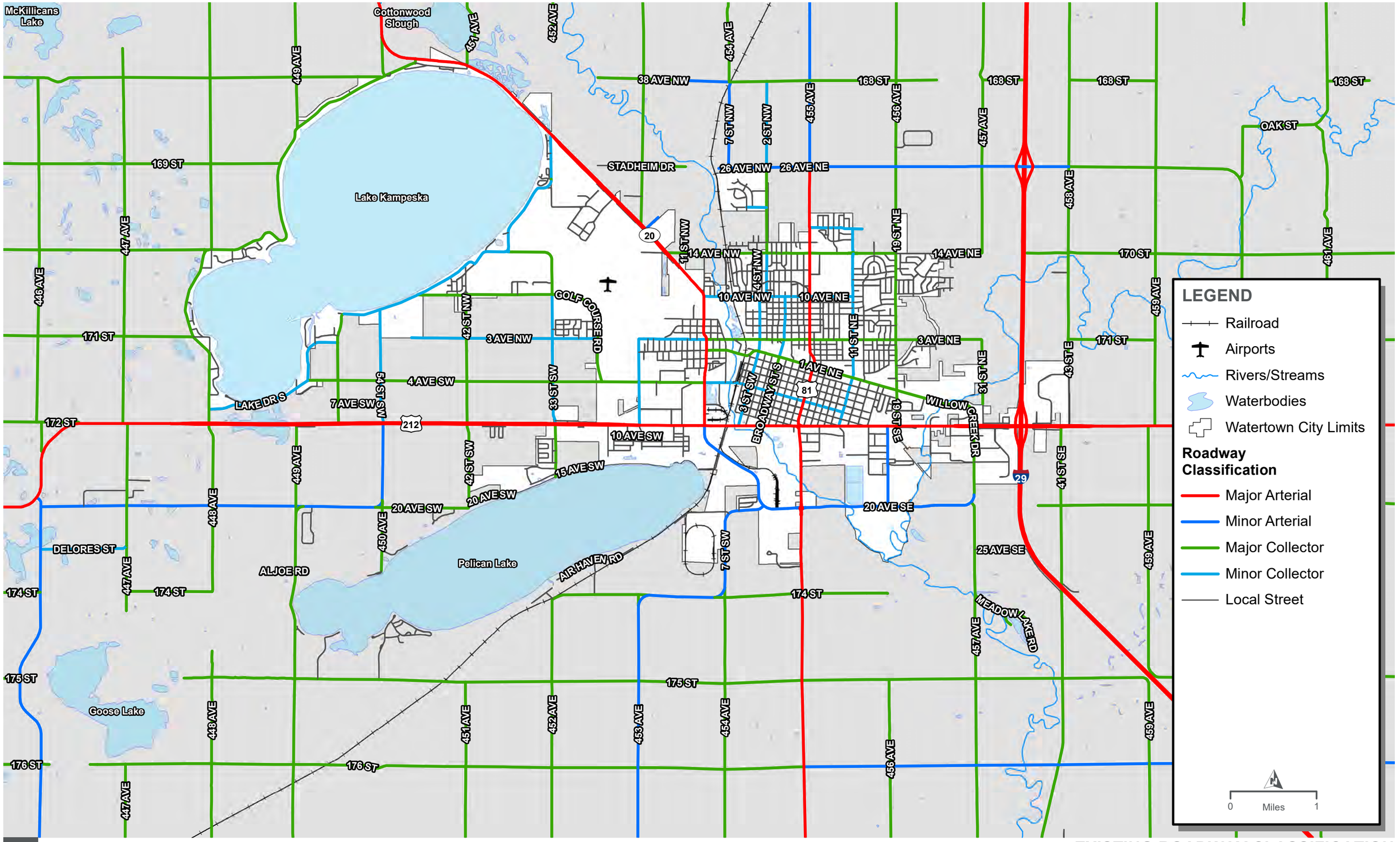
[1] City of Watertown – 2020 Comprehensive Land Use Plan
https://www.watertownsd.us/DocumentCenter/View/3859/DraftCompPlanUpdate2018?bidId=

- **US 212 (9th Avenue South)** is the only east-west major arterial through route, providing connection to the other major and minor arterials and access to a large portion of commercial and business areas within the City. This multi-lane route serves pass-through trips as the major eastern and western entrance and exit points to Watertown. 2019 daily traffic volumes ranged from 3,000 vpd east of the Interstate 29 interchange to a high of near 18,300 vpd in central Watertown to around 3,100 vpd west of Lake Kampeska.
- **US 81 (5th Street East)** is a north-south route providing connections through the central part of the City. 2019 daily traffic volumes ranged from 4,000 vpd south of US 212 to 11,000 vpd near the central business district to around 4,300 vpd north of 14th Avenue North.
- **SD 20 (10th Street West)** is a north-south route providing connections on the western edge of the City. 2019 daily traffic volumes ranged between 3,200 vpd by Lake Kampeska and 11,700 vpd near 3rd Avenue North.

- Minor Arterials
  - **US 81 (26th Avenue Northeast)** is an east-west route, just north of city limits, that connects Interstate 29 Exit 180 to US 81 (5th Street E). 2019 daily traffic volumes ranged from 1,300 vpd near the Exit 180 interchange to 4,300 vpd near the intersection with US 81 (5th Street E).
  - **20th Avenue South** is an east-west bypass route, located on the southern extent of the city, between 29th Street SE and the intersection of US 212 and SD20. 2017 daily traffic volumes ranged between 2,300 vpd near 29th Street SE and 5,700 vpd west of the intersection with US 81 (5th Street E).

- Major Collectors
  - **19th Street East** is a north-south route on the eastern edge of the City, spanning between US 212 and 14th Avenue NE.
  - **17th Street East** is a north-south route on the southeastern part of the City that provides a connection between US 212 and 20th Avenue SE.
  - **14th Avenue North** is an east-west route on the northern edge of the City, spanning between 3rd Street E and 19th Street E.
  - **1st Avenue North/Willow Creek Drive/29th Street Southeast** is a route spanning primarily east-west between 3rd Street W and US 212 and north-south between US 212 and 20th Ave SE.
  - **3rd Avenue North** is an east-west route spanning between SD 20 and 19th Street N in the central section of the City.
  - **Broadway Street** is a north-south route between US 212 and 1st Avenue N in the central downtown business area.
  - **4th Ave South** is an east-west route between South Lake Drive and SD 20 which provides a connection to Lake Kampeksa.

- Minor Collectors
  - **11th Street East** is a north-south route running between US 212 and 14th Avenue N on the eastern side of the City.
  - **Broadway Street North** is a north-south route between 1st Avenue N and 10th Avenue N on the northwestern side of the City.
  - **3rd Street West** is a north-south route in the western central part of the City between US 212 and 10th Avenue N.
  - **2nd Street West** is a north-south route in the northwestern section of the City between 10th Avenue NW and 14th Avenue NW.
  - **21st Street West** is a north-south route near the western edge of the City between US 212 and 3rd Avenue NW.
  - **33rd Street West** is a north-south route near the south side of Lake Kampeska between US 212 and Golf Course Road.
  - **10th Avenue North** is an east-west route in the northern section of the City between SD 20 and 19th Street E.
  - **4th Ave South** is an east-west route between SD 20 and 11th Street E which covers primarily the central area of the City.



EXISTING ROADWAY CLASSIFICATION (ADAPTED FROM CITY OF WATERTOWN MAJOR STREET PLAN)

FIGURE 1

Bike and Pedestrian Systems

The adoption of a comprehensive sidewalk plan in 2002 and Trail Master Plan in 2012 formalized the City of Watertown's intent to develop an efficient network of facilities for pedestrians and cyclists, offering alternatives to vehicle travel through enhanced connections to destinations and promoting improved public health through activity-based transportation in the region.

Currently, the bicycle and pedestrian network maintains numerous bicycle and pedestrian facilities, including sidewalks, separated paths/trails and shoulder/bike shared-lanes. Continued investment in these facilities can aid the City in maintaining a welcoming environment for both pedestrians and bicyclists and benefit the overall transportation system by allowing residents ample opportunity to take trips utilizing these modal options instead of a private vehicle.

The trail network provides recreational opportunities for users and connectivity to recreational areas such as public parks, the Redlin Art Center, the Cattail Crossing Golf Course, the Bramble Park Zoo, and the uptown business district. While the Watertown trail network offers several recreational opportunities for bicyclists and pedestrians, the use of these transportation mode for commuting purposes remains low. American Community Survey (ACS) data for 2018 indicates that 0.08% of Watertown residents commute to work via bicycling and 1.52% commute to work via walking.

Current Bicycle and Pedestrian Facilities

The bulk of existing bicycle facilities in the Watertown area are shared-use paths/trails, which total 22.6 miles. These facilities are separated from roadways and offer both bicyclists and pedestrians a wider path and increased safety due to the separation from motor vehicles. The total number of miles of shoulder bikeways is 3.4 miles, and these facilities are the second most common. Regarding planned investments in bicycle/trail facilities, Watertown has identified an additional 32.8 miles of shared-used paths/trails. **Table 1** displays the breakdown of all existing bicycle and pedestrian facilities in the Watertown area.

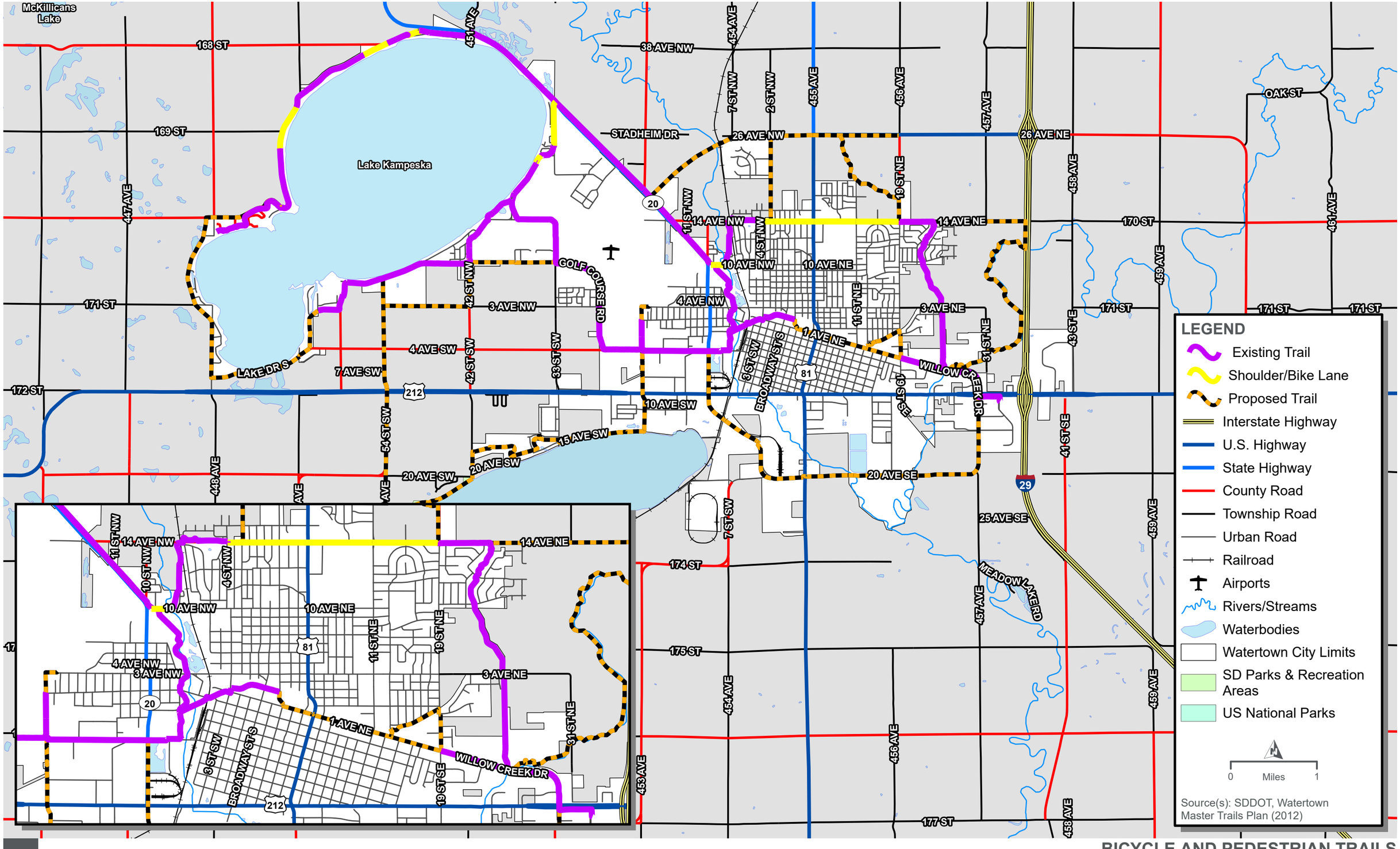
Table 1: Existing Bicycle and Pedestrian Facilities Length

Facility Type	Length (mi.)
Shared-use Path/Trail	22.6
Shoulder/Bike Lane	3.4
Sidewalk	100.1
Total Existing Mileage	126.1

Sidewalks are a critical facility for any urban transportation network as they allow for pedestrian connections and encourage active transportation, connecting the other modes of transportation. Furthermore, sidewalks have shown to generate increased economic activity in commercial and mixed-use areas as they facilitate increased foot traffic.

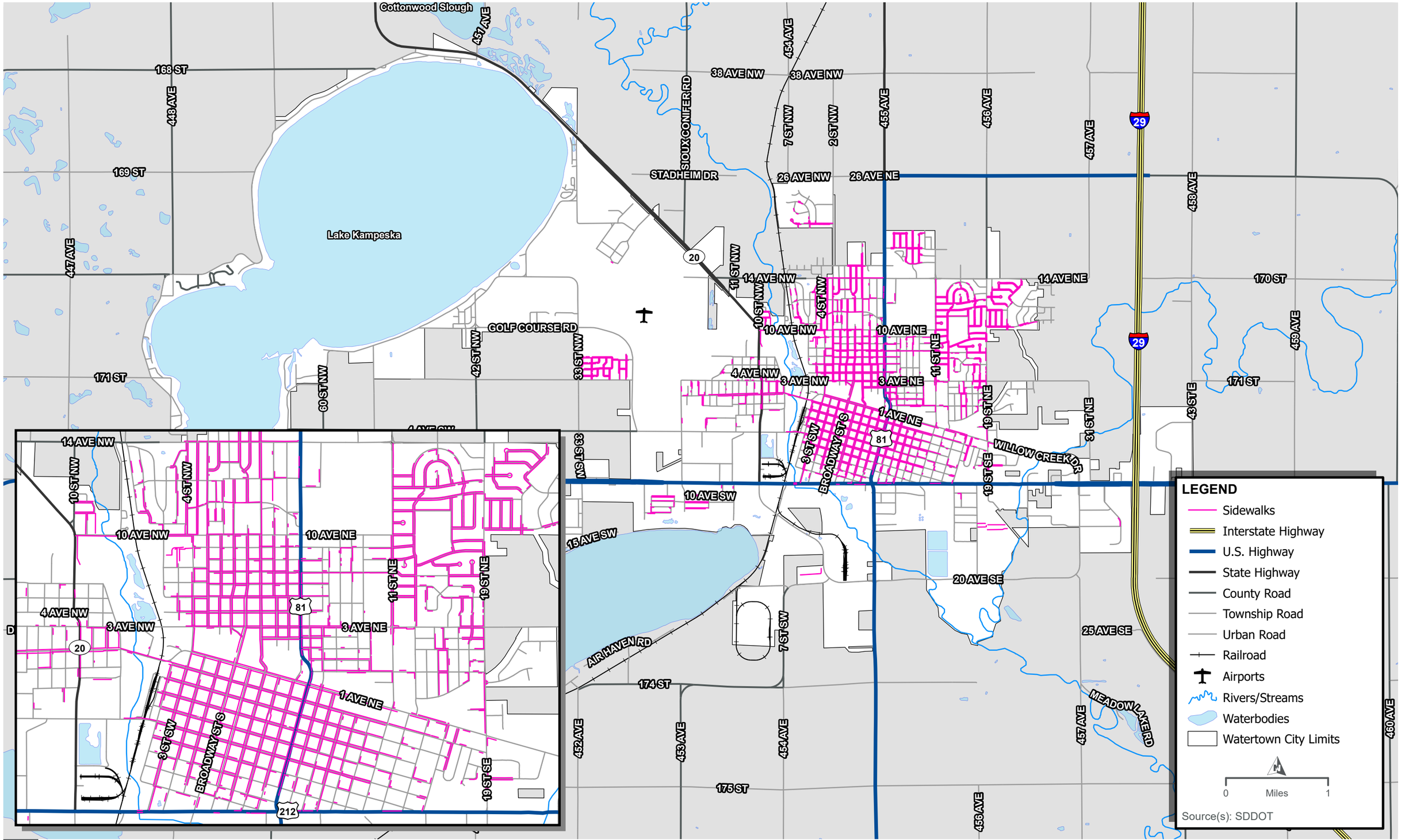
The 2002 sidewalk plan noted that at the time, there was more than 148 miles of sidewalk missing (gaps/no sidewalk installed/etc.) of 237 miles where sidewalk was possible (both sides of all street facilities). As a result, a prioritization process was identified to strategically improve the sidewalk network which the City continues to utilize.

Existing and proposed bicycle and pedestrian trails are shown in **Figure 2** and existing sidewalks are shown in **Figure 3**.



BICYCLE AND PEDESTRIAN TRAILS

FIGURE 2



SIDEWALKS

FIGURE 3

Transit Service

Transit service in the Watertown Area is provided by Community Transit of Watertown/Sisseton, Inc. via a curb-to-curb program comprised of 9 buses and 4 vans in the Codington County fleet. The program within the City of Watertown currently operates Monday through Saturday. Passengers must schedule rides one business day prior to the requested service. Out of town trips require a one-week notice. Passengers are encouraged to schedule return pick ups for round trip services or alternately can schedule a “will call” return trip which is subject to service availability at the time. Current fees for curb-to-curb transit service within Watertown proper are based upon service areas as follows:

One Way Trips:

Area No. 1 – Immediate Service Area (Watertown Proper) - $3.00

Area No. 2 – Outlying Service Area (Lake Pelican/Lake Kampeska) - $5.00

Area No. 3 – Extended Service Area (Dakota Sioux Casino/Destinations with access to Sioux Conifer Road from 167th Street to 164th Street) - $8.00

Currently, through a partnership with Prairie Lakes Hospital, medical trips within the immediate service area of Watertown are free. These free services include appointments with optometrists, doctors, dentists, physical therapists, etc.

Intercity Transportation

In addition to the highway links that connect the Watertown area to other parts of the state and country, there are additional modes for intercity travel including aviation and bus service.

Aviation

The Watertown Regional Airport is the home of commercial and general aviation within the Watertown area and is owned by the City of Watertown and operated through the City appointed Airport Board. The airport plays a fundamental role in the region's transportation network with a catchment area population of 150,000.

The airlines currently operating out of the Watertown Regional Airport are:

- United Airlines (operated by SkyWest): Flights to Chicago, IL and Denver, CO

Current services include daily flights to Chicago O'Hare and Denver International airports, which connect to approximately 130 cities.

Figure 4 displays the annual enplanements at Watertown Regional airport for the period 2009-2019. As indicated by the figure, annual enplanements have fluctuated from year to year based upon the services provided and flights available. Since 2017, annual enplanements have been holding steady in the 11,000 to 12,000 range.

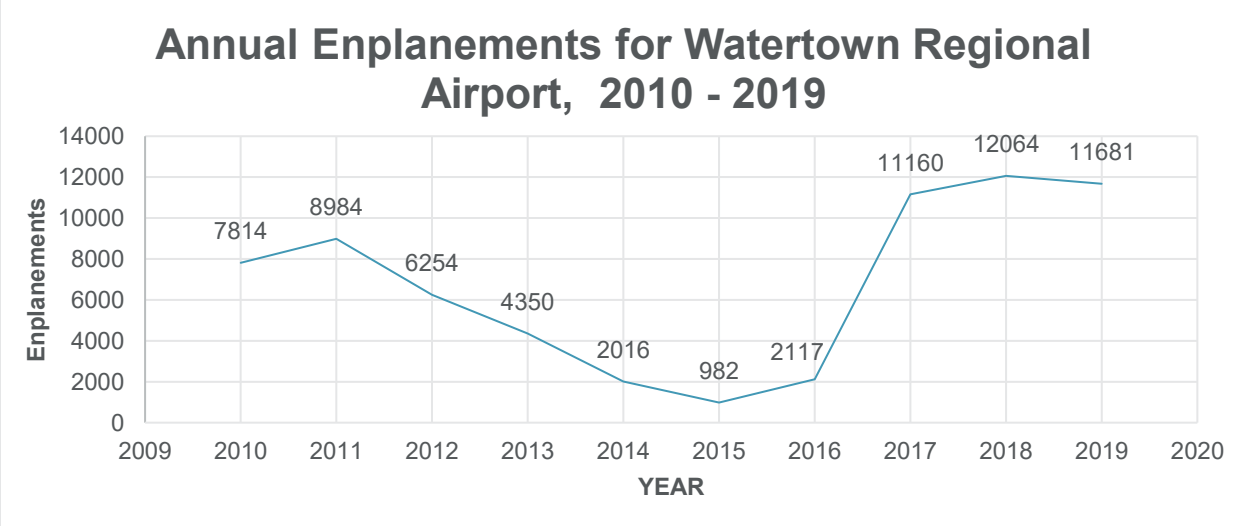


Figure 4: Annual Enplanements for Watertown Regional Airport, 2010 - 2019

Source: Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) data

Intercity Bus Service

The Watertown region's intercity bus service is operated by Jefferson Lines, with passenger pick-ups and drop-offs conducted at the Watertown/Jefferson Lines Curbside Bus Stop located at 820 35th Circle. Jefferson Lines serves as the regional intercity bus carrier, connecting Watertown with other communities in South Dakota, along the I-29 and I-90 corridors as well communities within the Region in North Dakota, Minnesota, Iowa, and Nebraska. Jefferson Lines main service area includes the central and northwest United States, from Arkansas to Washington state.

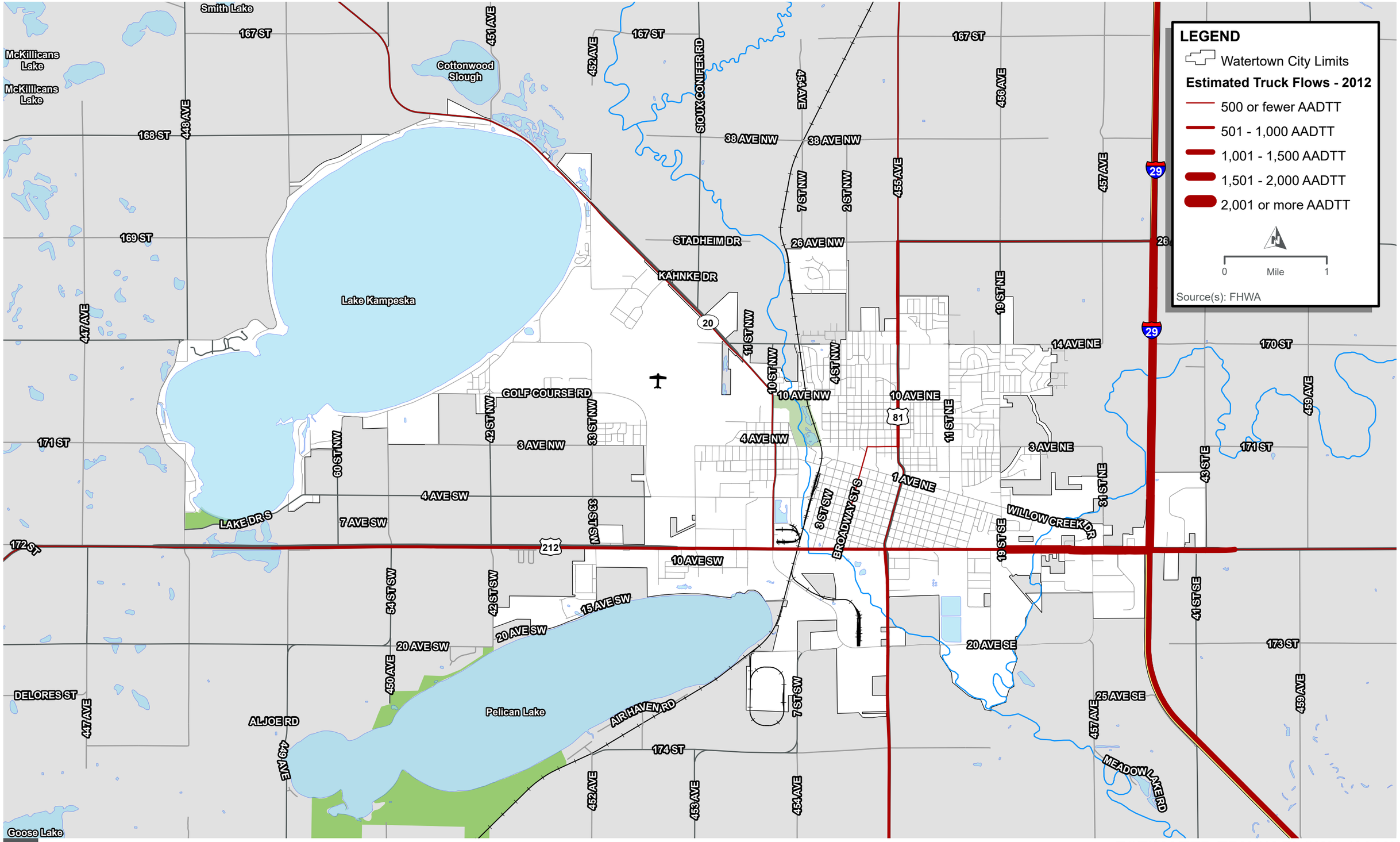
Freight System

Freight activities play an important role in the Watertown area economy and facilitating an efficient movement of goods on local and national highways is of paramount importance. To gain a better understanding of how highway freight volumes are expected to change in the Watertown Area boundaries over the next 25 years, freight forecast data was obtained from the Federal Highway Administration's Freight Analysis Framework (FAF) database. This data estimates the movement of commodities on the national highway system by using average truck payloads and assigning them to individual highways for forecasting purposes. Additional data points used by the FAF include functional classifications, number of lanes, and other pertinent highway characteristics to project future increases in tonnage moving along U.S. highways.

The assessment of FAF data for the Watertown area found that:

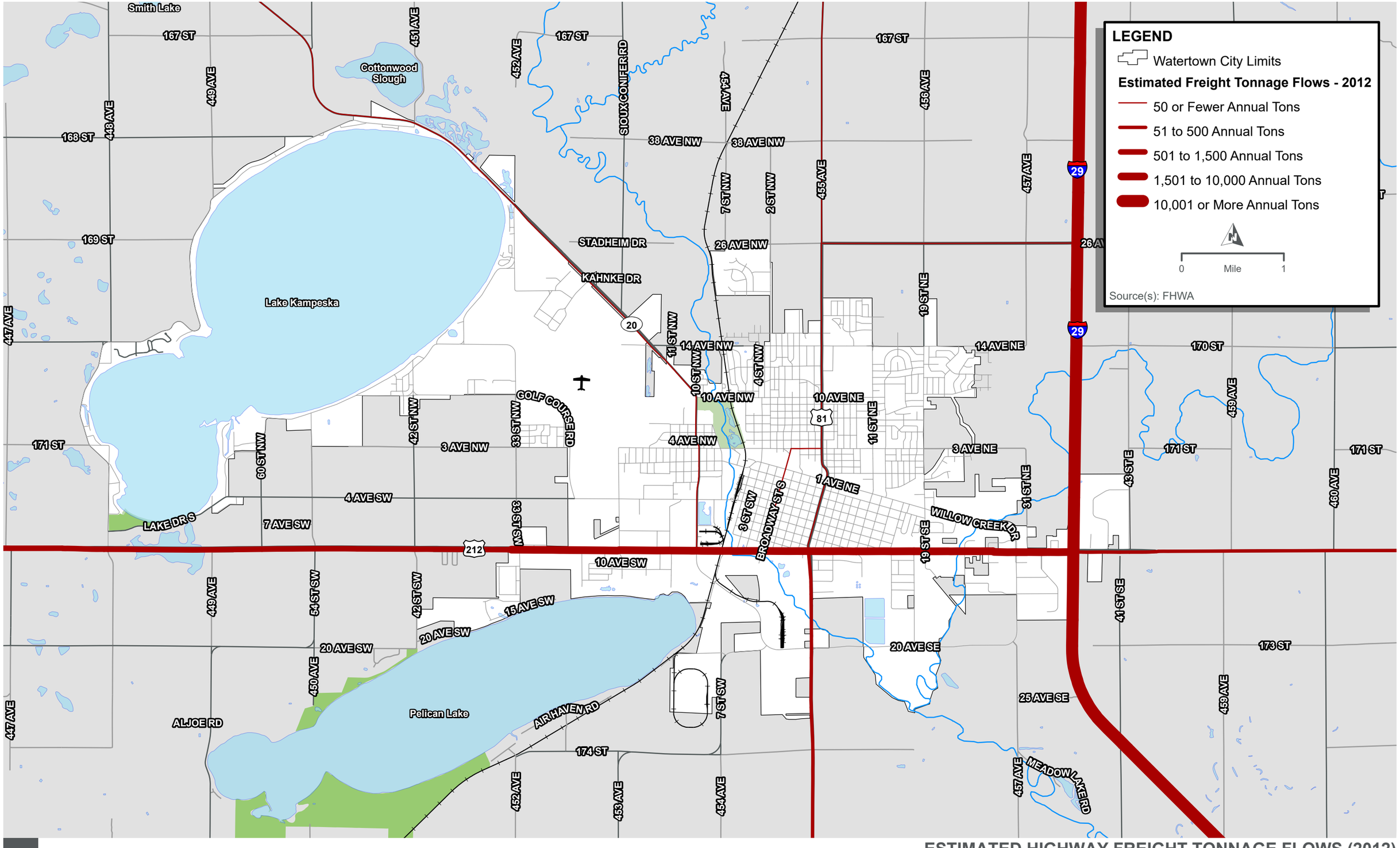
- Truck volumes are predicted to increase substantially over the planning horizon. FAF data indicate a predicted 60% increase in truck volumes between the 2012 baseline and year 2045. **Figure 5** illustrates current truck volumes from FAF.
- Commodity tonnage increases are predicted to also increase over the planning horizon. FAF data predict a 73% increase in commodity tonnage between the 2012 baseline and year 2045. **Figure 6** illustrates current commodity flows from FAF.

This marks a significant increase in freight activity traveling along highways in the area and has implications on public expenditures related to roadway maintenance, expansion, and the operational capabilities of the roadway network to support this increased amount of traffic.



ESTIMATED TRUCK FLOWS (2012)

FIGURE 5



ESTIMATED HIGHWAY FREIGHT TONNAGE FLOWS (2012)

FIGURE 6

Existing Conditions Traffic Volume Scenario

The 2020 Existing Conditions traffic volumes were developed from recent and existing traffic counts for traffic operation analysis. This section develops the existing conditions volumes, which lays the foundation for identifying transportation needs and development of future-year traffic volumes.

Existing Traffic Data

Existing conditions traffic volumes were developed from the following traffic data:

- Daily (24-hour) roadway segment counts were provided to the study team from SDDOT.
    - SDDOT collected segment counts on Interstate 29, US 212, US 81, and SD 20 annually between 2010 and 2019.
    - SDDOT collected segment counts throughout roads in Watertown between 2010 and 2018.
- Morning and afternoon/evening (AM and PM) peak hour intersection turning movement counts were collected as part of this study and provided by SDDOT for the study intersections as indicated in **Table 2**.
    - In addition to study intersections, the following intersection turning movement counts were provided by SDDOT to aid in corridor volume balancing for the Existing Conditions scenario:
        - US 212 and 29th Street SE (collected on January 18th, 2018)
        - US 212 and 33rd Street SE (collected on January 18th, 2018)

Scenario Development

AM and PM peak hour intersection turning movement volumes were developed for the existing conditions traffic volumes scenario along the following corridors (shown in **Figure 7**):

- **US 212 (9th Avenue SE)** – from Broadway Street S to I-29 NB Exit 177 RTI
- **US 81(5th Street E/26th Avenue NE)** – from 20th Avenue SE to I-29 NB Exit 180 RTI
- **1st Avenue NE/Willow Creek Drive (29th Street SE)** – from US 212 to 13th Street NE
- **19th Street (456th Avenue)** – from 1st Avenue NE to US 81 (26th Avenue NE)
- **3rd Street NW** – from W Kemp Avenue to 1st Avenue NW
- **10th Avenue NW** – from 2nd Street W to N Maple Street
- **N Maple Street** – from 10th Avenue N to 14th Avenue N

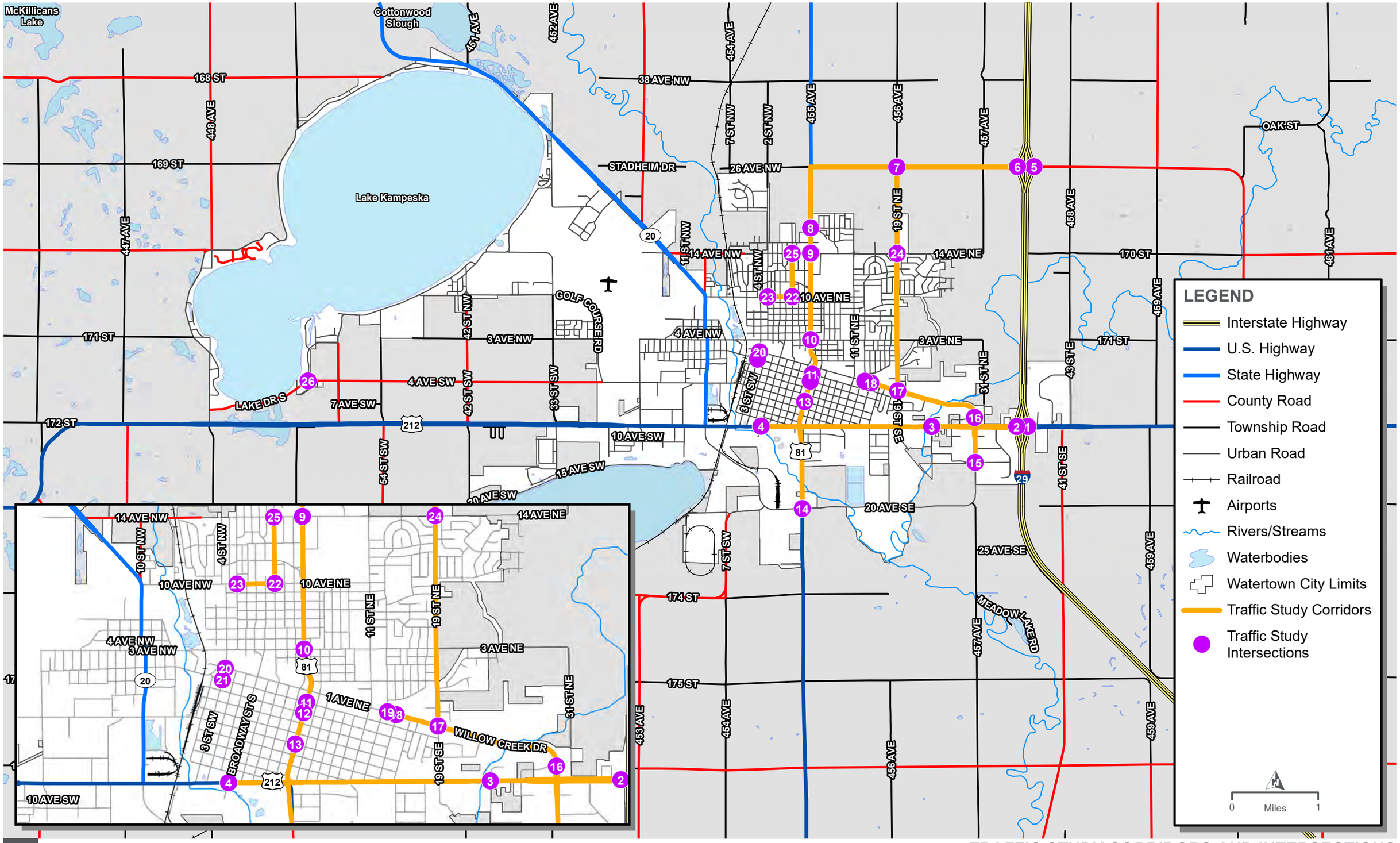
In addition, similar peak hour scenarios were developed for the isolated South Lake Drive and 4th Avenue SW intersection.

Existing counts were factored to year 2020 and reflect a September design season.

Table 2: Study Intersections

Intersection No.	Intersection Name	Collected by HDR	Provided by SDDOT
1	US 212 (9th Avenue SE) & Interstate 29 NB Exit 177 RTI[1]		X
2	US 212 (9th Avenue SE) & Interstate 29 SB Exit 177 RTI[1]		X
3	US 212 (9th Avenue SE) & 23rd Street SE (Willow Creek Drive)[2]	X	
4	US 212 (9th Avenue S) & Broadway Street S[3]		X
5	US 81 (26th Avenue NE) & Interstate 29 NB Exit 180 RTI[1]		X
6	US 81 (26th Avenue NE) & Interstate 29 SB Exit 180 RTI[1]		X
7	US 81 (26th Avenue NE) & 19th Street NE (456th Avenue) [2]	X	
8	US 81 (5th Street NE) & 18th Avenue NE[2]	X	
9	US 81 (5th Street NE) & 14th Avenue NE[4]		X
10	US 81 (5th Street NE) & 3rd Avenue NE[4]		X
11	US 81 (5th Street NE) & E Kemp Avenue[5]		X
12	US 81 (5th Street SE) & 1st Avenue SE[5]		X
13	US 81 (5th Street SE) & 4th Avenue SE[6]		X
14	US 81 (5th Street SE) & 20th Avenue SE[7]	X	
15	15th Avenue SE & 29th Street SE[2]	X	
16	8th Avenue SE & Willow Creek Drive[2]	X	
17	1st Avenue NE & 19th Street NE[2]	X	
18	1st Avenue NE & 13th Street NE (SB)[2]	X	
19	1st Avenue NE & 13th Street NE (NB)[2]	X	
20	1st Avenue NW & 3rd Street NW[2]	X	
21	W Kemp Avenue & 3rd Street W[2]	X	
22	10th Avenue NE & Maple Street NE[2]	X	
23	10th Avenue NW and 2nd Street W[2]	X	
24	14th Avenue NE & 19th Street NE[2]	X	
25	14th Avenue & N Maple Street NE[2]	X	
26	South Lake Drive & 4th Avenue SW[2]	X	

1 Collected on September 10th, 2019 as part of the 2020 Decennial Interstate Corridor Study.
2 Collected on September 15th, 2020 as part of the 2020 Watertown Master Transportation Plan.
3 Collect on November 9th, 2016.
4 Collected on November 19th, 2020 as part of the 2020 Watertown Master Transportation Plan.
5 Collected on November 17th, 2020 as part of the 2020 Watertown Master Transportation Plan.
6 Collected on March 14th, 2018.
7 Collected on January 19th, 2021.



TRAFFIC STUDY CORRIDORS AND INTERSECTIONS

FIGURE 7

Scenario Notes

The following provides discussion on various findings from the traffic scenario development process.

GROWTH FACTORS

Two different ADT growth rate forecasting methodologies, annual traffic change from historical daily traffic counts and county-wide growth rates were compared for reasonableness. The percentages observed from the annual traffic change from historical daily traffic counts between 2014 and 2019 varied between by +/- 3-6% depending on the roadway segment observed. The county-wide growth factors, however, provided a more uniform growth rate for each type of roadway observed. Because of the uniformity of the latter method, county-growth rates were used for this scenario and will be carried out throughout this study. Interpolation was used to calculate growth factors in between the 2020 baseline year and the given projected 20-year growth rate.

County-wide Growth Factors:

- Urban Arterials/Collectors/Locals (Codington County):
  - 1-year: 1.018
  - 2-year: 1.035
  - 3-year: 1.050
  - 4-year: 1.071
  - 5-year: 1.088
- Rural Arterials/Collectors/Locals (Codington County):
  - 1-year: 1.017
  - 2-year: 1.033
  - 3-year: 1.050
  - 4-year: 1.066
  - 5-year: 1.083

INTERSECTION BALANCING

Traffic volumes presented in this study include locations where peak hour intersection turning movement volumes were not balanced across intersections. This was largely due to the available turning movement counts, as some corridors had greater distance between intersections which enlarged the disparity of traffic volumes. Thus, a significant number of vehicles would either enter or exit the study corridor roadway between the analysis intersections. Due to this, any effort to balance traffic between such intersections would have notably altered traffic volumes for upstream or downstream intersections. Examples of these high-volume mid-segment intersections include:

- US 212 between Broadway Street S and 23rd Street SE
- US 81 between 4th Avenue SE and 20th Avenue SE
- 29th Street SE between US 212 and 15th Avenue SE
- 10th Avenue N between 2nd Street W and N Maple Street
- N Maple Street between 10th Avenue N and 14th Avenue N
- 19th Street NE between 1st Avenue NE and 14th Avenue N

These intersections were smoothed for reasonableness and the impact of mid-segment turning movements will be noted and accounted for in the operations analysis.

Traffic Volumes

2020 Existing Conditions traffic volumes are presented in the following figures.

CITY-WIDE DAILY SEGMENT VOLUMES

2020 Existing Conditions Daily Traffic Volumes

Figure 8: 2020 Daily Traffic Volumes

CORRIDOR SCENARIOS – PEAK HOUR INTERSECTION VOLUMES

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI

Figure 9: 2020 Peak Hour Traffic Volumes (Existing Conditions)

US 81(5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI

Figure 10: 2020 Peak Hour Traffic Volumes (Existing Conditions)
Figure 11: 2020 Peak Hour Traffic Volumes (Existing Conditions)

1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE

Figure 12: 2020 Peak Hour Traffic Volumes (Existing Conditions)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE)

Figure 13: 2020 Peak Hour Traffic Volumes (Existing Conditions)

3rd Street NW – from W Kemp Avenue to 1st Avenue NW

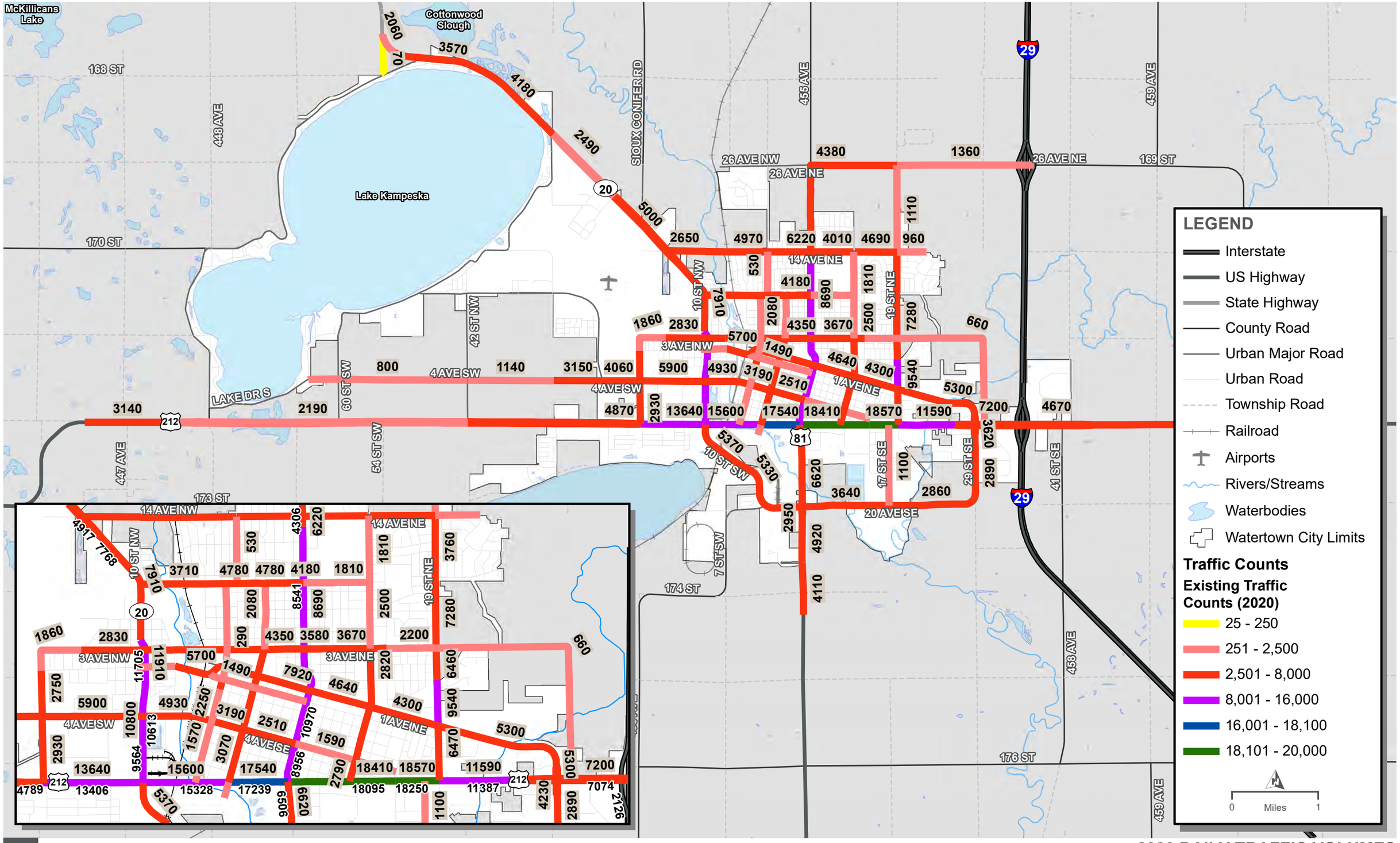
Figure 14: 2020 Peak Hour Traffic Volumes (Existing Conditions)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N

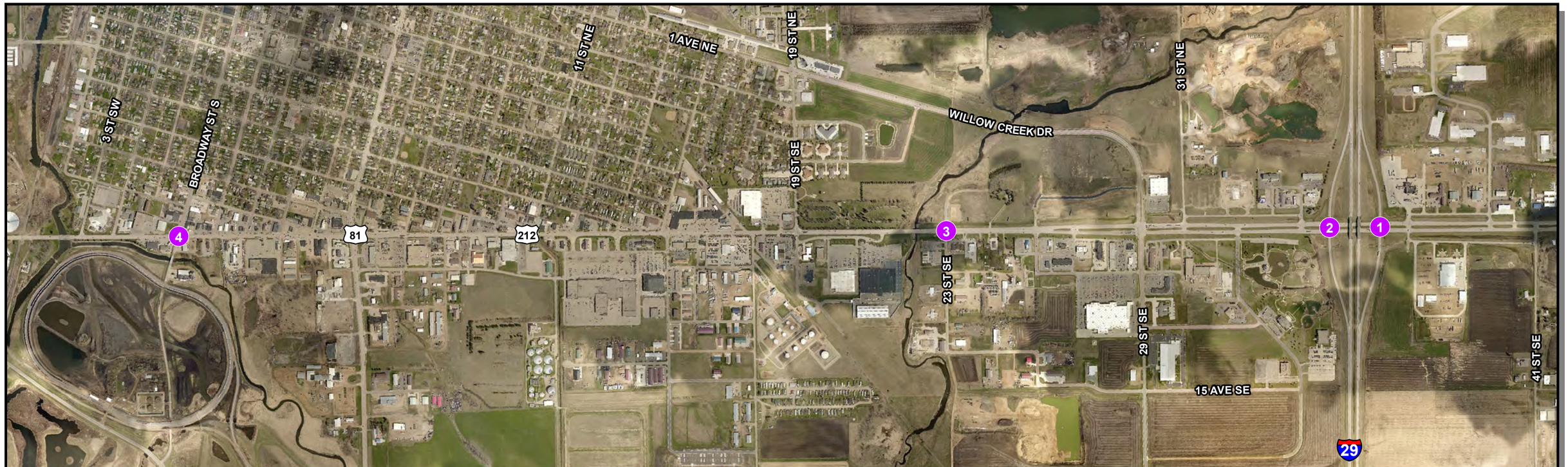
Figure 15: 2020 Peak Hour Traffic Volumes (Existing Conditions)

South Lake Drive and 4th Avenue SW – Isolated Intersection

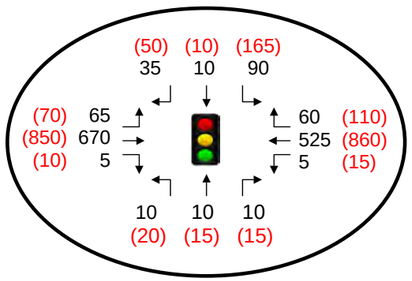
Figure 16: 2020 Peak Hour Traffic Volumes (Existing Conditions)



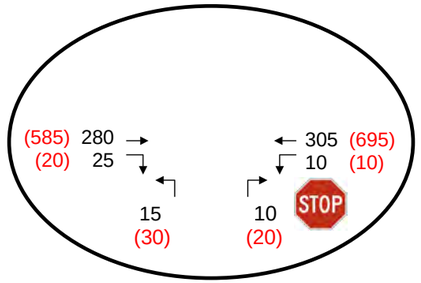
2020 DAILY TRAFFIC VOLUMES



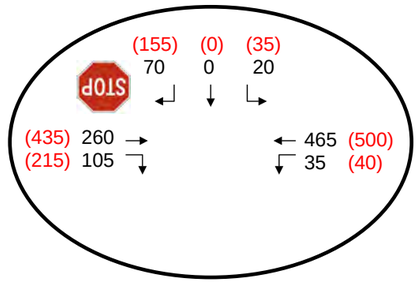
4. US 212 & Broadway Street S



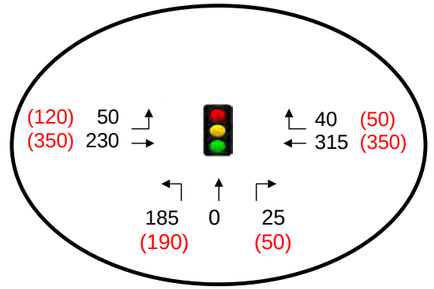
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

- 1 — Study Intersection
- AM (PM) — 2020 Peak Hour Traffic Volumes

Existing Traffic Control

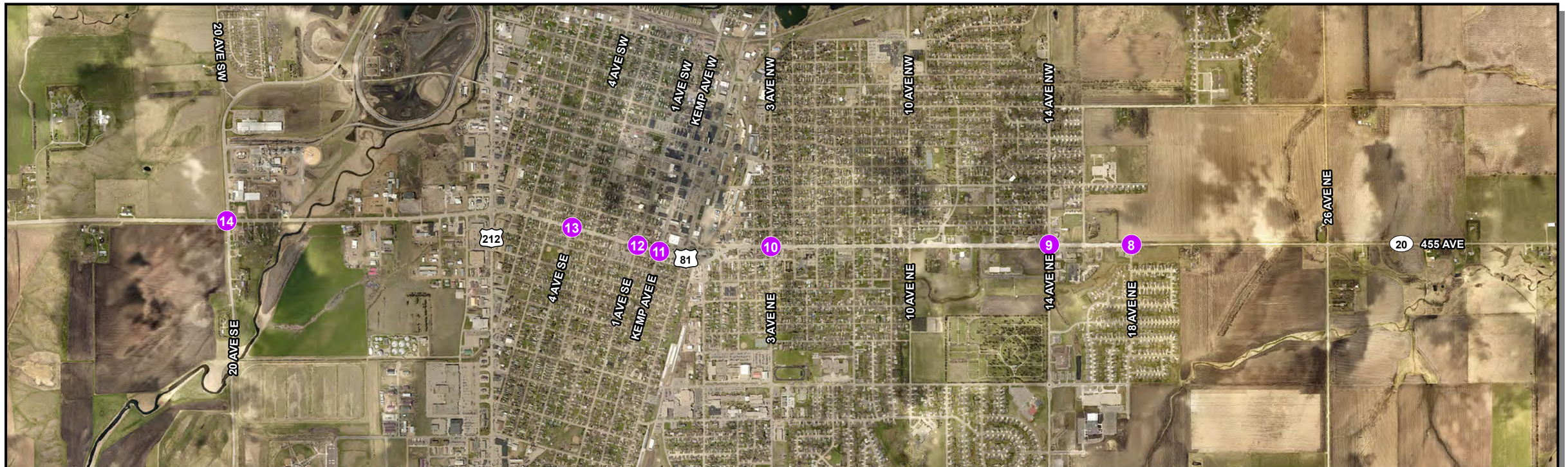
- Signal
- STOP — Stop Control
- Roundabout

Notes:
* Volumes reflect September design season.

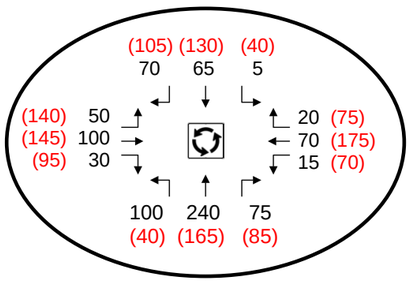
0 Miles 0.2

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
US 212 (9TH AVENUE S) CORRIDOR

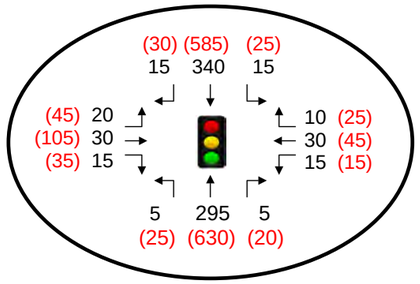
FIGURE 9



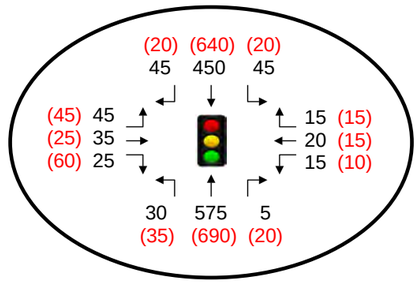
14. US 81 & 20th Ave SE



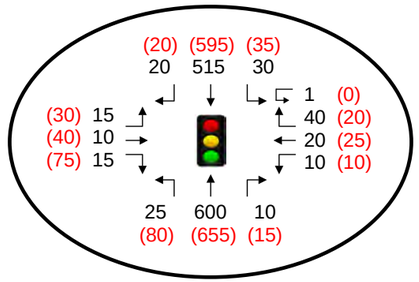
13. US 81 & 4th Avenue SE



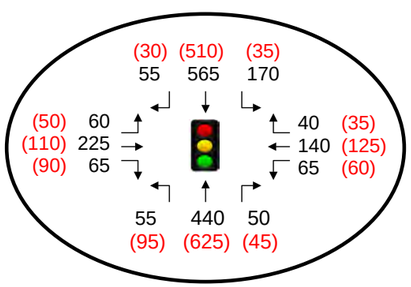
12. US 81 & 1st Avenue SE



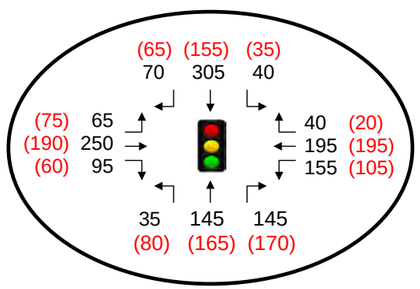
11. US 81 & E Kemp Avenue



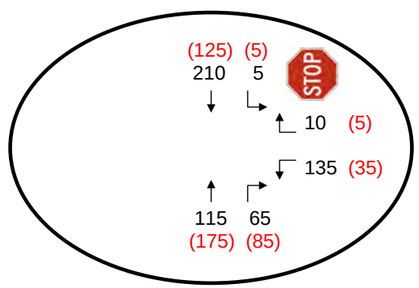
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

- 1 — Study Intersection
- AM (PM) — 2020 Peak Hour Traffic Volumes

Existing Traffic Control

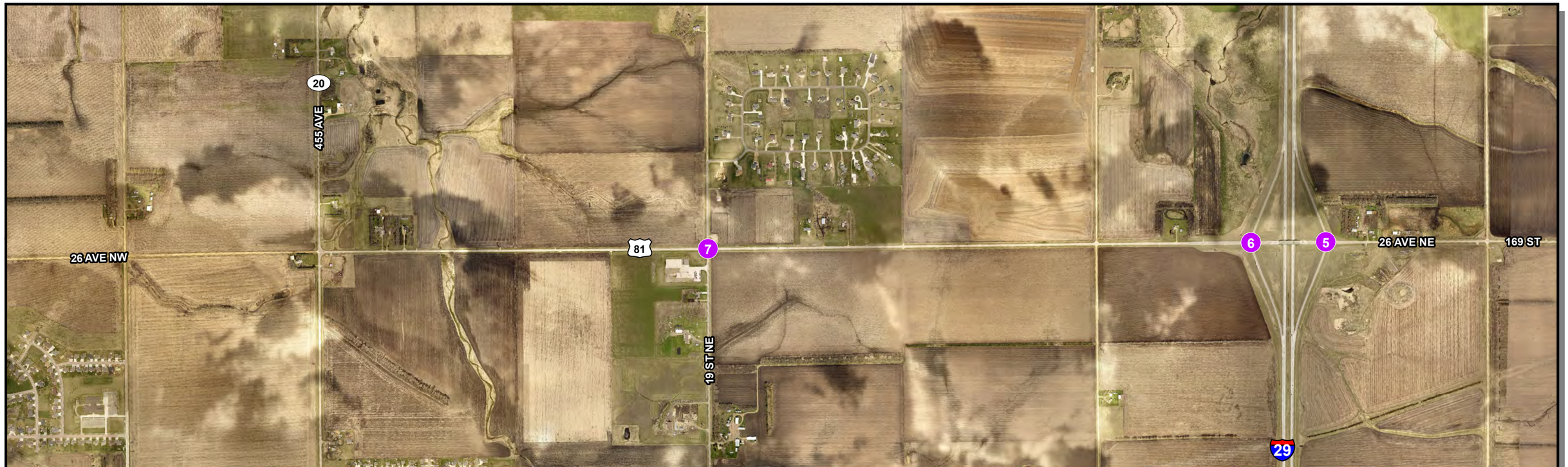
- Signal
- STOP — Stop Control
- Roundabout Control

Notes:
* Volumes reflect September design season.
** US 81 (5th Street E) corridor turning movements are shown with the same northbound orientation as previous figures.

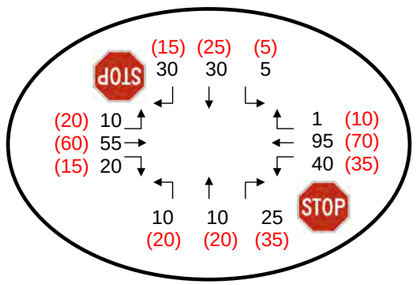
0 Miles 0.35

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
US 81 (5TH STREET E) CORRIDOR

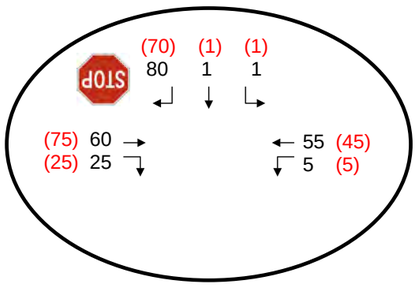
FIGURE 10



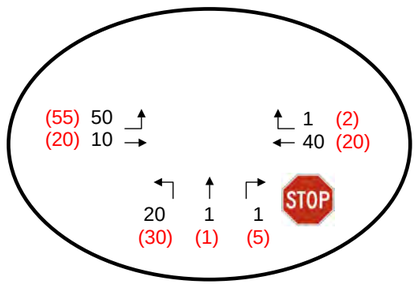
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

Roundabout

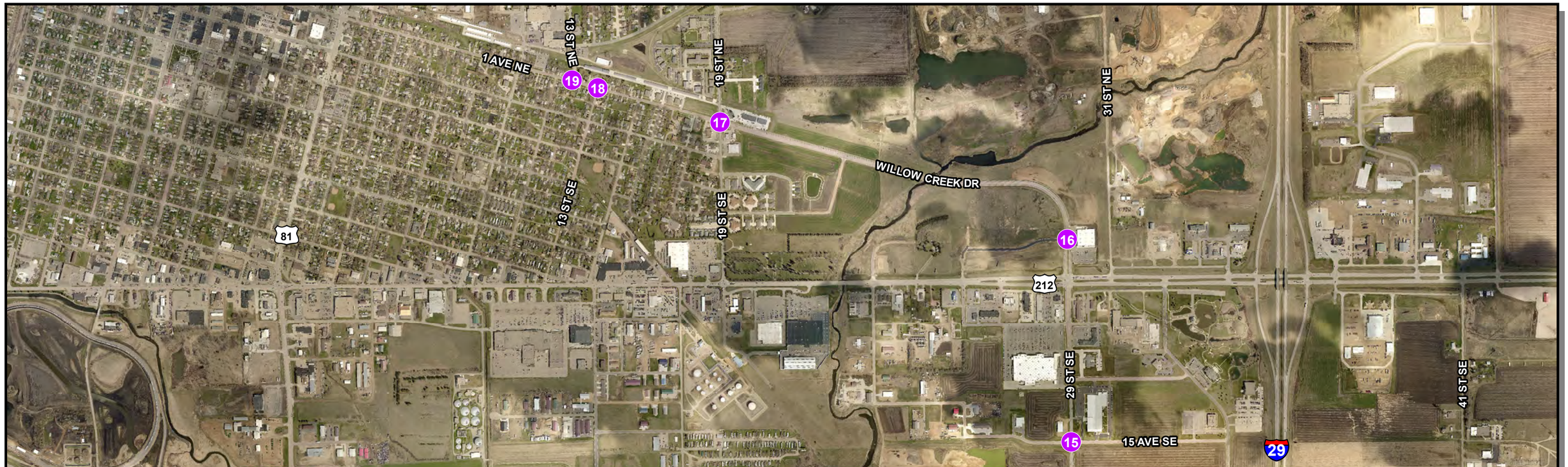
Notes:
* Volumes reflect September design season.

0 Miles 0.25

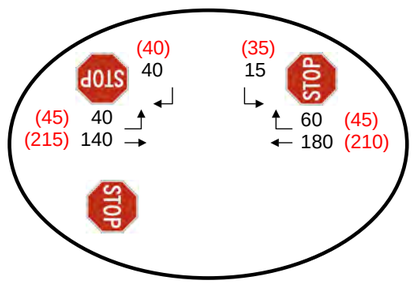
HDR

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
US 81 (26TH AVENUE NE) CORRIDOR

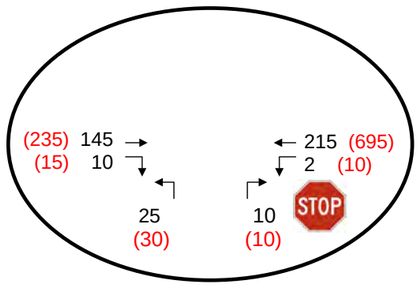
FIGURE 11



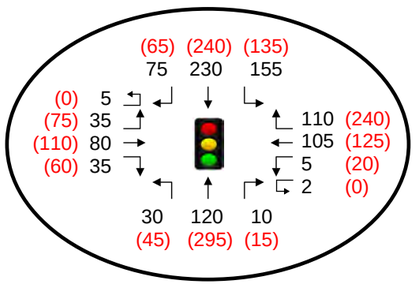
19. 1st Avenue NE & 13th Street NE (NB)



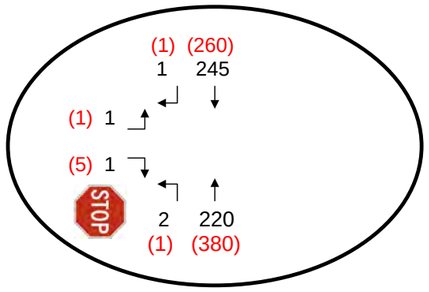
18. 1st Avenue NE & 13th Street NE (SB)



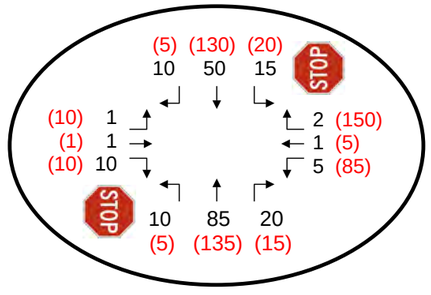
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

Roundabout

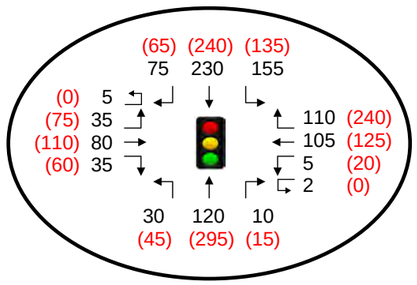
Notes:
* Volumes reflect September design season.

0 Miles 0.2

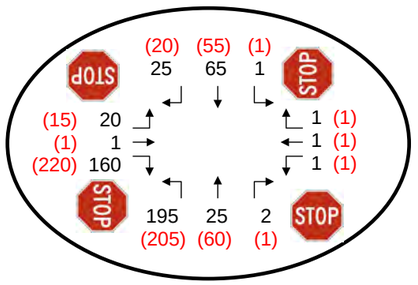
2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

FIGURE 12

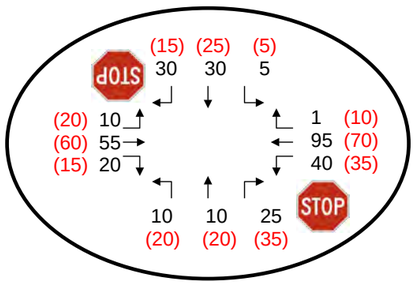
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

Roundabout

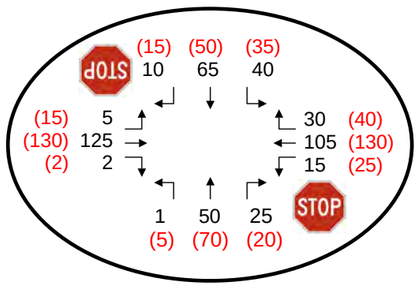
Notes:
* Volumes reflect September design season.
** 19th Street NE corridor turning movements are shown with the same northbound orientation as previous figures.

0 Miles 0.3

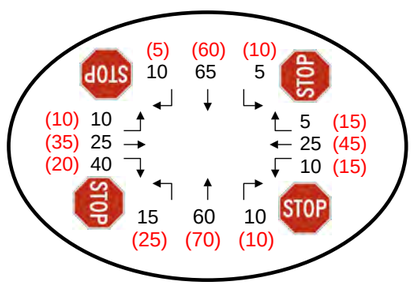
2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 13

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

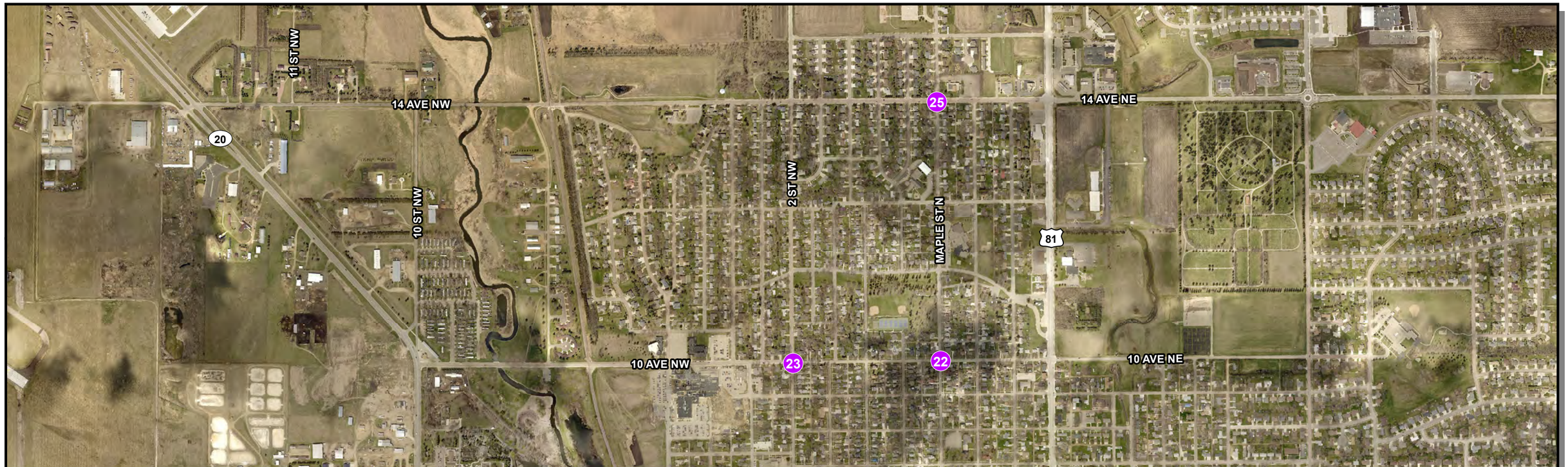
Roundabout

Notes:
* Volumes reflect September design season.

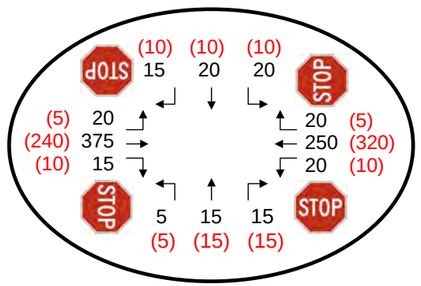
0 Miles 0.05

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
3RD STREET NW CORRIDOR

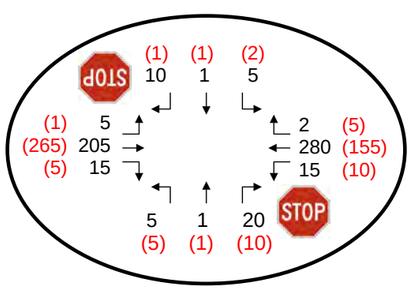
FIGURE 14



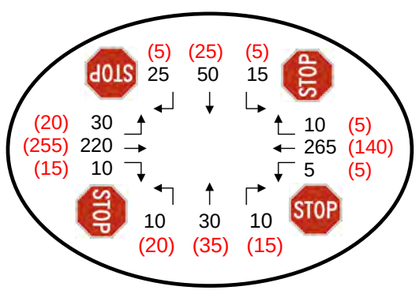
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

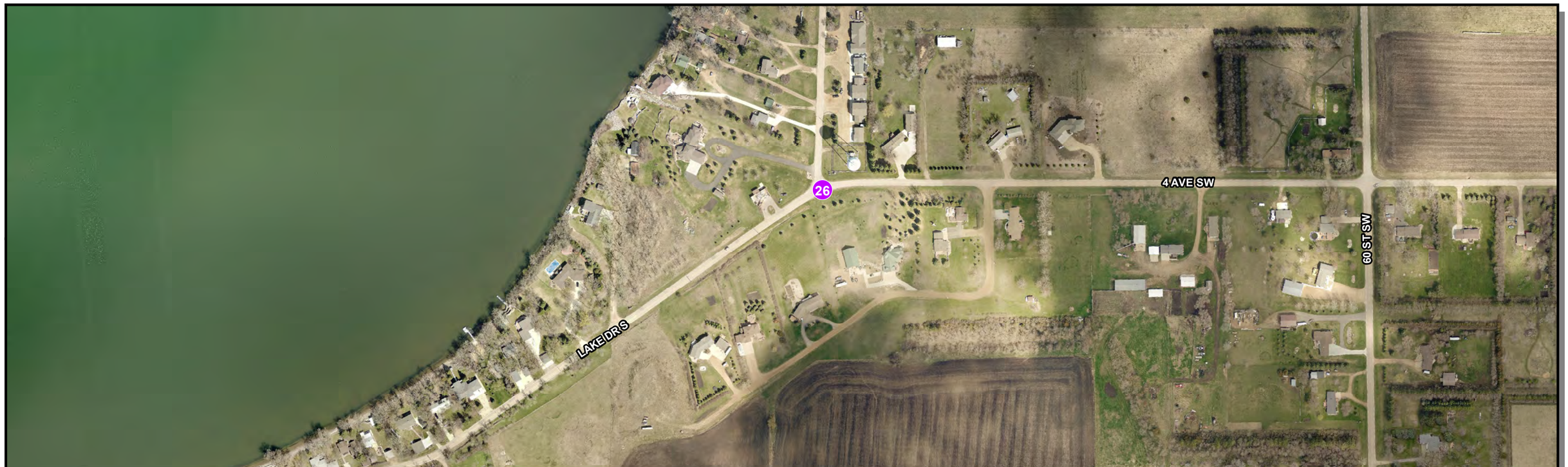
Roundabout

Notes:
* Volumes reflect September design season.

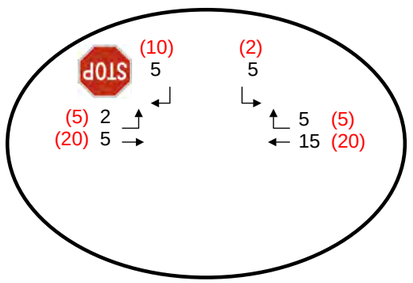
0 Miles 0.15

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 15



26. South Lake Drive & 4th Avenue SW



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Existing Traffic Control

Signal

Stop Control

Roundabout

Notes:
* Volumes reflect September design season.

0 Miles 0.05

2020 PEAK HOUR TRAFFIC VOLUMES (EXISTING)
SOUTH LAKE DRIVE & 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 16

Existing Conditions Traffic Operations

The following section presents the results of the traffic operations analysis based on 2020 existing conditions traffic volume scenario. This analysis consisted of a planning level number of lanes review which evaluates segment capacity and intersection operations analysis for the study intersections.

Planning Level Number of Lanes Review

Planning-level number of lanes review is based on LOS-based capacity thresholds for different roadway cross-sections presented in the SDDOT Road Design Manual Chapter 15 (Table 15-10). Color-coding in **Figure 17** is based on where the volume falls within **Table 3**. thresholds. Traffic patterns, traffic signals or other intersection control, number of access points, and number of major interesting roadways are considerations that typically dictate design needs. Therefore, it is recommended that planning-level number of lanes on either side of the thresholds be considered for segments where volumes are near the cut-off point and specific improvements be analyzed in a more detailed traffic operations analysis.

Table 3: Estimated Number of Lanes[2]

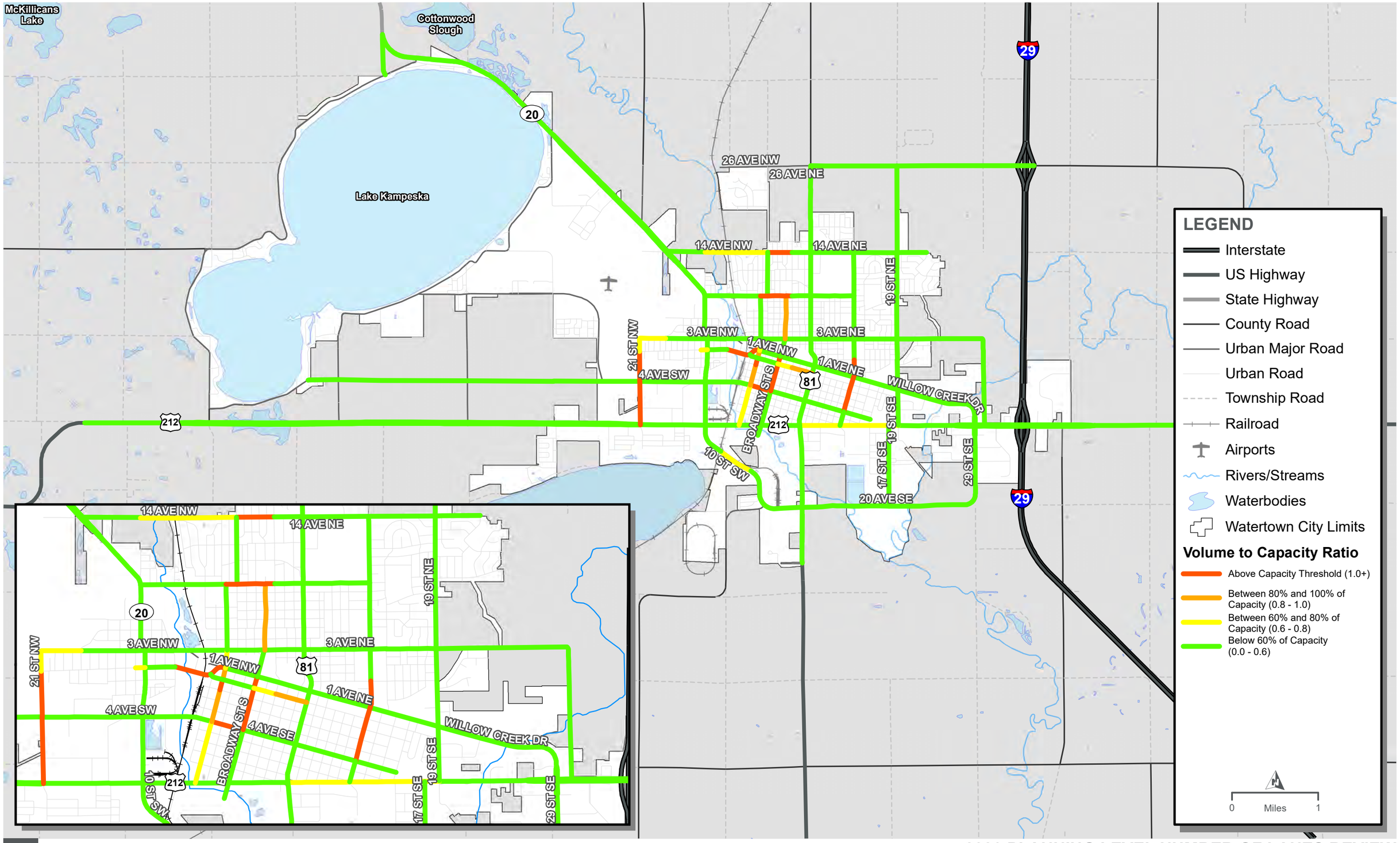
Total Number of Lanes	Total Design Year (ADT)[1]	
	Rural Level	Urban
2	< 8,000	< 2,500
3	[2]	2,500 to 16,000
4	8,000 to 20,000[3]	[3]
5	[2]	16,000 to 30,000
6	> 20,000[4]	> 30,000[4]

1 Construction/Reconstruction projects are designed based on a typical 20 year ADT project beyond the anticipated year of project construction.

2 Continuous left turn lanes may be considered based on left turn volumes and/or when intersections and/or approaches are closely spaced together.

3 Undivided sections may be used if left turn movements are low and there is no crash history, otherwise consider installing a median or 5 lane section.

4 Medians should be used.



2020 PLANNING LEVEL NUMBER OF LANES REVIEW

Intersection Operations

The intersection traffic operations analysis was conducted using Synchro 10 software. Level of Service (LOS) results, which is a measure of average vehicular delay at the intersection, are presented from the Highway Capacity Manual 6th Edition (HCM6) reporting module from Synchro. Thresholds for applicable LOS measures are provide in **Table 4**.

Table 4: Level of Service Definitions

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)	All-Way Stop, Two-Way Stop, and Roundabout Intersection Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80; volume exceeds capacity	> 50; volume exceeds capacity

Source: Highway Capacity Manual 6th Edition

LOS goals for this study are as follows:

- Signalized Intersections:
  - Rural area minimum allowable LOS – LOS B
  - Urban area minimum allowable LOS – LOS C
    - Individual movements allowed to operate at LOS E or better.
- Roundabouts:
  - Minimum allowable LOS – LOS C
- Two-Way Stop-Controlled Intersections:
  - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
  - Urban area minimum allowable LOS – LOS C (weighted average intersection approach)

Urban area analysis is applicable for facilities within Watertown City limits. Locations where the LOS exceeds (worse) these study goals demonstrates an operation or capacity-related need to be addressed later in the study.

2020 Existing Conditions scenario operational measures are presented in the following figures. Synchro reports are included in Appendix A.

CORRIDOR SCENARIOS – PEAK HOUR INTERSECTION LEVEL OF SERVICE (LOS)

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI

Figure 18: 2020 Peak Hour Intersection LOS (Existing)

US 81(5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI

Figure 19: 2020 Peak Hour Intersection LOS (Existing)

Figure 20: 2020 Peak Hour Intersection LOS (Existing)

1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE

Figure 21: 2020 Peak Hour Intersection LOS (Existing)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE)

Figure 22: 2020 Peak Hour Intersection LOS (Existing)

3rd Street NW – from W Kemp Avenue to 1st Avenue NW

Figure 23: 2020 Peak Hour Intersection LOS (Existing)

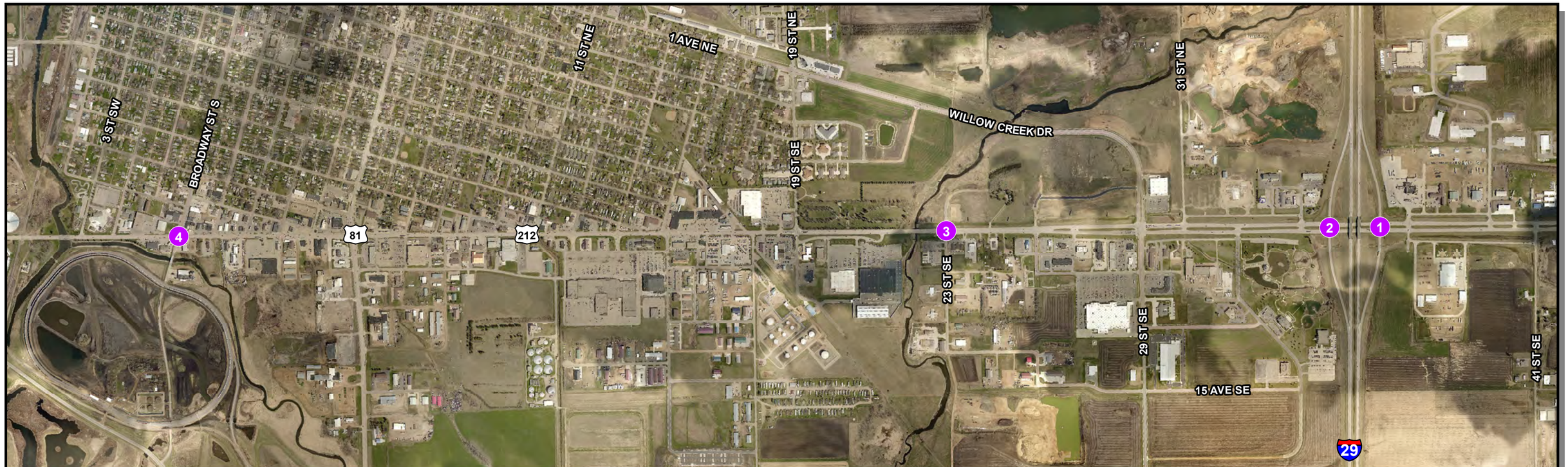
10th Avenue NW – from 2nd Street W to N Maple Street

N Maple Street – from 10th Avenue N to 14th Avenue N

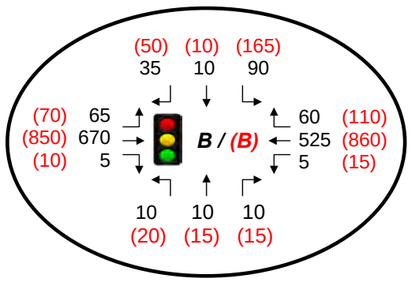
Figure 24: 2020 Peak Hour Intersection LOS (Existing)

South Lake Drive and 4th Avenue SW – Isolated Intersection

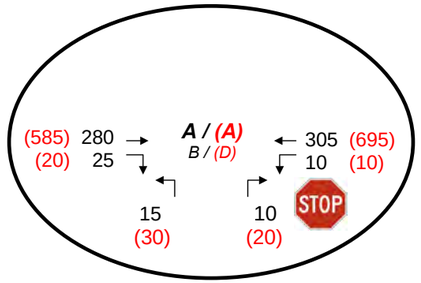
Figure 25: 2020 Peak Hour Intersection LOS (Existing)



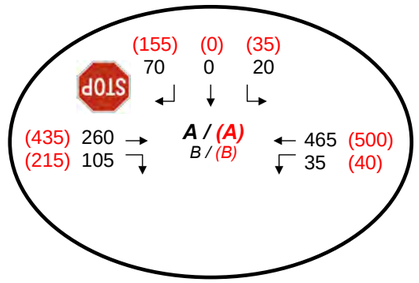
4. US 212 & Broadway Street S



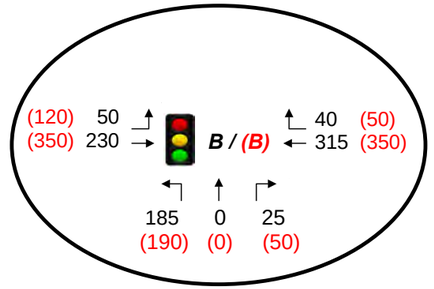
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

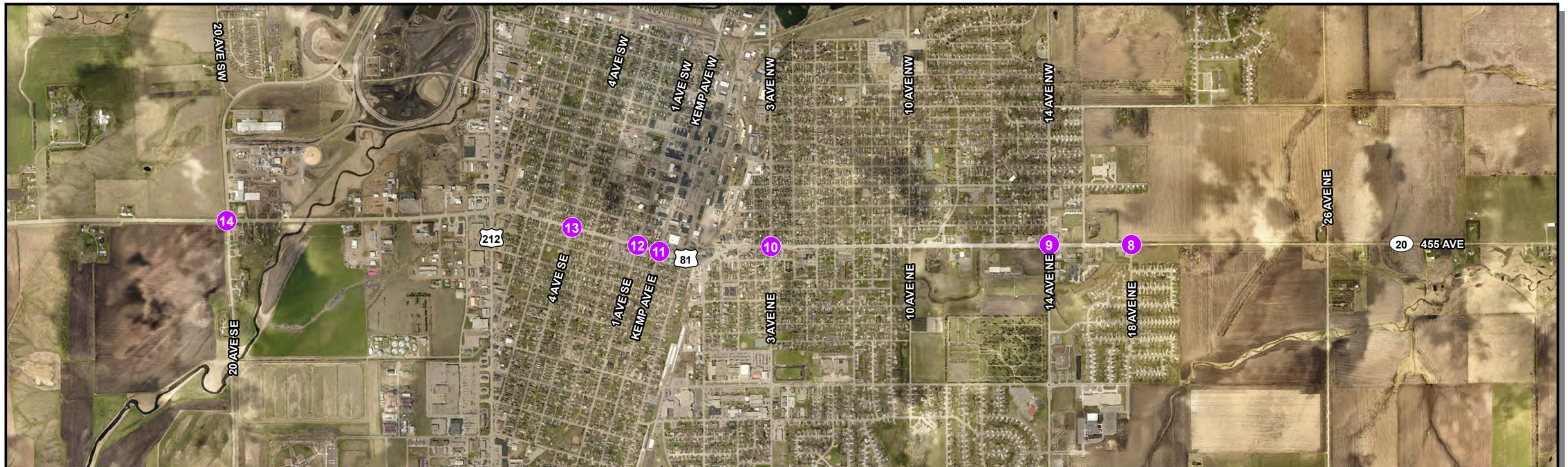
STOP Stop Control

Roundabout

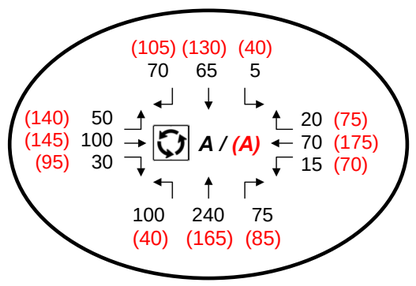
0 Miles 0.2

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
US 212 (9TH AVENUE S) CORRIDOR

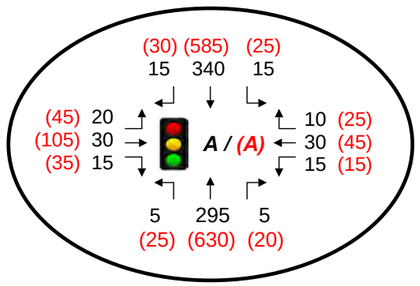
FIGURE 18



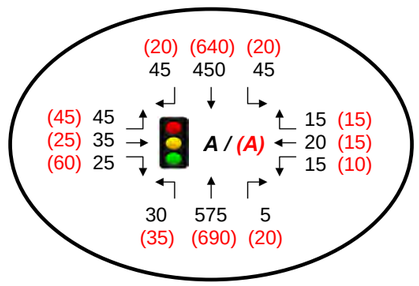
14. US 81 & 20th Ave SE



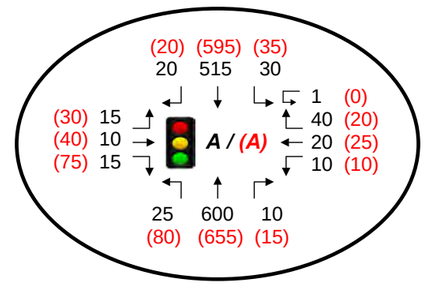
13. US 81 & 4th Avenue SE



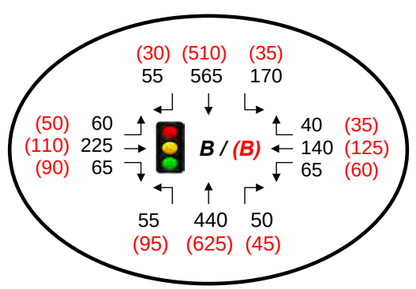
12. US 81 & 1st Avenue SE



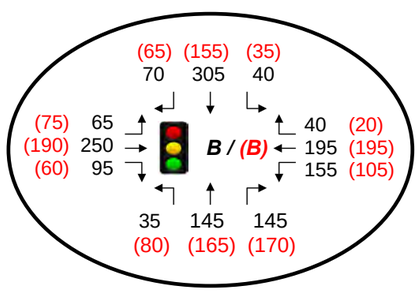
11. US 81 & E Kemp Avenue



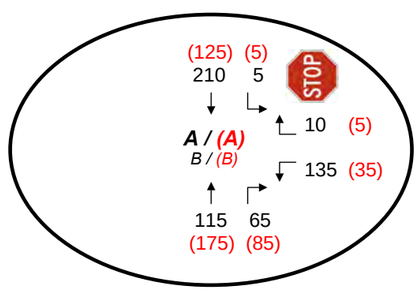
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

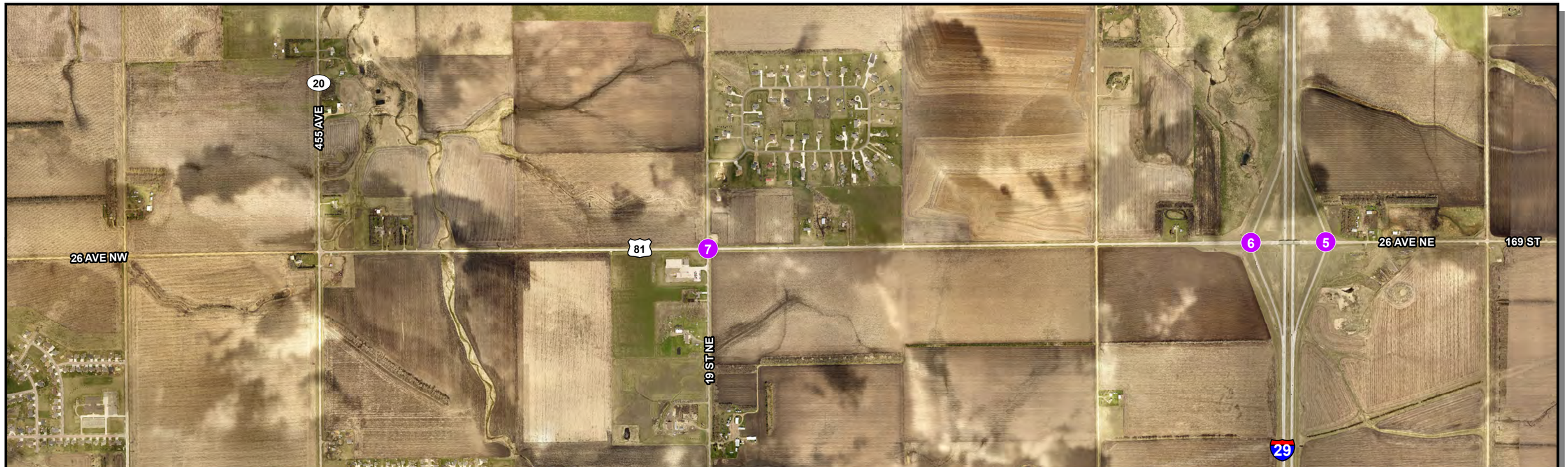
Stop Control

Roundabout Control

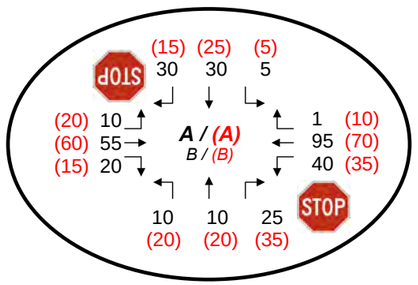
0 Miles 0.35

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
US 81 (5TH STREET E) CORRIDOR

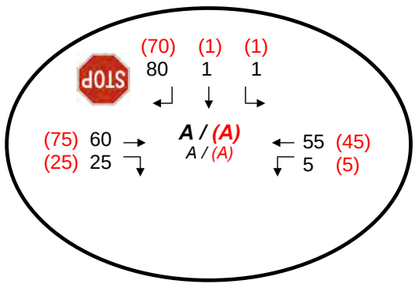
FIGURE 19



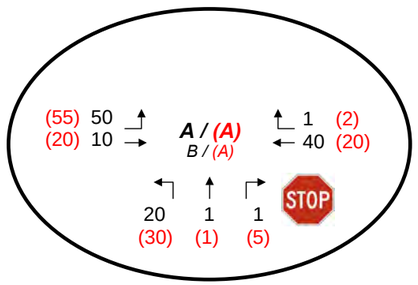
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

STOP Stop Control

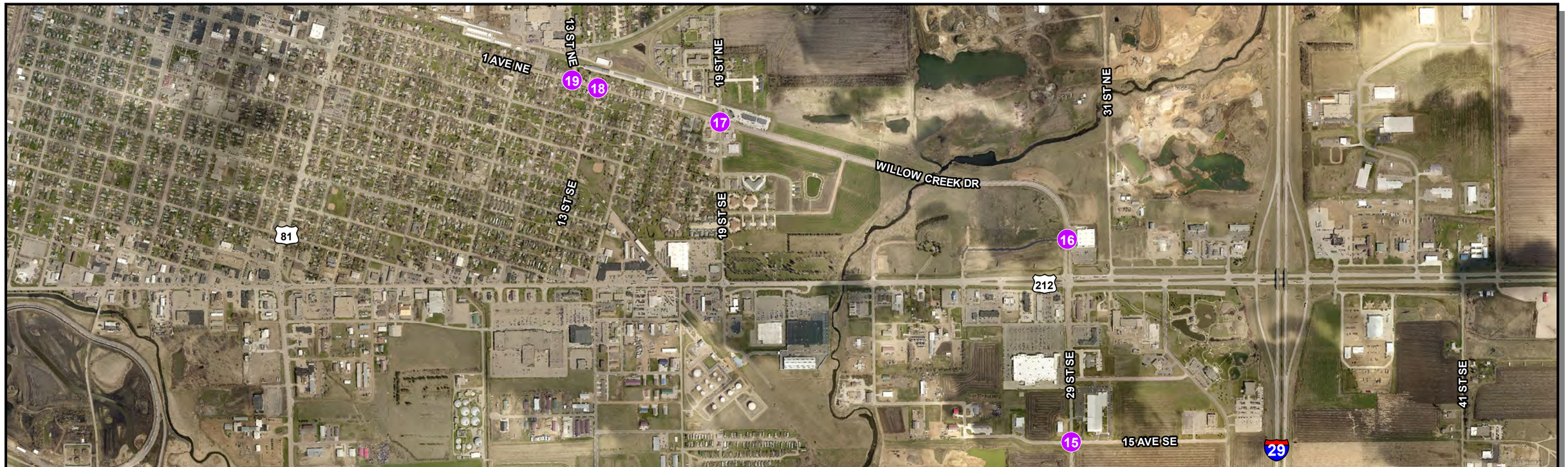
Roundabout Control

0 Miles 0.25

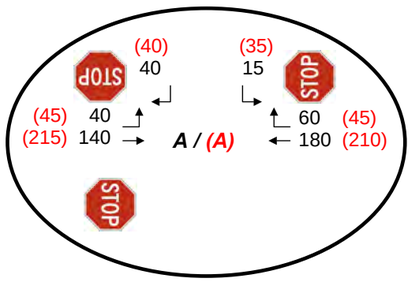
HDR

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
US 81 (26TH AVENUE NE) CORRIDOR

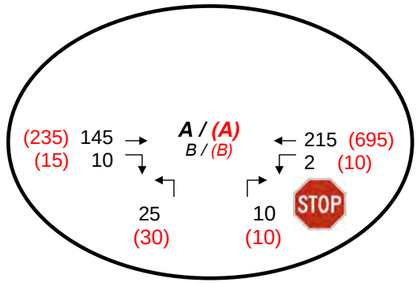
FIGURE 20



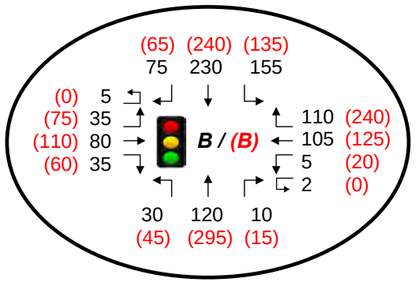
19. 1st Avenue NE & 13th Street NE (NB)



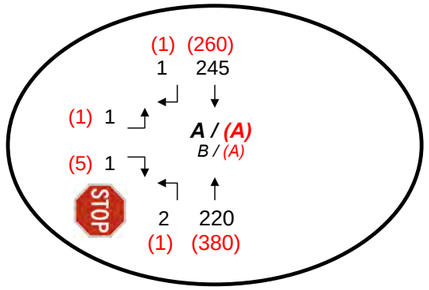
18. 1st Avenue NE & 13th Street NE (SB)



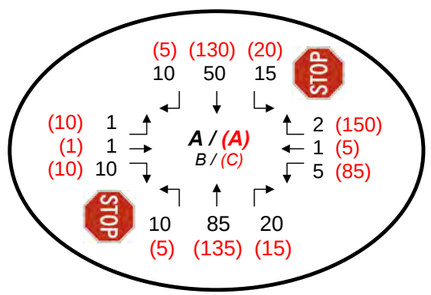
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

STOP Stop Control

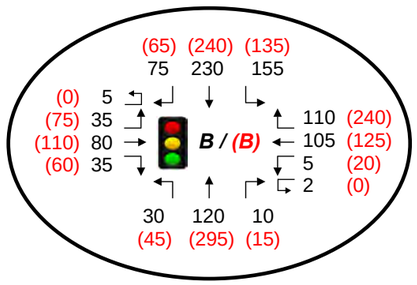
Roundabout Control

0 Miles 0.2

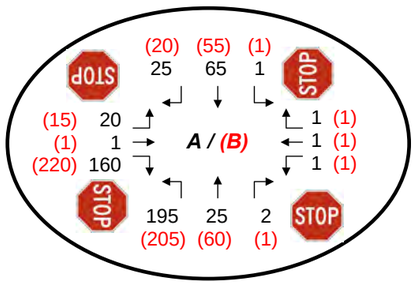
2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

FIGURE 21

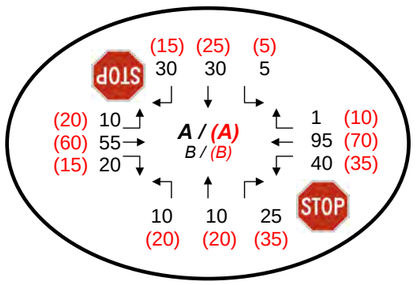
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

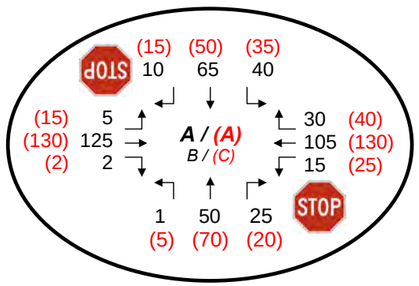
- 1 — Study Intersection
- AM (PM) — 2020 Peak Hour Traffic Volumes
- Intersection LOS
  - *A / (B)* — Overall Intersection
  - *B / (B)* — Worst-case Approach LOS (TWSC)
- Intersection Control
  - Signal
  - STOP — Stop Control
  - Roundabout

0 Miles 0.3

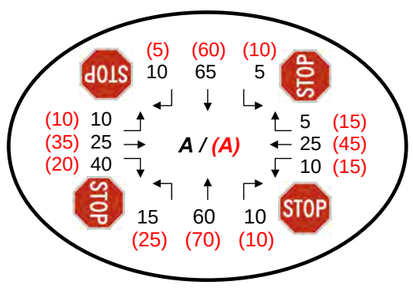
2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 22

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

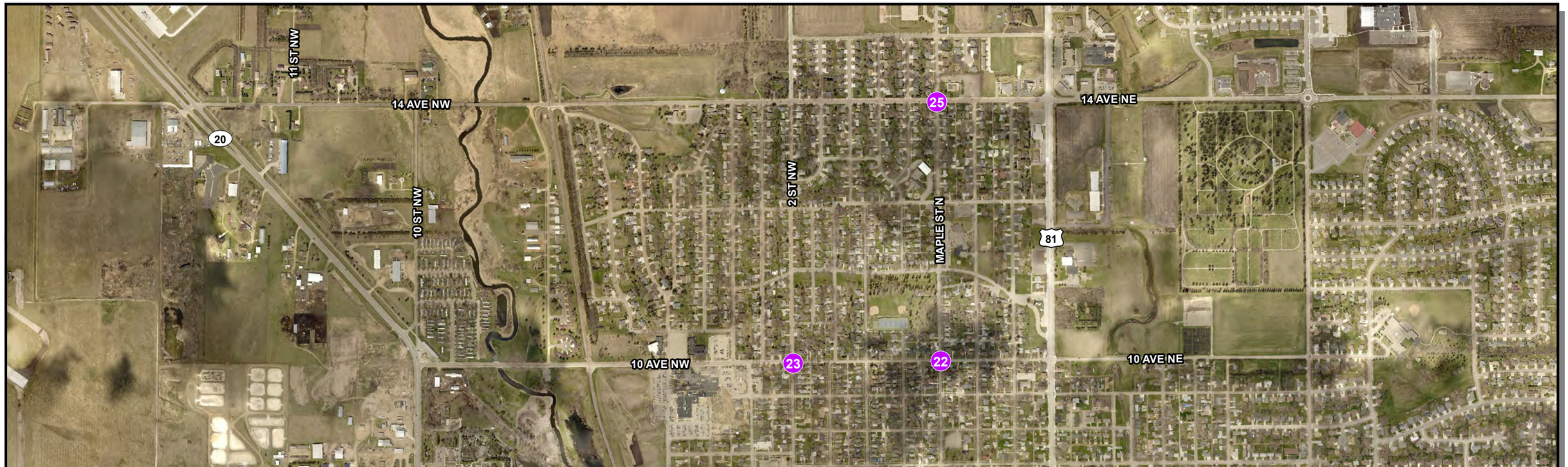
Stop Control

Roundabout

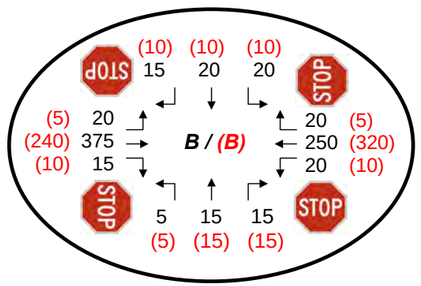
0 Miles 0.05

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING) 3RD STREET NW CORRIDOR

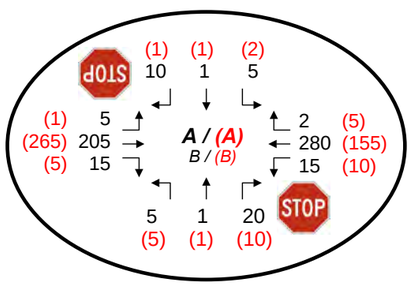
FIGURE 23



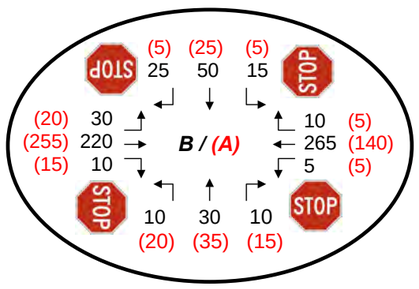
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2020 Peak Hour Traffic Volumes

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

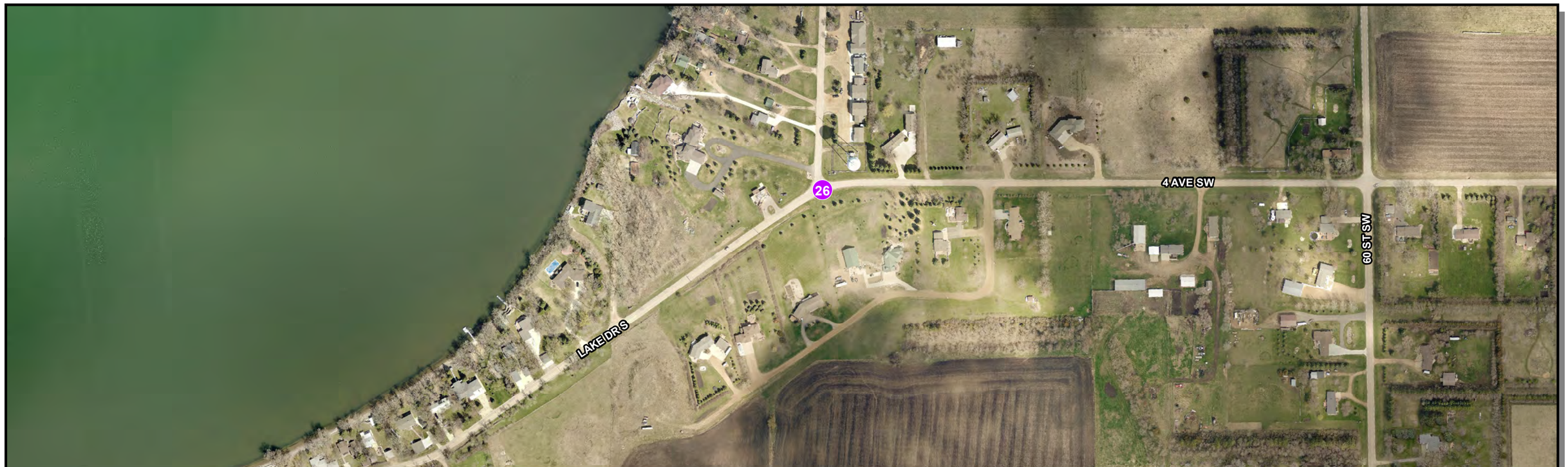
Stop Control

Roundabout

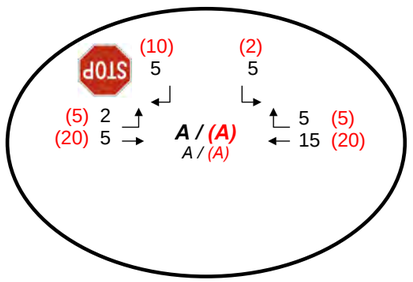
0 Miles 0.15

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING) 10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 24



26. South Lake Drive & 4th Avenue SW



LEGEND

- 1 — Study Intersection
- AM (PM) — 2020 Peak Hour Traffic Volumes
- Intersection LOS
  - A / (B) — Overall Intersection
  - B / (B) — Worst-case Approach LOS (TWSC)
- Intersection Control
  - Signal
  - Stop Control
  - Roundabout

0 Miles 0.05

2020 PEAK HOUR INTERSECTION LEVEL OF SERVICE (EXISTING)
SOUTH LAKE DRIVE AND 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 25

Traffic Operations Findings

The following are general findings derived from the 2020 existing conditions traffic operations analysis:

PLANNING LEVEL NUMBER OF LANES REVIEW

- A majority of roads within City limits function below 60% of SDDOT planning level capacity thresholds under existing daily traffic volumes.
- US 212 functions between 60% and 80% of capacity from 19th Street SE to US 81 with a volume to capacity (V/C) ratio of approximately 0.62. This is due to the highest daily volumes occurring on this segment of US 212. Since the V/C ratio remains low, this is indicative of a less significant future capacity concern.
- 14th Avenue North functions the following ways based on planning level capacity thresholds:
    - From 10th Street NW to 2nd Street NW, 14th Avenue NW operates between 60% and 80% of capacity. This is due to being classified as a rural segment with a greater volume capacity, as these segments are near the northern edge of the City and have more rural section attributes and few access points. V/C ratios for segments in this area were approximately 0.63, indicating a less significant future capacity issue.
    - From 2nd Street NW to N Maple Street, 14th Avenue North operates above capacity due to this segment being classified as an urban segment (with a lower capacity) and no left-turn lanes at major intersections. This represents a potentially mores significant future capacity issue.
- 10th Avenue North functions above the planning level capacity thresholds between 3rd Street NW to N Maple Street. This capacity classification is primarily due to the lack of left-turn lanes at major intersections along these urban segments.
- Other segments categorized as above planning capacity thresholds:
    - 11th Street E – from 4th Avenue SE to Arrow Avenue NE
    - Broadway Street – from 4th Avenue SW to 1st Avenue NE
    - 21st Street NW – from US 212 to 2nd Avenue NW
    - 4th Avenue SW – from Broadway Street S to 3rd Street SW
    - W Kemp Avenue – from 1st Avenue NW to Kampeska Boulevard

INTERSECTION OPERATIONS

- All study intersections met peak hour LOS goals and all intersections had an overall LOS of LOS B or above.
- US 212 and 23rd Street SE intersection has a TWSC worst-case approach LOS D for the northbound approach in the PM peak hour, indicating a notable delay for vehicles attempting to turn left or right onto US 212.

Section A – Synchro Traffic Operations Reports

Section A – Synchro Traffic Operations Reports

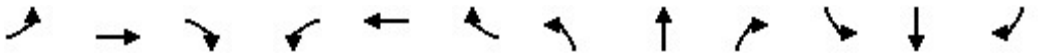
2020 EXISTING CONDITIONS - AM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
US 81 & 20th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

2020 EXISTING CONDITIONS - PM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
US 81 & 20th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

2020 Existing Conditions - AM

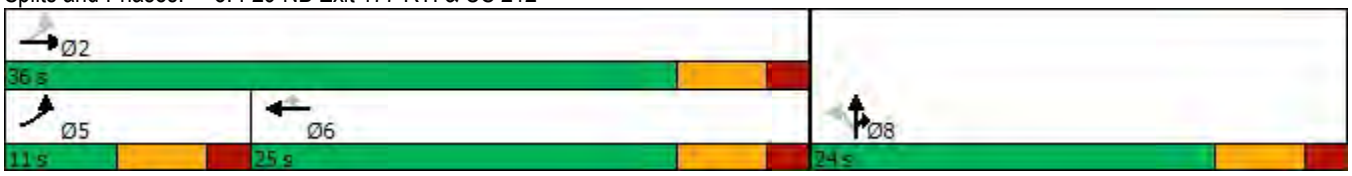


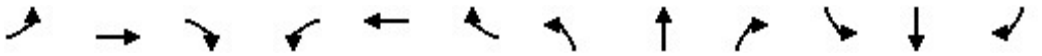
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	230	0	0	315	40	185	0	25	0	0	0
Future Volume (vph)	50	230	0	0	315	40	185	0	25	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	300		0	0		850	0		0	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1676	3353	0	0	3353	1500	0	1676	1500	0	0	0
Flt Permitted	0.373							0.950				
Satd. Flow (perm)	658	3353	0	0	3353	1500	0	1676	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						164			164			
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		690			1249			322			321	
Travel Time (s)		10.5			18.9			4.0			4.0	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	59	271	0	0	371	47	218	0	29	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	271	0	0	371	47	0	218	29	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	5	2			6			8	8			
Permitted Phases	2					6	8					
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	12.0	12.0	12.0			
Minimum Split (s)	11.0	24.0			24.0	24.0	24.0	24.0	24.0			
Total Split (s)	11.0	36.0			25.0	25.0	24.0	24.0	24.0			
Total Split (%)	18.3%	60.0%			41.7%	41.7%	40.0%	40.0%	40.0%			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Min			Min	Min	None	None	None			
Act Effct Green (s)	18.0	18.0			14.2	14.2		13.4	13.4			
Actuated g/C Ratio	0.41	0.41			0.32	0.32		0.31	0.31			
v/c Ratio	0.15	0.20			0.34	0.08		0.43	0.05			
Control Delay	8.8	8.6			14.0	0.2		16.0	0.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	8.8	8.6			14.0	0.2		16.0	0.2			
LOS	A	A			B	A		B	A			
Approach Delay		8.6			12.5			14.1				
Approach LOS		A			B			B				
Queue Length 50th (ft)	8	19			27	0		28	0			
Queue Length 95th (ft)	24	39			78	0		100	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		610			1169			242			241	
Turn Bay Length (ft)	300					850						
Base Capacity (vph)	390	2381			1590	797		714	733			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.15	0.11			0.23	0.06		0.31	0.04			

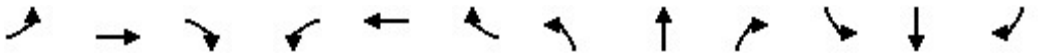
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 43.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 11.6		Intersection LOS: B	
Intersection Capacity Utilization 39.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: I-29 NB Exit 177 RTI & US 212





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	230	0	0	315	40	185	0	25	0	0	0
Future Volume (veh/h)	50	230	0	0	315	40	185	0	25	0	0	0
Initial Q (Qb), veh	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			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1772	1772	0	0	1772	1772	1772	1772	1772			
Adj Flow Rate, veh/h	59	271	0	0	371	47	218	0	29			
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	413	1488	0	0	805	359	457	0	407			
Arrive On Green	0.06	0.44	0.00	0.00	0.24	0.24	0.27	0.00	0.27			
Sat Flow, veh/h	1688	3455	0	0	3455	1502	1688	0	1502			
Grp Volume(v), veh/h	59	271	0	0	371	47	218	0	29			
Grp Sat Flow(s),veh/h/ln	1688	1683	0	0	1683	1502	1688	0	1502			
Q Serve(g_s), s	1.0	2.0	0.0	0.0	3.9	1.0	4.5	0.0	0.6			
Cycle Q Clear(g_c), s	1.0	2.0	0.0	0.0	3.9	1.0	4.5	0.0	0.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	413	1488	0	0	805	359	457	0	407			
V/C Ratio(X)	0.14	0.18	0.00	0.00	0.46	0.13	0.48	0.00	0.07			
Avail Cap(c_a), veh/h	515	2416	0	0	1530	683	727	0	647			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	9.7	7.1	0.0	0.0	13.6	12.5	12.8	0.0	11.3			
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.4	0.2	0.8	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	0.4	0.0	0.0	1.1	0.3	1.2	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	7.1	0.0	0.0	14.0	12.6	13.5	0.0	11.4			
LnGrp LOS	A	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		330			418			247				
Approach Delay, s/veh		7.6			13.9			13.3				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		24.5			8.5	16.0		17.3				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		30.0			5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s		4.0			3.0	5.9		6.5				
Green Ext Time (p_c), s		1.5			0.0	1.9		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			11.6									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	260	105	35	465	0	0	0	0	20	0	70
Future Volume (vph)	0	260	105	35	465	0	0	0	0	20	0	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.894	
Flt Protected				0.950							0.989	
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	0	1560	0
Flt Permitted				0.950							0.989	
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	0	1560	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	292	118	39	522	0	0	0	0	22	0	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	292	118	39	522	0	0	0	0	0	101	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.2%		ICU Level of Service A	
Analysis Period (min) 15			

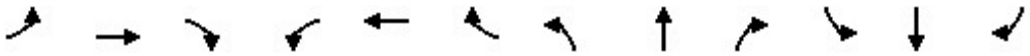
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	260	105	35	465	0	0	0	0	20	0	70
Future Vol, veh/h	0	260	105	35	465	0	0	0	0	20	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	292	118	39	522	0	0	0	0	22	0	79

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	410	0	0	746	1010	261
Stage 1	-	-	-	-	-	-	600	600	-
Stage 2	-	-	-	-	-	-	146	410	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	1145	-	0	349	238	738
Stage 1	0	-	-	-	-	0	511	488	-
Stage 2	0	-	-	-	-	0	866	594	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1145	-	-	337	0	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	337	0	-
Stage 1	-	-	-	-	-	-	511	0	-
Stage 2	-	-	-	-	-	-	837	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.6	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1145	-	584
HCM Lane V/C Ratio	-	-	0.034	-	0.173
HCM Control Delay (s)	-	-	8.3	-	12.5
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	280	25	10	305	0	15	0	10	0	0	0
Future Volume (vph)	0	280	25	10	305	0	15	0	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988						0.945				
Flt Protected				0.950				0.971				
Satd. Flow (prot)	1800	3318	0	1513	3288	0	0	1342	0	0	1800	0
Flt Permitted				0.950				0.971				
Satd. Flow (perm)	1800	3318	0	1513	3288	0	0	1342	0	0	1800	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	0	301	27	11	328	0	16	0	11	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	11	328	0	0	27	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

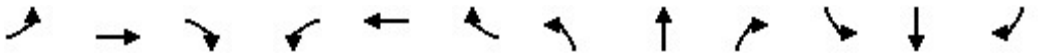
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	280	25	10	305	0	15	0	10	0	0	0
Future Vol, veh/h	0	280	25	10	305	0	15	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	13	4	0	19	0	29	0	0	0
Mvmt Flow	0	301	27	11	328	0	16	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	328	0	0	328	0	0	501	665	164	501	678	164
Stage 1	-	-	-	-	-	-	315	315	-	350	350	-
Stage 2	-	-	-	-	-	-	186	350	-	151	328	-
Critical Hdwy	4.1	-	-	4.36	-	-	7.88	6.5	7.48	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.33	-	-	3.69	4	3.59	3.5	4	3.3
Pot Cap-1 Maneuver	1243	-	-	1153	-	-	417	383	773	458	377	858
Stage 1	-	-	-	-	-	-	625	659	-	645	636	-
Stage 2	-	-	-	-	-	-	751	636	-	842	651	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1243	-	-	1153	-	-	414	379	773	448	373	858
Mov Cap-2 Maneuver	-	-	-	-	-	-	414	379	-	448	373	-
Stage 1	-	-	-	-	-	-	625	659	-	645	630	-
Stage 2	-	-	-	-	-	-	744	630	-	830	651	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	12.5	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	508	1243	-	-	1153	-	-	-
HCM Lane V/C Ratio	0.053	-	-	-	0.009	-	-	-
HCM Control Delay (s)	12.5	0	-	-	8.2	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

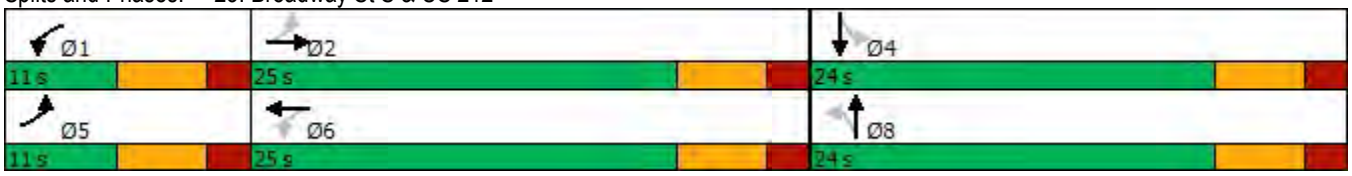


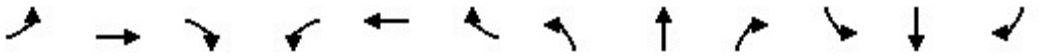
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	670	5	5	525	60	10	10	10	90	10	35
Future Volume (vph)	65	670	5	5	525	60	10	10	10	90	10	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	205		0	215		0	105		0	115		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.985			0.925			0.884	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3350	0	1676	3303	0	1676	1632	0	1676	1560	0
Flt Permitted	0.373			0.373			0.725			0.743		
Satd. Flow (perm)	658	3350	0	658	3303	0	1279	1632	0	1311	1560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			21			11			38	
Link Speed (mph)		35			35			40			25	
Link Distance (ft)		1772			1929			688			588	
Travel Time (s)		34.5			37.6			11.7			16.0	
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
Adj. Flow (vph)	71	728	5	5	571	65	11	11	11	98	11	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	733	0	5	636	0	11	22	0	98	49	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	11.0	25.0		11.0	25.0		24.0	24.0		24.0	24.0	
Total Split (%)	18.3%	41.7%		18.3%	41.7%		40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	24.8	25.8		22.7	21.8		9.3	9.3		9.3	9.3	
Actuated g/C Ratio	0.56	0.59		0.52	0.50		0.21	0.21		0.21	0.21	
v/c Ratio	0.14	0.37		0.01	0.39		0.04	0.06		0.35	0.14	
Control Delay	6.5	9.2		5.8	12.1		16.6	12.7		20.9	9.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.5	9.2		5.8	12.1		16.6	12.7		20.9	9.3	
LOS	A	A		A	B		B	B		C	A	
Approach Delay		8.9			12.1			14.0			17.1	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	8	50		1	71		2	2		23	2	
Queue Length 95th (ft)	25	153		4	127		13	17		61	24	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1692			1849			608			508	
Turn Bay Length (ft)	205			215			105			115		
Base Capacity (vph)	492	1992		460	1758		547	705		561	689	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.37		0.01	0.36		0.02	0.03		0.17	0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 44			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: Broadway St S & US 212

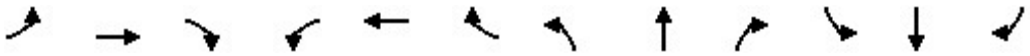




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	670	5	5	525	60	10	10	10	90	10	35
Future Volume (veh/h)	65	670	5	5	525	60	10	10	10	90	10	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	71	728	5	5	571	65	11	11	11	98	11	38
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	412	1218	8	335	891	101	369	128	128	395	55	191
Arrive On Green	0.07	0.36	0.36	0.01	0.29	0.29	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1688	3427	24	1688	3047	346	1356	813	813	1390	349	1206
Grp Volume(v), veh/h	71	358	375	5	315	321	11	0	22	98	0	49
Grp Sat Flow(s),veh/h/ln	1688	1683	1768	1688	1683	1710	1356	0	1626	1390	0	1555
Q Serve(g_s), s	1.1	6.5	6.5	0.1	6.1	6.1	0.3	0.0	0.4	2.4	0.0	1.0
Cycle Q Clear(g_c), s	1.1	6.5	6.5	0.1	6.1	6.1	1.3	0.0	0.4	2.9	0.0	1.0
Prop In Lane	1.00		0.01	1.00		0.20	1.00		0.50	1.00		0.78
Lane Grp Cap(c), veh/h	412	598	628	335	492	500	369	0	257	395	0	246
V/C Ratio(X)	0.17	0.60	0.60	0.01	0.64	0.64	0.03	0.00	0.09	0.25	0.00	0.20
Avail Cap(c_a), veh/h	519	853	895	548	853	866	806	0	780	843	0	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.5	9.9	9.9	9.5	11.5	11.6	14.3	0.0	13.5	14.7	0.0	13.7
Incr Delay (d2), s/veh	0.2	1.0	0.9	0.0	1.4	1.4	0.0	0.0	0.1	0.3	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	0.3	1.8	1.9	0.0	1.8	1.9	0.1	0.0	0.1	0.7	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.7	10.9	10.8	9.5	12.9	12.9	14.3	0.0	13.6	15.0	0.0	14.1
LnGrp LOS	A	B	B	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		804			641			33			147	
Approach Delay, s/veh		10.6			12.9			13.9			14.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	19.3		11.9	8.6	17.0		11.9				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	2.1	8.5		4.9	3.1	8.1		3.3				
Green Ext Time (p_c), s	0.0	3.2		0.4	0.0	2.8		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		12.0	
HCM 6th LOS		B	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	0	0	40	1	20	1	1	0	0	0
Future Volume (vph)	50	10	0	0	40	1	20	1	1	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.997			0.995				
Flt Protected		0.960						0.956				
Satd. Flow (prot)	0	1600	0	0	1662	0	0	1585	0	0	0	0
Flt Permitted		0.960						0.956				
Satd. Flow (perm)	0	1600	0	0	1662	0	0	1585	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	64	13	0	0	51	1	26	1	1	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	52	0	0	28	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.3%		ICU Level of Service A	
Analysis Period (min) 15			

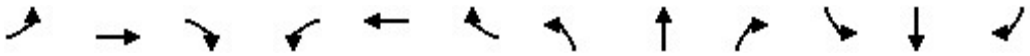
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	10	0	0	40	1	20	1	1	0	0	0
Future Vol, veh/h	50	10	0	0	40	1	20	1	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	13	0	0	51	1	26	1	1	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	52	0	-	-	-	0	193	193	13
Stage 1	-	-	-	-	-	-	141	141	-
Stage 2	-	-	-	-	-	-	52	52	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1554	-	0	0	-	-	796	702	1067
Stage 1	-	-	0	0	-	-	886	780	-
Stage 2	-	-	0	0	-	-	970	852	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1554	-	-	-	-	-	763	0	1067
Mov Cap-2 Maneuver	-	-	-	-	-	-	763	0	-
Stage 1	-	-	-	-	-	-	850	0	-
Stage 2	-	-	-	-	-	-	970	0	-

Approach	EB	WB	NB
HCM Control Delay, s	6.2	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	773	1554	-	-	-
HCM Lane V/C Ratio	0.036	0.041	-	-	-
HCM Control Delay (s)	9.8	7.4	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	60	25	5	55	0	0	0	0	1	1	80
Future Volume (vph)	0	60	25	5	55	0	0	0	0	1	1	80
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961									0.868	
Flt Protected					0.996							
Satd. Flow (prot)	0	1602	0	0	1660	0	0	0	0	0	1447	0
Flt Permitted					0.996							
Satd. Flow (perm)	0	1602	0	0	1660	0	0	0	0	0	1447	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	0	73	30	6	67	0	0	0	0	1	1	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	0	73	0	0	0	0	0	100	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.2%		ICU Level of Service A	
Analysis Period (min) 15			

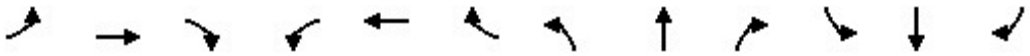
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	60	25	5	55	0	0	0	0	1	1	80
Future Vol, veh/h	0	60	25	5	55	0	0	0	0	1	1	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	73	30	6	67	0	0	0	0	1	1	98

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	103	0	0	167	182	67
Stage 1	-	-	-	-	-	-	79	79	-
Stage 2	-	-	-	-	-	-	88	103	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1489	-	0	823	712	997
Stage 1	0	-	-	-	-	0	944	829	-
Stage 2	0	-	-	-	-	0	935	810	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1489	-	-	820	0	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	820	0	-
Stage 1	-	-	-	-	-	-	944	0	-
Stage 2	-	-	-	-	-	-	931	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.6	9
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1489	-	994
HCM Lane V/C Ratio	-	-	0.004	-	0.101
HCM Control Delay (s)	-	-	7.4	0	9
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	55	20	40	95	1	10	10	25	5	30	30
Future Volume (vph)	10	55	20	40	95	1	10	10	25	5	30	30
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969			0.999			0.926			0.937	
Flt Protected		0.994			0.985			0.989			0.996	
Satd. Flow (prot)	0	1605	0	0	1640	0	0	1526	0	0	1555	0
Flt Permitted		0.994			0.985			0.989			0.996	
Satd. Flow (perm)	0	1605	0	0	1640	0	0	1526	0	0	1555	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	70	25	51	120	1	13	13	32	6	38	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	172	0	0	58	0	0	82	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	10	55	20	40	95	1	10	10	25	5	30	30
Future Vol, veh/h	10	55	20	40	95	1	10	10	25	5	30	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	70	25	51	120	1	13	13	32	6	38	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	95	0	0	370	332	83	354	344	121
Stage 1	-	-	-	-	-	-	109	109	-	223	223	-
Stage 2	-	-	-	-	-	-	261	223	-	131	121	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1467	-	-	1499	-	-	587	588	976	601	579	930
Stage 1	-	-	-	-	-	-	896	805	-	780	719	-
Stage 2	-	-	-	-	-	-	744	719	-	873	796	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1467	-	-	1499	-	-	515	562	976	552	553	930
Mov Cap-2 Maneuver	-	-	-	-	-	-	515	562	-	552	553	-
Stage 1	-	-	-	-	-	-	888	798	-	773	693	-
Stage 2	-	-	-	-	-	-	650	693	-	824	789	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	2.2	10.5	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	716	1467	-	-	1499	-	-	680
HCM Lane V/C Ratio	0.08	0.009	-	-	0.034	-	-	0.121
HCM Control Delay (s)	10.5	7.5	0	-	7.5	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.4

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	135	10	115	65	5	210
Future Volume (vph)	135	10	115	65	5	210
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0	0		100	190	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991			0.850		
Flt Protected	0.955				0.950	
Satd. Flow (prot)	1670	0	1765	1500	1676	1765
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1670	0	1765	1500	1676	1765
Link Speed (mph)	25		35			35
Link Distance (ft)	791		1566			1307
Travel Time (s)	21.6		30.5			25.5
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	12	140	79	6	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	177	0	140	79	6	256
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.9%		ICU Level of Service A	
Analysis Period (min) 15			

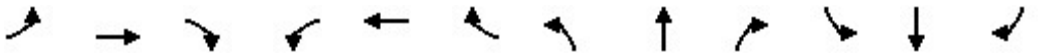
Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	10	115	65	5	210
Future Vol, veh/h	135	10	115	65	5	210
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	-	-	-	190	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	12	140	79	6	256

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	408	140	0	0	219	0
Stage 1	140	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	599	908	-	-	1350	-
Stage 1	887	-	-	-	-	-
Stage 2	777	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	597	908	-	-	1350	-
Mov Cap-2 Maneuver	645	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	774	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	658	1350	-
HCM Lane V/C Ratio	-	-	0.269	0.005	-
HCM Control Delay (s)	-	-	12.5	7.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0	-

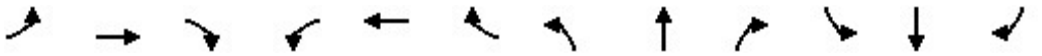


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	250	95	155	195	40	35	145	145	40	305	70
Future Volume (vph)	65	250	95	155	195	40	35	145	145	40	305	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	120		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.959			0.975			0.925			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1692	0	1676	1721	0	1676	3101	0	1676	3259	0
Flt Permitted	0.590			0.415			0.503			0.553		
Satd. Flow (perm)	1041	1692	0	732	1721	0	888	3101	0	976	3259	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			17			165			48	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1194			1025			1109			1566	
Travel Time (s)		23.3			20.0			21.6			30.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	74	284	108	176	222	45	40	165	165	45	347	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	392	0	176	267	0	40	330	0	45	427	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	17.4	17.4		17.4	17.4		17.2	12.1		17.2	12.1	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.33	0.23		0.33	0.23	
v/c Ratio	0.22	0.67		0.73	0.46		0.11	0.39		0.12	0.54	
Control Delay	15.5	21.8		38.3	16.6		9.5	10.0		9.6	18.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.5	21.8		38.3	16.6		9.5	10.0		9.6	18.5	
LOS	B	C		D	B		A	B		A	B	
Approach Delay		20.8			25.2			10.0			17.6	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)	16	90		46	57		7	22		8	54	
Queue Length 95th (ft)	45	#196		#141	122		19	47		21	87	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1114			945			1029			1486	
Turn Bay Length (ft)	120			120			120			120		
Base Capacity (vph)	357	602		251	601		364	1228		384	1211	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.65		0.70	0.44		0.11	0.27		0.12	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 52.6			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 64.5%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

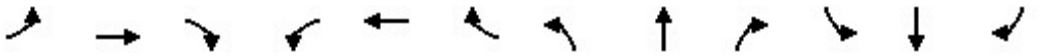
Splits and Phases: 17: US 81 (4th Street NE) & 14th Avenue NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	250	95	155	195	40	35	145	145	40	305	70
Future Volume (veh/h)	65	250	95	155	195	40	35	145	145	40	305	70
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	74	284	108	176	222	45	40	165	165	45	347	80
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	417	432	164	306	505	102	385	330	294	414	534	122
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.10	0.20	0.20	0.10	0.20	0.20
Sat Flow, veh/h	1178	1223	465	1050	1430	290	1688	1683	1502	1688	2723	620
Grp Volume(v), veh/h	74	0	392	176	0	267	40	165	165	45	213	214
Grp Sat Flow(s),veh/h/ln	1178	0	1688	1050	0	1720	1688	1683	1502	1688	1683	1660
Q Serve(g_s), s	2.6	0.0	10.0	8.0	0.0	6.1	0.9	4.5	5.1	1.0	5.9	6.1
Cycle Q Clear(g_c), s	8.7	0.0	10.0	18.0	0.0	6.1	0.9	4.5	5.1	1.0	5.9	6.1
Prop In Lane	1.00		0.28	1.00		0.17	1.00		1.00	1.00		0.37
Lane Grp Cap(c), veh/h	417	0	596	306	0	607	385	330	294	414	330	326
V/C Ratio(X)	0.18	0.00	0.66	0.57	0.00	0.44	0.10	0.50	0.56	0.11	0.64	0.66
Avail Cap(c_a), veh/h	417	0	596	306	0	607	385	627	559	414	627	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	0.0	13.9	21.7	0.0	12.6	13.4	18.3	18.5	13.3	18.9	18.9
Incr Delay (d2), s/veh	0.2	0.0	2.6	2.6	0.0	0.5	0.1	1.2	1.7	0.1	2.1	2.3
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	0.6	0.0	3.5	2.1	0.0	2.0	0.3	1.6	1.7	0.3	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	16.6	24.3	0.0	13.1	13.5	19.4	20.2	13.4	21.0	21.2
LnGrp LOS	B	A	B	C	A	B	B	B	C	B	C	C
Approach Vol, veh/h		466			443			370			472	
Approach Delay, s/veh		16.5			17.6			19.1			20.4	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	16.0		24.0	11.0	16.0		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	3.0	7.1		12.0	2.9	8.1		20.0				
Green Ext Time (p_c), s	0.0	1.5		1.4	0.0	1.8		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

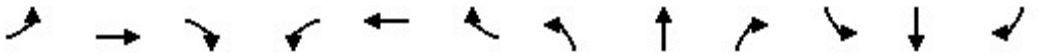


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	225	65	65	140	40	55	440	50	170	565	55
Future Volume (vph)	60	225	65	65	140	40	55	440	50	170	565	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	75		0	75		0	100		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.966			0.967			0.985			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1705	0	1676	1706	0	1676	3303	0	1676	3309	0
Flt Permitted	0.635			0.476			0.319			0.432		
Satd. Flow (perm)	1121	1705	0	840	1706	0	563	3303	0	762	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			24			21			18	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1200			1304			1548			1564	
Travel Time (s)		32.7			35.6			30.2			30.5	
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
Adj. Flow (vph)	65	245	71	71	152	43	60	478	54	185	614	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	316	0	71	195	0	60	532	0	185	674	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	13.7	13.7		13.7	13.7		20.7	15.6		20.7	15.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.39	0.30		0.39	0.30	
v/c Ratio	0.22	0.68		0.33	0.42		0.18	0.54		0.48	0.68	
Control Delay	17.9	24.8		20.8	17.6		9.2	17.6		13.5	20.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.9	24.8		20.8	17.6		9.2	17.6		13.5	20.3	
LOS	B	C		C	B		A	B		B	C	
Approach Delay		23.7			18.4			16.7			18.9	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	16	82		18	44		9	69		29	94	
Queue Length 95th (ft)	44	161		49	96		26	118		67	155	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1120			1224			1468			1484	
Turn Bay Length (ft)	75			75			100			165		
Base Capacity (vph)	390	610		292	609		327	1226		386	1227	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.52		0.24	0.32		0.18	0.43		0.48	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 52.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 67.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 23: US 81 (4th Street NE) & 3rd Avenue NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	225	65	65	140	40	55	440	50	170	565	55
Future Volume (veh/h)	60	225	65	65	140	40	55	440	50	170	565	55
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	65	245	71	71	152	43	60	478	54	185	614	60
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	371	364	105	267	366	104	381	822	92	432	835	81
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.10	0.27	0.27	0.10	0.27	0.27
Sat Flow, veh/h	1258	1320	383	1126	1328	376	1688	3050	343	1688	3099	302
Grp Volume(v), veh/h	65	0	316	71	0	195	60	263	269	185	333	341
Grp Sat Flow(s),veh/h/ln	1258	0	1703	1126	0	1704	1688	1683	1710	1688	1683	1718
Q Serve(g_s), s	2.3	0.0	8.3	3.0	0.0	4.7	1.2	6.8	6.9	3.9	9.1	9.1
Cycle Q Clear(g_c), s	7.0	0.0	8.3	11.4	0.0	4.7	1.2	6.8	6.9	3.9	9.1	9.1
Prop In Lane	1.00		0.22	1.00		0.22	1.00		0.20	1.00		0.18
Lane Grp Cap(c), veh/h	371	0	469	267	0	470	381	454	461	432	454	463
V/C Ratio(X)	0.18	0.00	0.67	0.27	0.00	0.42	0.16	0.58	0.58	0.43	0.73	0.74
Avail Cap(c_a), veh/h	473	0	606	358	0	607	381	633	643	432	633	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	16.3	21.3	0.0	15.0	11.4	16.0	16.0	11.9	16.8	16.8
Incr Delay (d2), s/veh	0.2	0.0	1.9	0.5	0.0	0.6	0.2	1.2	1.2	0.7	2.8	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	3.2	0.8	0.0	1.7	0.4	2.4	2.4	1.3	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	18.2	21.9	0.0	15.6	11.5	17.2	17.2	12.6	19.6	19.6
LnGrp LOS	B	A	B	C	A	B	B	B	B	B	B	B
Approach Vol, veh/h		381			266			592			859	
Approach Delay, s/veh		18.2			17.2			16.6			18.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	19.6		19.9	11.0	19.6		19.9				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	5.9	8.9		10.3	3.2	11.1		13.4				
Green Ext Time (p_c), s	0.0	2.2		1.3	0.0	2.5		0.6				

Intersection Summary												
HCM 6th Ctrl Delay			17.6									
HCM 6th LOS			B									

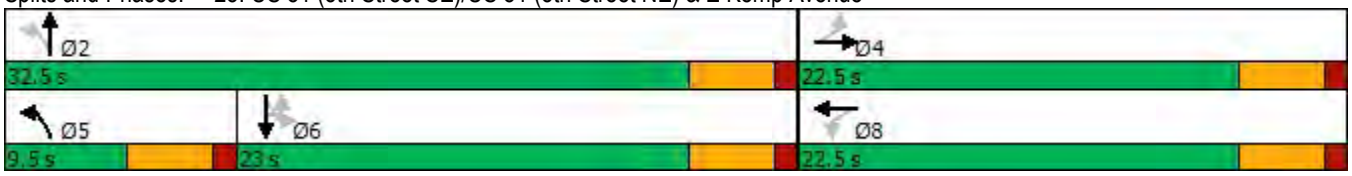
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	10	15	10	20	40	25	600	10	1	30	515
Future Volume (vph)	15	10	15	10	20	40	25	600	10	1	30	515
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Storage Length (ft)	0		0	0		0	100		0		100	
Storage Lanes	0		0	0		0	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt		0.949			0.923			0.998				0.994
Flt Protected		0.981			0.993		0.950				0.950	
Satd. Flow (prot)	0	1643	0	0	1617	0	1676	3346	0	0	1676	3333
Flt Permitted					0.940		0.352				0.394	
Satd. Flow (perm)	0	1675	0	0	1531	0	621	3346	0	0	695	3333
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		17			44			4				7
Link Speed (mph)		25			25			35				35
Link Distance (ft)		761			745			370				380
Travel Time (s)		20.8			20.3			7.2				7.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90
Adj. Flow (vph)	17	11	17	11	22	44	28	667	11	1	33	572
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	77	0	28	678	0	0	34	594
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6	6	
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		10.0	10.0	10.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		9.5	32.5		23.0	23.0	23.0
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	59.1%		41.8%	41.8%	41.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)		6.9			6.9		22.1	25.4			24.1	24.1
Actuated g/C Ratio		0.22			0.22		0.71	0.82			0.77	0.77
v/c Ratio		0.12			0.21		0.04	0.25			0.06	0.23
Control Delay		9.8			8.8		3.5	3.0			6.4	4.7
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		9.8			8.8		3.5	3.0			6.4	4.7
LOS		A			A		A	A			A	A
Approach Delay		9.8			8.8			3.0				4.8
Approach LOS		A			A			A				A
Queue Length 50th (ft)		2			2		1	0			0	0
Queue Length 95th (ft)		26			33		8	57			19	88

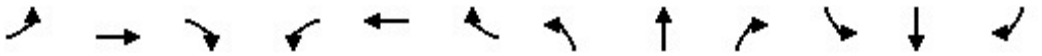
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	20
Future Volume (vph)	20
Ideal Flow (vphpl)	1800
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	22
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Internal Link Dist (ft)		681			665			290				300
Turn Bay Length (ft)							100				100	
Base Capacity (vph)		1047			968		623	2949			547	2628
Starvation Cap Reductn		0			0		0	0			0	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0
Reduced v/c Ratio		0.04			0.08		0.04	0.23			0.06	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 31.1			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.25			
Intersection Signal Delay: 4.3		Intersection LOS: A	
Intersection Capacity Utilization 39.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 28: US 81 (5th Street SE)/US 81 (5th Street NE) & E Kemp Avenue



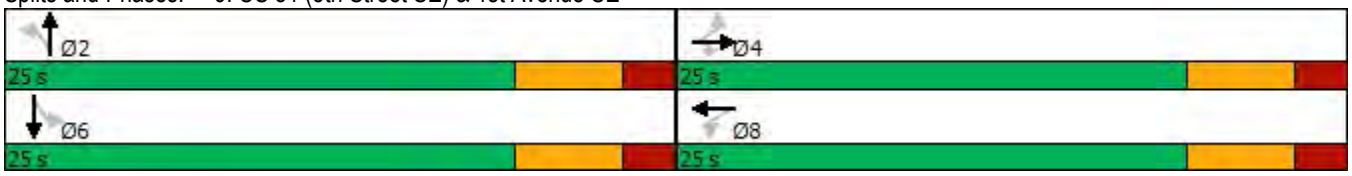


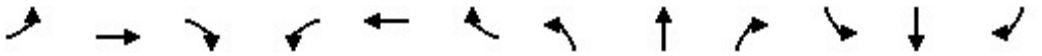
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	35	25	15	20	15	30	575	5	45	450	45
Future Volume (vph)	45	35	25	15	20	15	30	575	5	45	450	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	80		80	0		0	100		0	0		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.960			0.999			0.986	
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1676	1765	1500	0	1669	0	1676	3350	0	1676	3306	0
Flt Permitted	0.889				0.885		0.441			0.401		
Satd. Flow (perm)	1569	1765	1500	0	1499	0	778	3350	0	708	3306	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			2			24	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		642			750			1323			370	
Travel Time (s)		17.5			20.5			25.8			7.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	51	40	28	17	23	17	34	653	6	51	511	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	40	28	0	57	0	34	659	0	51	562	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.6	7.6	7.6		7.6		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.23	0.23	0.23		0.23		0.66	0.66		0.66	0.66	
v/c Ratio	0.14	0.10	0.07		0.16		0.07	0.30		0.11	0.26	
Control Delay	12.4	11.9	2.2		10.2		6.4	5.9		6.8	5.5	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	12.4	11.9	2.2		10.2		6.4	5.9		6.8	5.5	
LOS	B	B	A		B		A	A		A	A	
Approach Delay		9.8			10.2			5.9			5.6	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)	7	5	0		5		3	38		5	30	
Queue Length 95th (ft)	27	22	6		26		14	71		19	58	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		562			670			1243			290	
Turn Bay Length (ft)	80		80				100					
Base Capacity (vph)	898	1011	887		866		566	2438		515	2412	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.06	0.04	0.03		0.07		0.06	0.27		0.10	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 33.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 6.3		Intersection LOS: A	
Intersection Capacity Utilization 49.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: US 81 (5th Street SE) & 1st Avenue SE

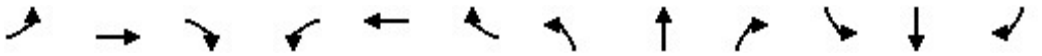




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	35	25	15	20	15	30	575	5	45	450	45
Future Volume (veh/h)	45	35	25	15	20	15	30	575	5	45	450	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	51	40	28	17	23	17	34	653	6	51	511	51
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	542	334	283	223	161	91	487	1279	12	448	1157	115
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1448	1772	1502	280	853	481	898	3418	31	821	3092	308
Grp Volume(v), veh/h	51	40	28	57	0	0	34	322	337	51	277	285
Grp Sat Flow(s),veh/h/ln	1448	1772	1502	1614	0	0	898	1683	1766	821	1683	1717
Q Serve(g_s), s	0.0	0.5	0.4	0.0	0.0	0.0	0.8	4.1	4.1	1.4	3.4	3.4
Cycle Q Clear(g_c), s	0.7	0.5	0.4	0.8	0.0	0.0	4.2	4.1	4.1	5.5	3.4	3.4
Prop In Lane	1.00		1.00	0.30		0.30	1.00		0.02	1.00		0.18
Lane Grp Cap(c), veh/h	542	334	283	474	0	0	487	630	661	448	630	642
V/C Ratio(X)	0.09	0.12	0.10	0.12	0.00	0.00	0.07	0.51	0.51	0.11	0.44	0.44
Avail Cap(c_a), veh/h	1272	1227	1040	1265	0	0	773	1166	1223	710	1166	1189
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	9.2	9.2	9.4	0.0	0.0	8.0	6.6	6.6	8.8	6.4	6.4
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.1	0.0	0.0	0.1	0.6	0.6	0.1	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	0.1	0.2	0.0	0.0	0.1	0.8	0.8	0.2	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	9.4	9.4	9.5	0.0	0.0	8.1	7.3	7.3	8.9	6.9	6.9
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		119			57			693			613	
Approach Delay, s/veh		9.4			9.5			7.3			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.3		11.2		16.3		11.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		6.2		2.7		7.5		2.8				
Green Ext Time (p_c), s		3.3		0.3		2.8		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			7.5									
HCM 6th LOS			A									

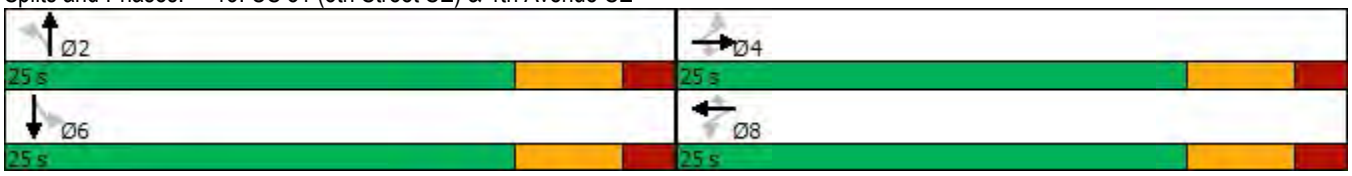


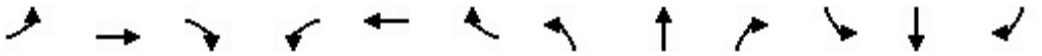
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	30	15	15	30	10	5	295	5	15	340	15
Future Volume (vph)	20	30	15	15	30	10	5	295	5	15	340	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		75	0		75	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.994	
Flt Protected		0.981			0.984		0.950			0.950		
Satd. Flow (prot)	0	1731	1500	0	1736	1500	1676	3346	0	1676	3333	0
Flt Permitted		0.961			0.915		0.500			0.534		
Satd. Flow (perm)	0	1696	1500	0	1615	1500	882	3346	0	942	3333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		4			10	
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		870			848			999			1323	
Travel Time (s)		19.8			23.1			19.5			25.8	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	37	18	18	37	12	6	360	6	18	415	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	18	0	55	12	6	366	0	18	433	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)		7.5	7.5		7.5	7.5	21.9	21.9		21.9	21.9	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.75	0.75		0.75	0.75	
v/c Ratio		0.14	0.04		0.13	0.03	0.01	0.15		0.03	0.17	
Control Delay		9.6	0.5		9.5	0.1	5.8	4.4		5.8	4.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		9.6	0.5		9.5	0.1	5.8	4.4		5.8	4.4	
LOS		A	A		A	A	A	A		A	A	
Approach Delay		7.5			7.8			4.4			4.5	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		4	0		3	0	0	0		0	0	
Queue Length 95th (ft)		22	1		20	0	4	34		8	40	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		790			768			919			1243	
Turn Bay Length (ft)			75			75	100			100		
Base Capacity (vph)		1132	1023		1078	1023	725	2754		775	2744	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.05	0.02		0.05	0.01	0.01	0.13		0.02	0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 29.2			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.17			
Intersection Signal Delay: 4.9		Intersection LOS: A	
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: US 81 (5th Street SE) & 4th Avenue SE

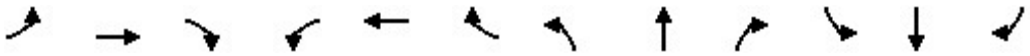




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	15	15	30	10	5	295	5	15	340	15
Future Volume (veh/h)	20	30	15	15	30	10	5	295	5	15	340	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	24	37	18	18	37	12	6	360	6	18	415	18
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	218	261	237	236	261	559	1273	21	595	1235	53
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	420	1254	1502	333	1358	1502	1011	3389	56	1076	3287	142
Grp Volume(v), veh/h	61	0	18	55	0	12	6	179	187	18	212	221
Grp Sat Flow(s),veh/h/ln	1674	0	1502	1692	0	1502	1011	1683	1762	1076	1683	1746
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	0.2	0.1	2.0	2.0	0.3	2.4	2.4
Cycle Q Clear(g_c), s	0.8	0.0	0.3	0.7	0.0	0.2	2.5	2.0	2.0	2.3	2.4	2.4
Prop In Lane	0.39		1.00	0.33		1.00	1.00		0.03	1.00		0.08
Lane Grp Cap(c), veh/h	479	0	261	473	0	261	559	632	662	595	632	656
V/C Ratio(X)	0.13	0.00	0.07	0.12	0.00	0.05	0.01	0.28	0.28	0.03	0.34	0.34
Avail Cap(c_a), veh/h	1355	0	1072	1360	0	1072	901	1201	1257	958	1201	1246
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.2	9.4	0.0	9.2	6.8	5.8	5.8	6.6	5.9	5.9
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.2	0.2	0.0	0.3	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	0.2	0.0	0.1	0.2	0.0	0.0	0.0	0.3	0.4	0.0	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.5	0.0	9.3	9.5	0.0	9.2	6.8	6.0	6.0	6.6	6.2	6.2
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		79			67			372			451	
Approach Delay, s/veh		9.5			9.4			6.1			6.3	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.0		10.6		16.0		10.6				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		4.5		2.8		4.4		2.7				
Green Ext Time (p_c), s		1.7		0.2		2.2		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			6.7									
HCM 6th LOS			A									



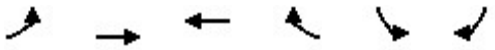
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	100	30	15	70	20	100	240	75	5	65	70
Future Volume (vph)	50	100	30	15	70	20	100	240	75	5	65	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.974			0.976			0.932	
Flt Protected		0.986			0.993			0.988			0.998	
Satd. Flow (prot)	0	1700	0	0	1707	0	0	1702	0	0	1641	0
Flt Permitted		0.986			0.993			0.988			0.998	
Satd. Flow (perm)	0	1700	0	0	1707	0	0	1702	0	0	1641	0
Link Speed (mph)		40			50			65			45	
Link Distance (ft)		2250			2754			1476			1428	
Travel Time (s)		38.4			37.6			15.5			21.6	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	60	120	36	18	84	24	120	289	90	6	78	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	126	0	0	499	0	0	168	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 59.5%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	6.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	216	126	499	168
Demand Flow Rate, veh/h	220	128	509	172
Vehicles Circulating, veh/h	104	478	189	226
Vehicles Exiting, veh/h	294	220	135	380
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.5	5.8	8.0	4.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	220	128	509	172
Cap Entry Lane, veh/h	1241	847	1138	1096
Entry HV Adj Factor	0.980	0.987	0.981	0.979
Flow Entry, veh/h	216	126	499	168
Cap Entry, veh/h	1216	836	1116	1073
V/C Ratio	0.177	0.151	0.447	0.157
Control Delay, s/veh	4.5	5.8	8.0	4.8
LOS	A	A	A	A
95th %tile Queue, veh	1	1	2	1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	40	140	180	60	15	40
Future Volume (vph)	40	140	180	60	15	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	70	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.966			0.850
Flt Protected		0.989			0.950	
Satd. Flow (prot)	0	1759	1730	0	1598	1530
Flt Permitted		0.989			0.950	
Satd. Flow (perm)	0	1759	1730	0	1598	1530
Link Speed (mph)		25	25		25	
Link Distance (ft)		791	278		1006	
Travel Time (s)		21.6	7.6		27.4	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	2%	1%	0%	2%	7%	0%
Adj. Flow (vph)	58	203	261	87	22	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	348	0	22	58
Sign Control		Stop	Stop		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	140	180	60	15	40
Future Vol, veh/h	40	140	180	60	15	40
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles, %	2	1	0	2	7	0
Mvmt Flow	58	203	261	87	22	58
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9.8	10.2	8.6
HCM LOS	A	B	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	100%	0%
Vol Thru, %	78%	75%	0%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	240	15	40
LT Vol	40	0	15	0
Through Vol	140	180	0	0
RT Vol	0	60	0	40
Lane Flow Rate	261	348	22	58
Geometry Grp	2	2	7	7
Degree of Util (X)	0.329	0.41	0.039	0.082
Departure Headway (Hd)	4.544	4.246	6.439	5.106
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	790	849	555	700
Service Time	2.572	2.27	4.184	2.85
HCM Lane V/C Ratio	0.33	0.41	0.04	0.083
HCM Control Delay	9.8	10.2	9.4	8.3
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	1.4	2	0.1	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	145	10	2	215	25	10
Future Volume (vph)	145	10	2	215	25	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992				0.962	
Flt Protected					0.965	
Satd. Flow (prot)	1769	0	0	1782	1671	0
Flt Permitted					0.965	
Satd. Flow (perm)	1769	0	0	1782	1671	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	278			1819	482	
Travel Time (s)	7.6			49.6	13.1	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Adj. Flow (vph)	210	14	3	312	36	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	224	0	0	315	50	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.6%		ICU Level of Service A	
Analysis Period (min) 15			

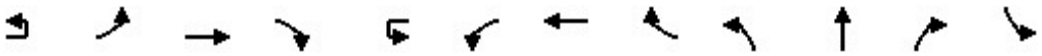
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	145	10	2	215	25	10
Future Vol, veh/h	145	10	2	215	25	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	210	14	3	312	36	14

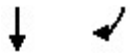
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	224	0	535	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	318	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1357	-	510	828
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	742	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1357	-	508	828
Mov Cap-2 Maneuver	-	-	-	-	508	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	740	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	571	-	-	1357	-
HCM Lane V/C Ratio	0.089	-	-	0.002	-
HCM Control Delay (s)	11.9	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	35	80	35	2	5	105	110	30	120	10	155
Future Volume (vph)	5	35	80	35	2	5	105	110	30	120	10	155
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)		215		215		145		0	150		0	150
Storage Lanes		1		1		1		1	1		0	1
Taper Length (ft)		25				25			25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850				0.850		0.988		
Flt Protected		0.950				0.950			0.950			0.950
Satd. Flow (prot)	0	1624	1800	1485	0	1699	1782	1485	1644	1731	0	1693
Flt Permitted		0.671				0.690			0.531			0.455
Satd. Flow (perm)	0	1147	1800	1485	0	1234	1782	1485	919	1731	0	811
Right Turn on Red				Yes				Yes			Yes	
Satd. Flow (RTOR)				164				141		7		
Link Speed (mph)			25				45			35		
Link Distance (ft)			1819				1221			982		
Travel Time (s)			49.6				18.5			19.1		
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles (%)	0%	6%	0%	3%	2%	0%	1%	3%	4%	3%	0%	1%
Adj. Flow (vph)	6	45	103	45	3	6	135	141	38	154	13	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	103	45	0	9	135	141	38	167	0	199
Turn Type	Perm	Perm	NA	Perm	Perm	Perm	NA	pt+ov	Perm	NA		pm+pt
Protected Phases			4				8	8 1		2		1
Permitted Phases	4	4		4	8	8			2			6
Detector Phase	4	4	4	4	8	8	8	8 1	2	2		1
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		12.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%		40.0%	40.0%		20.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0	6.0		6.0	6.0		6.0
Lead/Lag									Lag	Lag		Lead
Lead-Lag Optimize?									Yes	Yes		Yes
Recall Mode	None	None	None	None	None	None	None		Min	Min		None
Act Effct Green (s)		8.9	8.9	8.9		8.9	8.9	17.9	15.6	15.6		22.9
Actuated g/C Ratio		0.22	0.22	0.22		0.22	0.22	0.44	0.39	0.39		0.57
v/c Ratio		0.20	0.26	0.10		0.03	0.34	0.19	0.11	0.25		0.34
Control Delay		16.7	16.5	0.4		14.4	17.7	2.4	14.8	15.1		7.8
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		16.7	16.5	0.4		14.4	17.7	2.4	14.8	15.1		7.8
LOS		B	B	A		B	B	A	B	B		A
Approach Delay			12.9				10.0			15.0		
Approach LOS			B				B			B		
Queue Length 50th (ft)		10	21	0		2	28	0	7	32		23



Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	230	75
Future Volume (vph)	230	75
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.963	
Flt Protected		
Satd. Flow (prot)	1708	0
Flt Permitted		
Satd. Flow (perm)	1708	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	39	
Link Speed (mph)	35	
Link Distance (ft)	5295	
Travel Time (s)	103.1	
Peak Hour Factor	0.78	0.78
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	295	96
Shared Lane Traffic (%)		
Lane Group Flow (vph)	391	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	7.0	
Minimum Split (s)	24.0	
Total Split (s)	36.0	
Total Split (%)	60.0%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Min	
Act Effct Green (s)	24.6	
Actuated g/C Ratio	0.61	
v/c Ratio	0.37	
Control Delay	7.2	
Queue Delay	0.0	
Total Delay	7.2	
LOS	A	
Approach Delay	7.4	
Approach LOS	A	
Queue Length 50th (ft)	44	

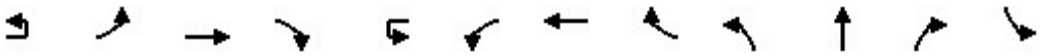
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Queue Length 95th (ft)		29	47	0		9	58	14	23	65		48
Internal Link Dist (ft)			1739				1141			902		
Turn Bay Length (ft)		215		215		145			150			150
Base Capacity (vph)		529	830	773		569	822	841	489	925		593
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0
Reduced v/c Ratio		0.10	0.12	0.06		0.02	0.16	0.17	0.08	0.18		0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 40.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 47.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: 19th St NE & 1st Ave NE/Willow Creek Dr

Lane Group	SBT	SBR
Queue Length 95th (ft)	85	
Internal Link Dist (ft)	5215	
Turn Bay Length (ft)		
Base Capacity (vph)	1298	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.30	

Intersection Summary



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	35	80	35	2	5	105	110	30	120	10	155
Future Volume (veh/h)	5	35	80	35	2	5	105	110	30	120	10	155
Initial Q (Qb), veh		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
Parking Bus, Adj		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		
Adj Sat Flow, veh/h/ln		1716	1800	1758		1800	1786	1758	1744	1758	1800	1786
Adj Flow Rate, veh/h		45	103	45		6	135	141	38	154	13	199
Peak Hour Factor		0.78	0.78	0.78		0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %		6	0	3		0	1	3	4	3	0	1
Cap, veh/h		331	344	284		377	341	465	386	308	26	535
Arrive On Green		0.19	0.19	0.19		0.19	0.19	0.19	0.19	0.19	0.19	0.12
Sat Flow, veh/h		1068	1800	1490		1259	1786	1490	977	1599	135	1701
Grp Volume(v), veh/h		45	103	45		6	135	141	38	0	167	199
Grp Sat Flow(s),veh/h/ln		1068	1800	1490		1259	1786	1490	977	0	1734	1701
Q Serve(g_s), s		1.4	1.8	0.9		0.1	2.4	2.6	1.2	0.0	3.1	3.0
Cycle Q Clear(g_c), s		3.8	1.8	0.9		1.9	2.4	2.6	1.2	0.0	3.1	3.0
Prop In Lane		1.00		1.00		1.00		1.00	1.00		0.08	1.00
Lane Grp Cap(c), veh/h		331	344	284		377	341	465	386	0	334	535
V/C Ratio(X)		0.14	0.30	0.16		0.02	0.40	0.30	0.10	0.00	0.50	0.37
Avail Cap(c_a), veh/h		656	891	738		760	884	918	682	0	858	610
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		14.5	12.6	12.3		13.4	12.9	9.5	12.3	0.0	13.1	8.6
Incr Delay (d2), s/veh		0.2	0.5	0.3		0.0	0.7	0.4	0.1	0.0	1.2	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
%ile BackOfQ(50%),veh/ln		0.3	0.6	0.3		0.0	0.7	0.6	0.2	0.0	1.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		14.7	13.1	12.5		13.5	13.6	9.9	12.4	0.0	14.3	9.1
LnGrp LOS		B	B	B		B	B	A	B	A	B	A
Approach Vol, veh/h			193				282			205		
Approach Delay, s/veh			13.3				11.7			13.9		
Approach LOS			B				B			B		

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.4	13.0		12.9		23.4		12.9				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	6.0	18.0		18.0		30.0		18.0				
Max Q Clear Time (g_c+I1), s	5.0	5.1		5.8		7.7		4.6				
Green Ext Time (p_c), s	0.1	0.8		0.7		2.4		0.9				

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	230	75
Future Volume (veh/h)	230	75
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1800
Adj Flow Rate, veh/h	295	96
Peak Hour Factor	0.78	0.78
Percent Heavy Veh, %	2	0
Cap, veh/h	613	200
Arrive On Green	0.48	0.48
Sat Flow, veh/h	1280	417
Grp Volume(v), veh/h	0	391
Grp Sat Flow(s),veh/h/ln	0	1697
Q Serve(g_s), s	0.0	5.7
Cycle Q Clear(g_c), s	0.0	5.7
Prop In Lane		0.25
Lane Grp Cap(c), veh/h	0	813
V/C Ratio(X)	0.00	0.48
Avail Cap(c_a), veh/h	0	1400
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.4
Incr Delay (d2), s/veh	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.2
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	0.0	6.9
LnGrp LOS	A	A
Approach Vol, veh/h	590	
Approach Delay, s/veh	7.6	
Approach LOS	A	
Timer - Assigned Phs		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	1	2	220	245	1
Future Volume (vph)	1	1	2	220	245	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.932					
Flt Protected	0.976			0.999		
Satd. Flow (prot)	1637	0	0	3350	3386	0
Flt Permitted	0.976			0.999		
Satd. Flow (perm)	1637	0	0	3350	3386	0
Link Speed (mph)	30			35	45	
Link Distance (ft)	233			583	1620	
Travel Time (s)	5.3			11.4	24.5	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	1	1	3	278	310	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	0	281	311	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.9%		ICU Level of Service A	
Analysis Period (min) 15			

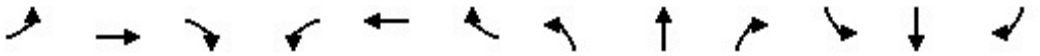
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	2	220	245	1
Future Vol, veh/h	1	1	2	220	245	1
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, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	1	1	3	278	310	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	456	156	311	0	-	0
Stage 1	311	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	538	868	1261	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	536	868	1261	-	-	-
Mov Cap-2 Maneuver	536	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	873	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1261	-	663	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	7.9	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	10	5	1	2	10	85	20	15	50	10
Future Volume (vph)	1	1	10	5	1	2	10	85	20	15	50	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.884			0.970			0.971			0.975	
Flt Protected		0.996			0.968		0.950			0.950		
Satd. Flow (prot)	0	1235	0	0	1690	0	1583	1720	0	1710	1718	0
Flt Permitted		0.996			0.968		0.950			0.950		
Satd. Flow (perm)	0	1235	0	0	1690	0	1583	1720	0	1710	1718	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	1	1	12	6	1	2	12	102	24	18	60	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	0	0	9	0	12	126	0	18	72	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.5%		ICU Level of Service A	
Analysis Period (min) 15			

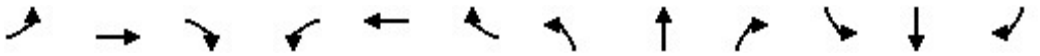
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	10	5	1	2	10	85	20	15	50	10
Future Vol, veh/h	1	1	10	5	1	2	10	85	20	15	50	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	33	0	0	0	8	2	0	0	0	13
Mvmt Flow	1	1	12	6	1	2	12	102	24	18	60	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	242	252	66	247	246	114	72	0	0	126	0	0
Stage 1	102	102	-	138	138	-	-	-	-	-	-	-
Stage 2	140	150	-	109	108	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	716	655	918	711	660	944	1491	-	-	1473	-	-
Stage 1	909	815	-	870	786	-	-	-	-	-	-	-
Stage 2	868	777	-	901	810	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	642	918	690	647	944	1491	-	-	1473	-	-
Mov Cap-2 Maneuver	702	642	-	690	647	-	-	-	-	-	-	-
Stage 1	902	805	-	863	780	-	-	-	-	-	-	-
Stage 2	857	771	-	877	800	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	10	0.6	1.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1491	-	-	865	733	1473	-	-
HCM Lane V/C Ratio	0.008	-	-	0.017	0.013	0.012	-	-
HCM Control Delay (s)	7.4	-	-	9.2	10	7.5	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1	160	1	1	1	195	25	2	1	65	25
Future Volume (vph)	20	1	160	1	1	1	195	25	2	1	65	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.881			0.925			0.990			0.963	
Flt Protected		0.994		0.950			0.950				0.999	
Satd. Flow (prot)	0	1506	0	1710	1665	0	1693	1677	0	0	1605	0
Flt Permitted		0.994		0.950			0.950				0.999	
Satd. Flow (perm)	0	1506	0	1710	1665	0	1693	1677	0	0	1605	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
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
Heavy Vehicles (%)	42%	0%	0%	0%	0%	0%	1%	3%	50%	0%	11%	0%
Adj. Flow (vph)	22	1	174	1	1	1	212	27	2	1	71	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	197	0	1	2	0	212	29	0	0	99	0
Sign Control		Stop			Stop			Stop			Stop	

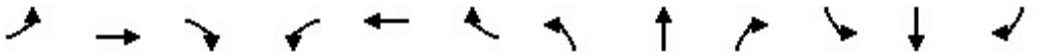
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	1	160	1	1	1	195	25	2	1	65	25
Future Vol, veh/h	20	1	160	1	1	1	195	25	2	1	65	25
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
Heavy Vehicles, %	42	0	0	0	0	0	1	3	50	0	11	0
Mvmt Flow	22	1	174	1	1	1	212	27	2	1	71	27
Number of Lanes	0	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	11.2	8.4	10.9	9.2
HCM LOS	B	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	11%	100%	0%	1%
Vol Thru, %	0%	93%	1%	0%	50%	71%
Vol Right, %	0%	7%	88%	0%	50%	27%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	195	27	181	1	2	91
LT Vol	195	0	20	1	0	1
Through Vol	0	25	1	0	1	65
RT Vol	0	2	160	0	1	25
Lane Flow Rate	212	29	197	1	2	99
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.335	0.042	0.307	0.002	0.003	0.144
Departure Headway (Hd)	5.69	5.169	5.622	6.177	5.319	5.242
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	632	691	637	576	668	681
Service Time	3.436	2.916	3.671	3.95	3.091	3.298
HCM Lane V/C Ratio	0.335	0.042	0.309	0.002	0.003	0.145
HCM Control Delay	11.3	8.1	11.2	9	8.1	9.2
HCM Lane LOS	B	A	B	A	A	A
HCM 95th-tile Q	1.5	0.1	1.3	0	0	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	125	2	15	105	30	1	50	25	40	65	10
Future Volume (vph)	5	125	2	15	105	30	1	50	25	40	65	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.966			0.956			0.988	
Flt Protected		0.998		0.950				0.999			0.983	
Satd. Flow (prot)	0	1727	0	1629	1694	0	0	1686	0	0	1718	0
Flt Permitted		0.998		0.950				0.999			0.983	
Satd. Flow (perm)	0	1727	0	1629	1694	0	0	1686	0	0	1718	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		577			733			480			518	
Travel Time (s)		15.7			20.0			13.1			14.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	4%	0%	5%	2%	5%	0%	0%	6%	5%	0%	0%
Adj. Flow (vph)	6	156	3	19	131	38	1	63	31	50	81	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	165	0	19	169	0	0	95	0	0	144	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.3%		ICU Level of Service A	
Analysis Period (min) 15			

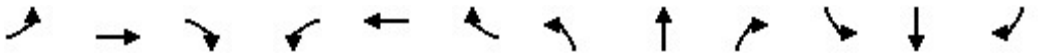
Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	125	2	15	105	30	1	50	25	40	65	10
Future Vol, veh/h	5	125	2	15	105	30	1	50	25	40	65	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	4	0	5	2	5	0	0	6	5	0	0
Mvmt Flow	6	156	3	19	131	38	1	63	31	50	81	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	169	0	0	159	0	0	405	377	158	405	359	150
Stage 1	-	-	-	-	-	-	170	170	-	188	188	-
Stage 2	-	-	-	-	-	-	235	207	-	217	171	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.1	6.5	6.26	7.15	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.5	4	3.354	3.545	4	3.3
Pot Cap-1 Maneuver	1421	-	-	1402	-	-	560	558	877	551	571	902
Stage 1	-	-	-	-	-	-	837	762	-	807	748	-
Stage 2	-	-	-	-	-	-	773	734	-	779	761	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1421	-	-	1402	-	-	484	547	877	478	560	902
Mov Cap-2 Maneuver	-	-	-	-	-	-	484	547	-	478	560	-
Stage 1	-	-	-	-	-	-	833	758	-	803	738	-
Stage 2	-	-	-	-	-	-	669	724	-	686	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	11.8	14
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	623	1421	-	-	1402	-	-	545
HCM Lane V/C Ratio	0.152	0.004	-	-	0.013	-	-	0.264
HCM Control Delay (s)	11.8	7.5	0	-	7.6	-	-	14
HCM Lane LOS	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	1.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	25	40	10	25	5	15	60	10	5	65	10
Future Volume (vph)	10	25	40	10	25	5	15	60	10	5	65	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		250	0		250	0		0	0		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.984			0.983	
Flt Protected		0.986			0.986			0.991			0.997	
Satd. Flow (prot)	0	1655	1485	0	1726	1308	0	1719	0	0	1722	0
Flt Permitted		0.986			0.986			0.991			0.997	
Satd. Flow (perm)	0	1655	1485	0	1726	1308	0	1719	0	0	1722	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		765			2317			386			480	
Travel Time (s)		20.9			63.2			10.5			13.1	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	25%	0%	3%	0%	4%	17%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	13	32	52	13	32	6	19	78	13	6	84	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	52	0	45	6	0	110	0	0	103	0
Sign Control		Stop			Stop			Stop			Stop	

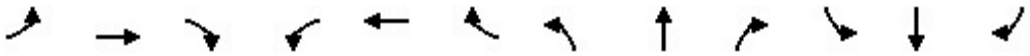
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	25	40	10	25	5	15	60	10	5	65	10
Future Vol, veh/h	10	25	40	10	25	5	15	60	10	5	65	10
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	25	0	3	0	4	17	0	3	0	0	3	0
Mvmt Flow	13	32	52	13	32	6	19	78	13	6	84	13
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8	8.2	8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	29%	0%	29%	0%	6%
Vol Thru, %	71%	71%	0%	71%	0%	81%
Vol Right, %	12%	0%	100%	0%	100%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	35	40	35	5	80
LT Vol	15	10	0	10	0	5
Through Vol	60	25	0	25	0	65
RT Vol	10	0	40	0	5	10
Lane Flow Rate	110	45	52	45	6	104
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.133	0.071	0.062	0.066	0.008	0.125
Departure Headway (Hd)	4.348	5.606	4.331	5.221	4.442	4.329
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	827	640	829	688	807	831
Service Time	2.362	3.325	2.05	2.941	2.162	2.342
HCM Lane V/C Ratio	0.133	0.07	0.063	0.065	0.007	0.125
HCM Control Delay	8	8.8	7.3	8.3	7.2	8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.2	0	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	220	10	5	265	10	10	30	10	15	50	25
Future Volume (vph)	30	220	10	5	265	10	10	30	10	15	50	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.995			0.973			0.962	
Flt Protected		0.994			0.999			0.990			0.992	
Satd. Flow (prot)	0	1743	0	0	1772	0	0	1672	0	0	1699	0
Flt Permitted		0.994			0.999			0.990			0.992	
Satd. Flow (perm)	0	1743	0	0	1772	0	0	1672	0	0	1699	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1515			1128			1396			2664	
Travel Time (s)		41.3			30.8			38.1			72.7	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	4%	2%	0%	0%	1%	0%	9%	0%	10%	0%	2%	0%
Adj. Flow (vph)	34	253	11	6	305	11	11	34	11	17	57	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	0	0	322	0	0	56	0	0	103	0
Sign Control		Stop			Stop			Stop			Stop	

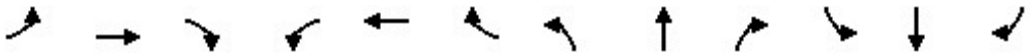
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	220	10	5	265	10	10	30	10	15	50	25
Future Vol, veh/h	30	220	10	5	265	10	10	30	10	15	50	25
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	4	2	0	0	1	0	9	0	10	0	2	0
Mvmt Flow	34	253	11	6	305	11	11	34	11	17	57	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.9	11.1	9.2	9.3
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	12%	2%	17%
Vol Thru, %	60%	85%	95%	56%
Vol Right, %	20%	4%	4%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	260	280	90
LT Vol	10	30	5	15
Through Vol	30	220	265	50
RT Vol	10	10	10	25
Lane Flow Rate	57	299	322	103
Geometry Grp	1	1	1	1
Degree of Util (X)	0.089	0.395	0.417	0.152
Departure Headway (Hd)	5.558	4.763	4.659	5.274
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	637	750	766	673
Service Time	3.656	2.828	2.721	3.362
HCM Lane V/C Ratio	0.089	0.399	0.42	0.153
HCM Control Delay	9.2	10.9	11.1	9.3
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	1.9	2.1	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	205	15	15	280	2	5	1	20	5	1	10
Future Volume (vph)	5	205	15	15	280	2	5	1	20	5	1	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.999			0.895			0.915	
Flt Protected		0.999			0.997			0.990			0.984	
Satd. Flow (prot)	0	1709	0	0	1771	0	0	1535	0	0	1621	0
Flt Permitted		0.999			0.997			0.990			0.984	
Satd. Flow (perm)	0	1709	0	0	1771	0	0	1535	0	0	1621	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1128			1515			1440			909	
Travel Time (s)		30.8			41.3			39.3			24.8	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	17%	3%	17%	6%	1%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	6	241	18	18	329	2	6	1	24	6	1	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	265	0	0	349	0	0	31	0	0	19	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.6%		ICU Level of Service A	
Analysis Period (min) 15			

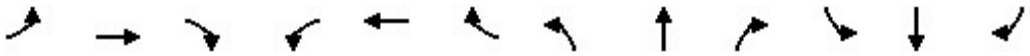
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	205	15	15	280	2	5	1	20	5	1	10
Future Vol, veh/h	5	205	15	15	280	2	5	1	20	5	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	17	3	17	6	1	0	0	0	5	0	0	0
Mvmt Flow	6	241	18	18	329	2	6	1	24	6	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	331	0	0	259	0	0	635	629	250	641	637	330
Stage 1	-	-	-	-	-	-	262	262	-	366	366	-
Stage 2	-	-	-	-	-	-	373	367	-	275	271	-
Critical Hdwy	4.27	-	-	4.16	-	-	7.1	6.5	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.353	-	-	2.254	-	-	3.5	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1149	-	-	1283	-	-	394	402	781	390	398	716
Stage 1	-	-	-	-	-	-	747	695	-	657	626	-
Stage 2	-	-	-	-	-	-	652	626	-	736	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1149	-	-	1283	-	-	380	393	781	371	389	716
Mov Cap-2 Maneuver	-	-	-	-	-	-	380	393	-	371	389	-
Stage 1	-	-	-	-	-	-	743	691	-	653	615	-
Stage 2	-	-	-	-	-	-	629	615	-	708	685	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	11	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	629	1149	-	-	1283	-	-	533
HCM Lane V/C Ratio	0.049	0.005	-	-	0.014	-	-	0.035
HCM Control Delay (s)	11	8.1	0	-	7.8	0	-	12
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	375	15	20	250	20	5	15	15	20	20	15
Future Volume (vph)	20	375	15	20	250	20	5	15	15	20	20	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.991			0.942			0.964	
Flt Protected		0.998			0.997			0.993			0.982	
Satd. Flow (prot)	0	1735	0	0	1737	0	0	1641	0	0	1601	0
Flt Permitted		0.998			0.997			0.993			0.982	
Satd. Flow (perm)	0	1735	0	0	1737	0	0	1641	0	0	1601	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	22	412	16	22	275	22	5	16	16	22	22	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	450	0	0	319	0	0	37	0	0	60	0
Sign Control		Stop			Stop			Stop			Stop	

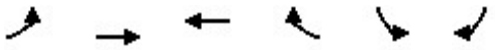
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	375	15	20	250	20	5	15	15	20	20	15
Future Vol, veh/h	20	375	15	20	250	20	5	15	15	20	20	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	22	412	16	22	275	22	5	16	16	22	22	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.3	10.9	8.9	9.2
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	5%	7%	36%
Vol Thru, %	43%	91%	86%	36%
Vol Right, %	43%	4%	7%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	410	290	55
LT Vol	5	20	20	20
Through Vol	15	375	250	20
RT Vol	15	15	20	15
Lane Flow Rate	38	451	319	60
Geometry Grp	1	1	1	1
Degree of Util (X)	0.058	0.564	0.409	0.093
Departure Headway (Hd)	5.465	4.506	4.625	5.558
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	649	797	774	639
Service Time	3.553	2.55	2.674	3.641
HCM Lane V/C Ratio	0.059	0.566	0.412	0.094
HCM Control Delay	8.9	13.3	10.9	9.2
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.2	3.6	2	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	5	15	5	5	5
Future Volume (vph)	2	5	15	5	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.965		0.932	
Flt Protected		0.987			0.976	
Satd. Flow (prot)	0	1303	1541	0	1223	0
Flt Permitted		0.987			0.976	
Satd. Flow (perm)	0	1303	1541	0	1223	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		250	315		248	
Travel Time (s)		5.7	7.2		5.6	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles (%)	100%	0%	7%	0%	0%	50%
Adj. Flow (vph)	3	8	23	8	8	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	31	0	16	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.8

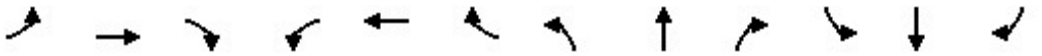
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	5	15	5	5	5
Future Vol, veh/h	2	5	15	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	66	66	66	66	66	66
Heavy Vehicles, %	100	0	7	0	0	50
Mvmt Flow	3	8	23	8	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	31	0	-	0	41	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	14	-
Critical Hdwy	5.1	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	3.1	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1126	-	-	-	975	926
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1126	-	-	-	972	926
Mov Cap-2 Maneuver	-	-	-	-	972	-
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1126	-	-	-	948
HCM Lane V/C Ratio	0.003	-	-	-	0.016
HCM Control Delay (s)	8.2	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

2020 Existing Conditions - PM

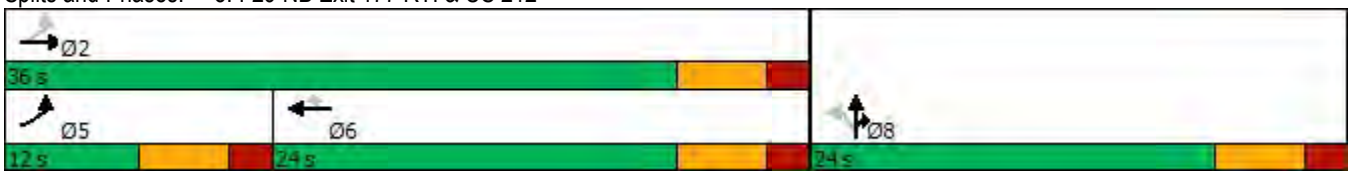


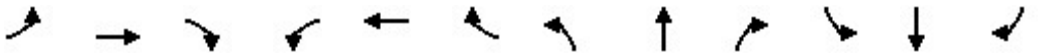
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	350	0	0	350	50	190	0	50	0	0	0
Future Volume (vph)	120	350	0	0	350	50	190	0	50	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	300		0	0		850	0		0	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1676	3353	0	0	3353	1500	0	1676	1500	0	0	0
Flt Permitted	0.385							0.950				
Satd. Flow (perm)	679	3353	0	0	3353	1500	0	1676	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						164			164			
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		690			1249			322			321	
Travel Time (s)		10.5			18.9			4.0			4.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	129	376	0	0	376	54	204	0	54	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	376	0	0	376	54	0	204	54	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	5	2			6			8	8			
Permitted Phases	2					6	8					
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	12.0	12.0	12.0			
Minimum Split (s)	11.0	24.0			24.0	24.0	24.0	24.0	24.0			
Total Split (s)	12.0	36.0			24.0	24.0	24.0	24.0	24.0			
Total Split (%)	20.0%	60.0%			40.0%	40.0%	40.0%	40.0%	40.0%			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Min			Min	Min	None	None	None			
Act Effct Green (s)	25.0	26.8			17.8	17.8		13.3	13.3			
Actuated g/C Ratio	0.55	0.59			0.39	0.39		0.29	0.29			
v/c Ratio	0.25	0.19			0.29	0.08		0.42	0.10			
Control Delay	8.7	7.3			15.7	0.2		18.1	0.3			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	8.7	7.3			15.7	0.2		18.1	0.3			
LOS	A	A			B	A		B	A			
Approach Delay		7.6			13.8			14.4				
Approach LOS		A			B			B				
Queue Length 50th (ft)	18	27			46	0		46	0			
Queue Length 95th (ft)	46	56			86	0		104	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		610			1169			242			241	
Turn Bay Length (ft)	300					850						
Base Capacity (vph)	509	2296			1659	825		688	712			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.25	0.16			0.23	0.07		0.30	0.08			

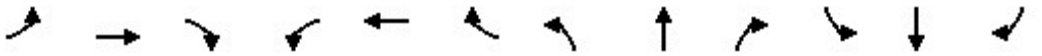
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 45.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 43.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: I-29 NB Exit 177 RTI & US 212





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	350	0	0	350	50	190	0	50	0	0	0
Future Volume (veh/h)	120	350	0	0	350	50	190	0	50	0	0	0
Initial Q (Qb), veh	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			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1772	1772	0	0	1772	1772	1772	1772	1772			
Adj Flow Rate, veh/h	129	376	0	0	376	54	204	0	54			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	447	1547	0	0	776	346	446	0	397			
Arrive On Green	0.09	0.46	0.00	0.00	0.23	0.23	0.26	0.00	0.26			
Sat Flow, veh/h	1688	3455	0	0	3455	1502	1688	0	1502			
Grp Volume(v), veh/h	129	376	0	0	376	54	204	0	54			
Grp Sat Flow(s),veh/h/ln	1688	1683	0	0	1683	1502	1688	0	1502			
Q Serve(g_s), s	2.3	3.0	0.0	0.0	4.2	1.2	4.4	0.0	1.2			
Cycle Q Clear(g_c), s	2.3	3.0	0.0	0.0	4.2	1.2	4.4	0.0	1.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	447	1547	0	0	776	346	446	0	397			
V/C Ratio(X)	0.29	0.24	0.00	0.00	0.48	0.16	0.46	0.00	0.14			
Avail Cap(c_a), veh/h	527	2327	0	0	1396	623	700	0	623			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	9.9	7.1	0.0	0.0	14.5	13.3	13.4	0.0	12.2			
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.0	0.5	0.2	0.7	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			
%ile BackOfQ(50%),veh/ln	0.6	0.6	0.0	0.0	1.3	0.3	1.2	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	7.2	0.0	0.0	14.9	13.5	14.1	0.0	12.3			
LnGrp LOS	B	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		505			430			258				
Approach Delay, s/veh		8.0			14.8			13.7				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		25.9			9.9	16.0		17.5				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		30.0			6.0	18.0		18.0				
Max Q Clear Time (g_c+I1), s		5.0			4.3	6.2		6.4				
Green Ext Time (p_c), s		2.2			0.0	1.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			11.7									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	435	215	35	490	0	0	0	0	35	0	155
Future Volume (vph)	0	435	215	35	490	0	0	0	0	35	0	155
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.890	
Flt Protected				0.950							0.991	
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	0	1556	0
Flt Permitted				0.950							0.991	
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	0	1556	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	453	224	36	510	0	0	0	0	36	0	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	224	36	510	0	0	0	0	0	197	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.3%		ICU Level of Service A	
Analysis Period (min) 15			

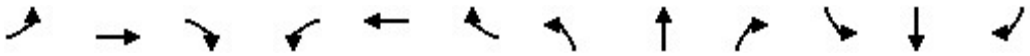
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	435	215	35	490	0	0	0	0	35	0	155
Future Vol, veh/h	0	435	215	35	490	0	0	0	0	35	0	155
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	453	224	36	510	0	0	0	0	36	0	161

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	677	0	0	809	1259	255
Stage 1	-	-	-	-	-	-	582	582	-
Stage 2	-	-	-	-	-	-	227	677	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	911	-	0	318	169	744
Stage 1	0	-	-	-	-	0	522	497	-
Stage 2	0	-	-	-	-	0	789	450	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	911	-	-	305	0	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	0	-
Stage 1	-	-	-	-	-	-	522	0	-
Stage 2	-	-	-	-	-	-	757	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.6	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	911	-	588
HCM Lane V/C Ratio	-	-	0.04	-	0.337
HCM Control Delay (s)	-	-	9.1	-	14.2
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	585	20	10	695	0	30	0	20	0	0	0
Future Volume (vph)	0	585	20	10	695	0	30	0	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995						0.946				
Flt Protected				0.950				0.971				
Satd. Flow (prot)	1800	3233	0	1286	3288	0	0	1527	0	0	1800	0
Flt Permitted				0.950				0.971				
Satd. Flow (perm)	1800	3233	0	1286	3288	0	0	1527	0	0	1800	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	0	672	23	11	799	0	34	0	23	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	695	0	11	799	0	0	57	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.3%		ICU Level of Service A	
Analysis Period (min) 15			

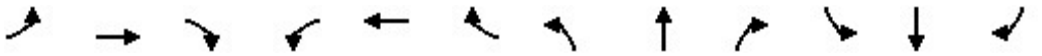
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	585	20	10	695	0	30	0	20	0	0	0
Future Vol, veh/h	0	585	20	10	695	0	30	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	4	42	33	4	0	3	0	16	0	0	0
Mvmt Flow	0	672	23	11	799	0	34	0	23	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	799	0	0	695	0	0	1106	1505	348	1157	1516	400
Stage 1	-	-	-	-	-	-	684	684	-	821	821	-
Stage 2	-	-	-	-	-	-	422	821	-	336	695	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.56	6.5	7.22	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.53	-	-	3.53	4	3.46	3.5	4	3.3
Pot Cap-1 Maneuver	833	-	-	718	-	-	164	122	609	154	121	605
Stage 1	-	-	-	-	-	-	402	452	-	339	391	-
Stage 2	-	-	-	-	-	-	577	391	-	657	447	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	833	-	-	718	-	-	162	120	609	146	119	605
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	120	-	146	119	-
Stage 1	-	-	-	-	-	-	402	452	-	339	385	-
Stage 2	-	-	-	-	-	-	568	385	-	632	447	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	25.9	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	229	833	-	-	718	-	-	-
HCM Lane V/C Ratio	0.251	-	-	-	0.016	-	-	-
HCM Control Delay (s)	25.9	0	-	-	10.1	-	-	0
HCM Lane LOS	D	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	-

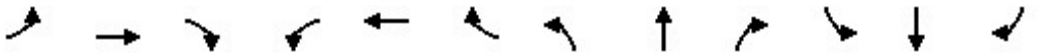


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	850	10	15	860	110	20	15	15	165	10	50
Future Volume (vph)	70	850	10	15	860	110	20	15	15	165	10	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	205		0	215		0	105		0	115		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.983			0.925			0.875	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3346	0	1676	3296	0	1676	1632	0	1676	1544	0
Flt Permitted	0.128			0.228			0.710			0.734		
Satd. Flow (perm)	226	3346	0	402	3296	0	1253	1632	0	1295	1544	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			24			18			60	
Link Speed (mph)		35			35			40			25	
Link Distance (ft)		1772			1929			688			588	
Travel Time (s)		34.5			37.6			11.7			16.0	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	84	1024	12	18	1036	133	24	18	18	199	12	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	1036	0	18	1169	0	24	36	0	199	72	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	11.0	30.0		11.0	30.0		24.0	24.0		24.0	24.0	
Total Split (%)	16.9%	46.2%		16.9%	46.2%		36.9%	36.9%		36.9%	36.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	34.0	33.0		30.4	26.5		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.56	0.54		0.50	0.44		0.23	0.23		0.23	0.23	
v/c Ratio	0.34	0.57		0.06	0.81		0.08	0.09		0.68	0.18	
Control Delay	11.2	13.2		7.5	23.5		18.6	12.5		33.9	8.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.2	13.2		7.5	23.5		18.6	12.5		33.9	8.4	
LOS	B	B		A	C		B	B		C	A	
Approach Delay		13.1			23.2			14.9			27.1	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	13	111		3	202		7	5		67	4	
Queue Length 95th (ft)	30	235		10	#311		21	21		116	26	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1692			1849			608			508	
Turn Bay Length (ft)	205			215			105			115		
Base Capacity (vph)	245	1814		305	1446		371	497		384	500	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.57		0.06	0.81		0.06	0.07		0.52	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 60.9			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 64.3%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

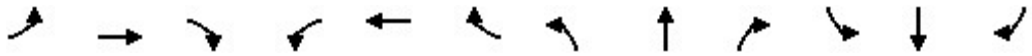
Splits and Phases: 23: Broadway St S & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	850	10	15	860	110	20	15	15	165	10	50
Future Volume (veh/h)	70	850	10	15	860	110	20	15	15	165	10	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	84	1024	12	18	1036	133	24	18	18	199	12	60
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	1527	18	283	1213	156	348	165	165	384	52	260
Arrive On Green	0.07	0.45	0.45	0.02	0.40	0.40	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1688	3408	40	1688	3001	385	1328	813	813	1372	257	1284
Grp Volume(v), veh/h	84	506	530	18	581	588	24	0	36	199	0	72
Grp Sat Flow(s),veh/h/ln	1688	1683	1765	1688	1683	1703	1328	0	1626	1372	0	1541
Q Serve(g_s), s	1.5	13.0	13.0	0.3	17.2	17.3	0.8	0.0	1.0	7.6	0.0	2.1
Cycle Q Clear(g_c), s	1.5	13.0	13.0	0.3	17.2	17.3	3.0	0.0	1.0	8.6	0.0	2.1
Prop In Lane	1.00		0.02	1.00		0.23	1.00		0.50	1.00		0.83
Lane Grp Cap(c), veh/h	285	754	791	283	680	688	348	0	329	384	0	312
V/C Ratio(X)	0.29	0.67	0.67	0.06	0.85	0.86	0.07	0.00	0.11	0.52	0.00	0.23
Avail Cap(c_a), veh/h	328	754	791	400	735	744	514	0	533	556	0	505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.4	12.0	12.0	10.2	14.9	14.9	19.6	0.0	17.9	21.4	0.0	18.3
Incr Delay (d2), s/veh	0.6	2.3	2.2	0.1	9.1	9.1	0.1	0.0	0.1	1.1	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	0.5	4.3	4.5	0.1	7.0	7.1	0.2	0.0	0.3	2.4	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	14.3	14.2	10.3	24.0	24.0	19.7	0.0	18.0	22.5	0.0	18.7
LnGrp LOS	B	B	B	B	C	C	B	A	B	C	A	B
Approach Vol, veh/h		1120			1187			60			271	
Approach Delay, s/veh		14.1			23.8			18.7			21.5	
Approach LOS		B			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	30.6		17.1	9.6	28.2		17.1				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	24.0		18.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	2.3	15.0		10.6	3.5	19.3		5.0				
Green Ext Time (p_c), s	0.0	4.2		0.6	0.0	2.9		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			19.3									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	20	0	0	20	2	30	1	5	0	0	0
Future Volume (vph)	55	20	0	0	20	2	30	1	5	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989			0.983				
Flt Protected		0.965						0.959				
Satd. Flow (prot)	0	1608	0	0	1648	0	0	1571	0	0	0	0
Flt Permitted		0.965						0.959				
Satd. Flow (perm)	0	1608	0	0	1648	0	0	1571	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	22	0	0	22	2	33	1	5	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	82	0	0	24	0	0	39	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.2%		ICU Level of Service A	
Analysis Period (min) 15			

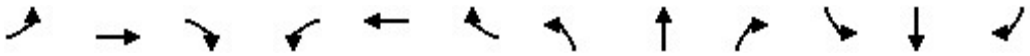
Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	20	0	0	20	2	30	1	5	0	0	0
Future Vol, veh/h	55	20	0	0	20	2	30	1	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	22	0	0	22	2	33	1	5	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	24	0	-	-	-	0	165	166	22
Stage 1	-	-	-	-	-	-	142	142	-
Stage 2	-	-	-	-	-	-	23	24	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1591	-	0	0	-	-	826	727	1055
Stage 1	-	-	0	0	-	-	885	779	-
Stage 2	-	-	0	0	-	-	1000	875	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1591	-	-	-	-	-	795	0	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	795	0	-
Stage 1	-	-	-	-	-	-	851	0	-
Stage 2	-	-	-	-	-	-	1000	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.4	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	824	1591	-	-	-
HCM Lane V/C Ratio	0.048	0.038	-	-	-
HCM Control Delay (s)	9.6	7.4	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	0.1	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	75	25	5	45	0	0	0	0	1	1	70
Future Volume (vph)	0	75	25	5	45	0	0	0	0	1	1	70
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967									0.868	
Flt Protected					0.995						0.999	
Satd. Flow (prot)	0	1612	0	0	1658	0	0	0	0	0	1445	0
Flt Permitted					0.995						0.999	
Satd. Flow (perm)	0	1612	0	0	1658	0	0	0	0	0	1445	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	82	27	5	49	0	0	0	0	1	1	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	109	0	0	54	0	0	0	0	0	79	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.9%		ICU Level of Service A	
Analysis Period (min) 15			

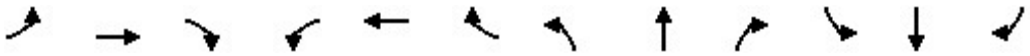
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	75	25	5	45	0	0	0	0	1	1	70
Future Vol, veh/h	0	75	25	5	45	0	0	0	0	1	1	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	82	27	5	49	0	0	0	0	1	1	77

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	109	0	0	155	168	49
Stage 1	-	-	-	-	-	-	59	59	-
Stage 2	-	-	-	-	-	-	96	109	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1481	-	0	836	725	1020
Stage 1	0	-	-	-	-	0	964	846	-
Stage 2	0	-	-	-	-	0	928	805	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1481	-	-	833	0	1020
Mov Cap-2 Maneuver	-	-	-	-	-	-	833	0	-
Stage 1	-	-	-	-	-	-	964	0	-
Stage 2	-	-	-	-	-	-	925	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.7	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1481	-	1017
HCM Lane V/C Ratio	-	-	0.004	-	0.078
HCM Control Delay (s)	-	-	7.4	0	8.8
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	60	15	35	70	10	20	20	35	5	25	15
Future Volume (vph)	20	60	15	35	70	10	20	20	35	5	25	15
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.988			0.936			0.955	
Flt Protected		0.990			0.985			0.987			0.994	
Satd. Flow (prot)	0	1615	0	0	1622	0	0	1540	0	0	1582	0
Flt Permitted		0.990			0.985			0.987			0.994	
Satd. Flow (perm)	0	1615	0	0	1622	0	0	1540	0	0	1582	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	73	18	43	85	12	24	24	43	6	30	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	0	0	140	0	0	91	0	0	54	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	60	15	35	70	10	20	20	35	5	25	15
Future Vol, veh/h	20	60	15	35	70	10	20	20	35	5	25	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	73	18	43	85	12	24	24	43	6	30	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	91	0	0	331	313	82	341	316	91
Stage 1	-	-	-	-	-	-	130	130	-	177	177	-
Stage 2	-	-	-	-	-	-	201	183	-	164	139	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1496	-	-	1504	-	-	622	602	978	613	600	967
Stage 1	-	-	-	-	-	-	874	789	-	825	753	-
Stage 2	-	-	-	-	-	-	801	748	-	838	782	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1504	-	-	565	574	978	547	572	967
Mov Cap-2 Maneuver	-	-	-	-	-	-	565	574	-	547	572	-
Stage 1	-	-	-	-	-	-	859	776	-	811	730	-
Stage 2	-	-	-	-	-	-	730	726	-	763	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	2.3	10.8	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	707	1496	-	-	1504	-	-	658
HCM Lane V/C Ratio	0.129	0.016	-	-	0.028	-	-	0.083
HCM Control Delay (s)	10.8	7.4	0	-	7.5	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	5	175	85	5	125
Future Volume (vph)	35	5	175	85	5	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0	0		100	190	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.983			0.850		
Flt Protected	0.958				0.950	
Satd. Flow (prot)	1662	0	1765	1500	1676	1765
Flt Permitted	0.958				0.950	
Satd. Flow (perm)	1662	0	1765	1500	1676	1765
Link Speed (mph)	25		35			35
Link Distance (ft)	791		1566			1307
Travel Time (s)	21.6		30.5			25.5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	41	6	203	99	6	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	0	203	99	6	145
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.7%		ICU Level of Service A	
Analysis Period (min) 15			

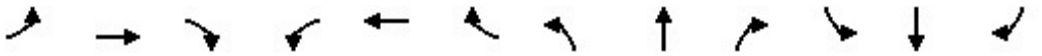
Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	5	175	85	5	125
Future Vol, veh/h	35	5	175	85	5	125
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	-	-	-	190	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	6	203	99	6	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	360	203	0	0	302	0
Stage 1	203	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	639	838	-	-	1259	-
Stage 1	831	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	636	838	-	-	1259	-
Mov Cap-2 Maneuver	677	-	-	-	-	-
Stage 1	831	-	-	-	-	-
Stage 2	867	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	694	1259	-
HCM Lane V/C Ratio	-	-	0.067	0.005	-
HCM Control Delay (s)	-	-	10.6	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

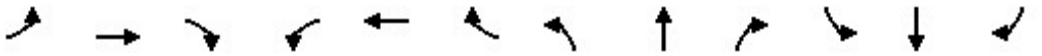


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	190	60	105	195	20	80	165	170	35	155	65
Future Volume (vph)	75	190	60	105	195	20	80	165	170	35	155	65
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	120		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.964			0.986			0.924			0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1701	0	1676	1740	0	1676	3098	0	1676	3202	0
Flt Permitted	0.604			0.559			0.593			0.521		
Satd. Flow (perm)	1066	1701	0	986	1740	0	1046	3098	0	919	3202	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			9			198			76	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1194			1025			1109			1566	
Travel Time (s)		23.3			20.0			21.6			30.5	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	87	221	70	122	227	23	93	192	198	41	180	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	291	0	122	250	0	93	390	0	41	256	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	12.2	12.2		12.2	12.2		15.7	10.6		15.7	10.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.34	0.23		0.34	0.23	
v/c Ratio	0.31	0.62		0.47	0.54		0.22	0.45		0.10	0.32	
Control Delay	16.5	19.6		20.6	18.4		9.7	10.0		8.9	12.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.5	19.6		20.6	18.4		9.7	10.0		8.9	12.3	
LOS	B	B		C	B		A	A		A	B	
Approach Delay		18.9			19.1			9.9			11.8	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	18	59		26	52		12	21		5	20	
Queue Length 95th (ft)	46	118		64	105		36	53		19	46	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1114			945			1029			1486	
Turn Bay Length (ft)	120			120			120			120		
Base Capacity (vph)	420	687		389	691		425	1405		395	1377	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.42		0.31	0.36		0.22	0.28		0.10	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 46.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 55.3%		ICU Level of Service B	
Analysis Period (min) 15			

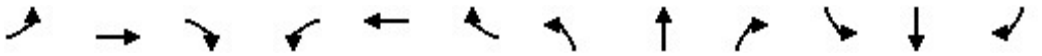
Splits and Phases: 17: US 81 (4th Street NE) & 14th Avenue NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	190	60	105	195	20	80	165	170	35	155	65
Future Volume (veh/h)	75	190	60	105	195	20	80	165	170	35	155	65
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	87	221	70	122	227	23	93	192	198	41	180	76
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	374	390	123	334	478	48	500	356	317	427	494	201
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.11	0.21	0.21	0.11	0.21	0.21
Sat Flow, veh/h	1196	1290	409	1152	1583	160	1688	1683	1502	1688	2336	949
Grp Volume(v), veh/h	87	0	291	122	0	250	93	192	198	41	128	128
Grp Sat Flow(s),veh/h/ln	1196	0	1698	1152	0	1743	1688	1683	1502	1688	1683	1601
Q Serve(g_s), s	3.0	0.0	6.8	4.7	0.0	5.5	1.9	4.8	5.7	0.8	3.1	3.2
Cycle Q Clear(g_c), s	8.5	0.0	6.8	11.5	0.0	5.5	1.9	4.8	5.7	0.8	3.1	3.2
Prop In Lane	1.00		0.24	1.00		0.09	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	374	0	513	334	0	527	500	356	317	427	356	339
V/C Ratio(X)	0.23	0.00	0.57	0.36	0.00	0.47	0.19	0.54	0.62	0.10	0.36	0.38
Avail Cap(c_a), veh/h	468	0	646	425	0	663	500	676	603	427	676	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	0.0	13.9	18.8	0.0	13.4	11.8	16.6	16.9	11.7	15.9	16.0
Incr Delay (d2), s/veh	0.3	0.0	1.0	0.7	0.0	0.7	0.2	1.3	2.0	0.1	0.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	2.3	1.1	0.0	1.9	0.6	1.7	1.8	0.3	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	14.9	19.4	0.0	14.1	12.0	17.9	18.9	11.8	16.5	16.7
LnGrp LOS	B	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		378			372			483			297	
Approach Delay, s/veh		15.4			15.8			17.2			15.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	16.0		20.3	11.0	16.0		20.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	2.8	7.7		10.5	3.9	5.2		13.5				
Green Ext Time (p_c), s	0.0	1.7		1.2	0.0	1.1		0.8				

Intersection Summary			
HCM 6th Ctrl Delay		16.2	
HCM 6th LOS		B	

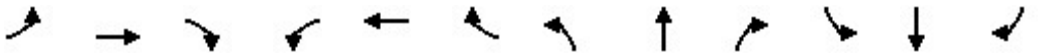


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	110	90	60	125	35	95	625	45	35	510	30
Future Volume (vph)	50	110	90	60	125	35	95	625	45	35	510	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	75		0	75		0	100		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.967			0.990			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1645	0	1676	1706	0	1676	3319	0	1676	3326	0
Flt Permitted	0.645			0.620			0.393			0.291		
Satd. Flow (perm)	1138	1645	0	1094	1706	0	694	3319	0	514	3326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			24			13			10	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1200			1304			1548			1564	
Travel Time (s)		32.7			35.6			30.2			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	122	100	67	139	39	106	694	50	39	567	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	222	0	67	178	0	106	744	0	39	600	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	10.7	10.7		10.7	10.7		21.0	16.0		21.0	16.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.42	0.32		0.42	0.32	
v/c Ratio	0.23	0.55		0.29	0.47		0.27	0.70		0.12	0.56	
Control Delay	19.3	18.0		20.4	19.6		8.6	19.0		7.5	16.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.3	18.0		20.4	19.6		8.6	19.0		7.5	16.6	
LOS	B	B		C	B		A	B		A	B	
Approach Delay		18.2			19.8			17.7			16.0	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	14	40		17	41		13	93		5	71	
Queue Length 95th (ft)	39	94		45	88		39	171		18	133	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1120			1224			1468			1484	
Turn Bay Length (ft)	75			75			100			165		
Base Capacity (vph)	416	646		400	639		392	1289		334	1290	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.34		0.17	0.28		0.27	0.58		0.12	0.47	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

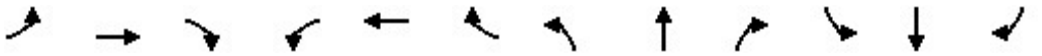
Splits and Phases: 23: US 81 (4th Street NE) & 3rd Avenue NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	110	90	60	125	35	95	625	45	35	510	30
Future Volume (veh/h)	50	110	90	60	125	35	95	625	45	35	510	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	56	122	100	67	139	39	106	694	50	39	567	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	206	169	282	305	85	449	936	67	398	950	55
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.10	0.29	0.29	0.10	0.29	0.29
Sat Flow, veh/h	1277	901	738	1227	1331	373	1688	3185	229	1688	3233	188
Grp Volume(v), veh/h	56	0	222	67	0	178	106	367	377	39	295	305
Grp Sat Flow(s),veh/h/ln	1277	0	1639	1227	0	1705	1688	1683	1731	1688	1683	1738
Q Serve(g_s), s	1.9	0.0	5.8	2.5	0.0	4.3	1.9	9.5	9.5	0.7	7.2	7.2
Cycle Q Clear(g_c), s	6.2	0.0	5.8	8.3	0.0	4.3	1.9	9.5	9.5	0.7	7.2	7.2
Prop In Lane	1.00		0.45	1.00		0.22	1.00		0.13	1.00		0.11
Lane Grp Cap(c), veh/h	327	0	375	282	0	390	449	495	509	398	495	511
V/C Ratio(X)	0.17	0.00	0.59	0.24	0.00	0.46	0.24	0.74	0.74	0.10	0.60	0.60
Avail Cap(c_a), veh/h	512	0	612	460	0	637	449	664	683	398	664	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	16.6	20.3	0.0	16.0	9.9	15.4	15.4	9.9	14.6	14.6
Incr Delay (d2), s/veh	0.2	0.0	1.5	0.4	0.0	0.8	0.3	3.0	3.0	0.1	1.2	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	2.1	0.7	0.0	1.6	0.6	3.4	3.5	0.2	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	18.1	20.7	0.0	16.8	10.2	18.4	18.3	10.0	15.7	15.7
LnGrp LOS	B	A	B	C	A	B	B	B	B	B	B	B
Approach Vol, veh/h		278			245			850			639	
Approach Delay, s/veh		18.2			17.9			17.3			15.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	20.2		17.0	11.0	20.2		17.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	2.7	11.5		8.2	3.9	9.2		10.3				
Green Ext Time (p_c), s	0.0	2.7		1.1	0.0	2.5		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			16.9									
HCM 6th LOS			B									

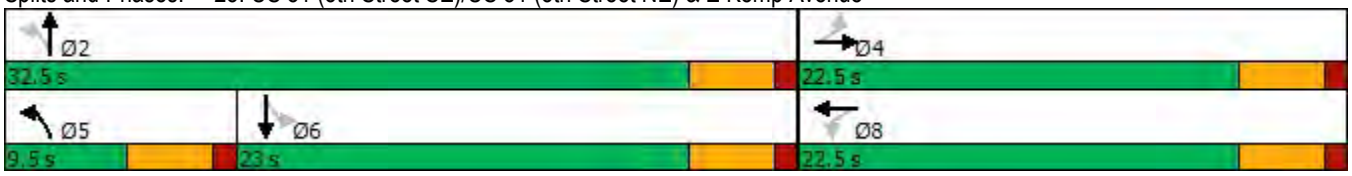


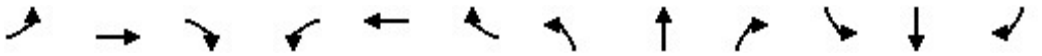
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	40	75	10	25	20	80	655	15	35	595	20
Future Volume (vph)	30	40	75	10	25	20	80	655	15	35	595	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.930			0.951			0.997			0.995	
Flt Protected		0.990			0.991		0.950			0.950		
Satd. Flow (prot)	0	1625	0	0	1663	0	1676	3343	0	1676	3336	0
Flt Permitted		0.912			0.943		0.286			0.360		
Satd. Flow (perm)	0	1497	0	0	1583	0	505	3343	0	635	3336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		86			23			6			6	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		761			745			370			380	
Travel Time (s)		20.8			20.3			7.2			7.4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	34	46	86	11	29	23	92	753	17	40	684	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	63	0	92	770	0	40	707	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	32.5		23.0	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	59.1%		41.8%	41.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Act Effct Green (s)		8.1			8.1		23.7	24.9		20.1	20.1	
Actuated g/C Ratio		0.21			0.21		0.61	0.64		0.52	0.52	
v/c Ratio		0.43			0.18		0.20	0.36		0.12	0.41	
Control Delay		12.5			12.0		5.4	5.3		10.9	10.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		12.5			12.0		5.4	5.3		10.9	10.2	
LOS		B			B		A	A		B	B	
Approach Delay		12.5			12.0			5.3			10.2	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)		16			8		7	38		6	65	
Queue Length 95th (ft)		54			30		24	80		23	117	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		681			665			290			300	
Turn Bay Length (ft)							100			100		
Base Capacity (vph)		779			789		468	2542		368	1936	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.21			0.08		0.20	0.30		0.11	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 38.8			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 51.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 28: US 81 (5th Street SE)/US 81 (5th Street NE) & E Kemp Avenue

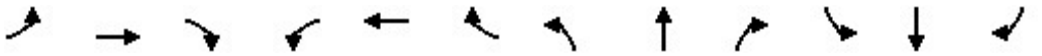




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	40	75	10	25	20	80	655	15	35	595	20
Future Volume (veh/h)	30	40	75	10	25	20	80	655	15	35	595	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	34	46	86	11	29	23	92	753	17	40	684	23
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	84	130	156	141	96	499	1896	43	472	1123	38
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.09	0.56	0.56	0.34	0.34	0.34
Sat Flow, veh/h	229	528	814	162	884	601	1688	3366	76	740	3323	112
Grp Volume(v), veh/h	166	0	0	63	0	0	92	377	393	40	346	361
Grp Sat Flow(s),veh/h/ln	1571	0	0	1647	0	0	1688	1683	1758	740	1683	1752
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	1.0	4.1	4.1	1.2	5.6	5.6
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.1	0.0	0.0	1.0	4.1	4.1	1.2	5.6	5.6
Prop In Lane	0.20		0.52	0.17		0.37	1.00		0.04	1.00		0.06
Lane Grp Cap(c), veh/h	384	0	0	393	0	0	499	948	990	472	569	592
V/C Ratio(X)	0.43	0.00	0.00	0.16	0.00	0.00	0.18	0.40	0.40	0.08	0.61	0.61
Avail Cap(c_a), veh/h	997	0	0	1016	0	0	612	1452	1516	643	959	998
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	0.0	11.9	0.0	0.0	5.5	4.0	4.0	7.5	9.0	9.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.2	0.0	0.0	0.2	0.3	0.3	0.1	1.1	1.0
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	1.0	0.0	0.0	0.3	0.0	0.0	0.2	0.5	0.5	0.1	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	12.1	0.0	0.0	5.7	4.3	4.2	7.6	10.0	10.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	B	A
Approach Vol, veh/h		166			63			862			747	
Approach Delay, s/veh		13.6			12.1			4.4			9.9	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		22.8		9.7	7.3	15.5		9.7				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		28.0		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		6.1		5.2	3.0	7.6		3.1				
Green Ext Time (p_c), s		4.7		0.7	0.0	3.4		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			7.7									
HCM 6th LOS			A									

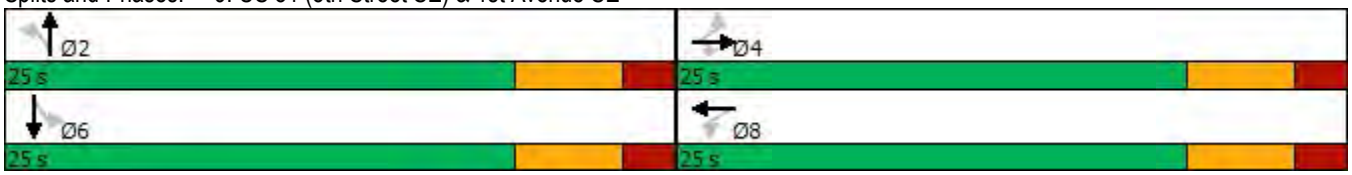


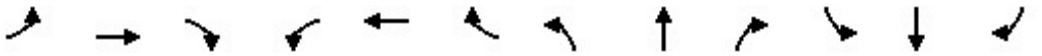
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	25	60	10	15	15	35	690	20	20	640	20
Future Volume (vph)	45	25	60	10	15	15	35	690	20	20	640	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	80		80	0		0	100		0	0		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.949			0.996			0.995	
Flt Protected	0.950				0.988		0.950			0.950		
Satd. Flow (prot)	1676	1765	1500	0	1655	0	1676	3340	0	1676	3336	0
Flt Permitted	0.889				0.907		0.373			0.353		
Satd. Flow (perm)	1569	1765	1500	0	1519	0	658	3340	0	623	3336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			67		17			7			7	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		642			750			1323			370	
Travel Time (s)		17.5			20.5			25.8			7.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	28	67	11	17	17	39	767	22	22	711	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	28	67	0	45	0	39	789	0	22	733	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.6	7.6	7.6		7.6		23.3	23.3		23.3	23.3	
Actuated g/C Ratio	0.22	0.22	0.22		0.22		0.68	0.68		0.68	0.68	
v/c Ratio	0.15	0.07	0.18		0.13		0.09	0.35		0.05	0.33	
Control Delay	13.2	12.4	5.8		10.2		6.4	5.9		6.2	5.7	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	13.2	12.4	5.8		10.2		6.4	5.9		6.2	5.7	
LOS	B	B	A		B		A	A		A	A	
Approach Delay		9.6			10.2			5.9			5.8	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)	7	4	0		4		4	48		2	44	
Queue Length 95th (ft)	28	18	20		22		16	90		11	83	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		562			670			1243			290	
Turn Bay Length (ft)	80		80				100					
Base Capacity (vph)	873	982	864		853		468	2378		443	2375	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.06	0.03	0.08		0.05		0.08	0.33		0.05	0.31	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 34.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 6.3		Intersection LOS: A	
Intersection Capacity Utilization 49.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: US 81 (5th Street SE) & 1st Avenue SE

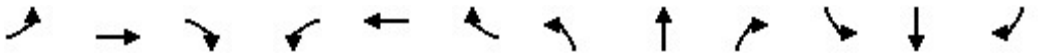




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	25	60	10	15	15	35	690	20	20	640	20
Future Volume (veh/h)	45	25	60	10	15	15	35	690	20	20	640	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	50	28	67	11	17	17	39	767	22	22	711	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	525	333	283	191	150	114	430	1343	39	409	1339	41
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1456	1772	1502	204	795	606	766	3342	96	727	3334	103
Grp Volume(v), veh/h	50	28	67	45	0	0	39	386	403	22	359	374
Grp Sat Flow(s),veh/h/ln	1456	1772	1502	1604	0	0	766	1683	1755	727	1683	1753
Q Serve(g_s), s	0.1	0.4	1.1	0.0	0.0	0.0	1.2	5.2	5.2	0.7	4.7	4.7
Cycle Q Clear(g_c), s	0.7	0.4	1.1	0.7	0.0	0.0	5.9	5.2	5.2	5.9	4.7	4.7
Prop In Lane	1.00		1.00	0.24		0.38	1.00		0.05	1.00		0.06
Lane Grp Cap(c), veh/h	525	333	283	455	0	0	430	676	705	409	676	704
V/C Ratio(X)	0.10	0.08	0.24	0.10	0.00	0.00	0.09	0.57	0.57	0.05	0.53	0.53
Avail Cap(c_a), veh/h	1196	1150	975	1173	0	0	619	1093	1139	589	1093	1138
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.9	9.8	10.1	9.9	0.0	0.0	8.9	6.8	6.8	9.1	6.7	6.7
Incr Delay (d2), s/veh	0.1	0.1	0.4	0.1	0.0	0.0	0.1	0.8	0.7	0.1	0.6	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	0.2	0.1	0.3	0.2	0.0	0.0	0.1	1.0	1.1	0.1	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.0	9.9	10.5	10.0	0.0	0.0	9.0	7.6	7.5	9.2	7.3	7.3
LnGrp LOS	B	A	B	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		145			45			828			755	
Approach Delay, s/veh		10.2			10.0			7.6			7.3	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.8		11.5		17.8		11.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		7.9		3.1		7.9		2.7				
Green Ext Time (p_c), s		3.8		0.4		3.5		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			7.8									
HCM 6th LOS			A									

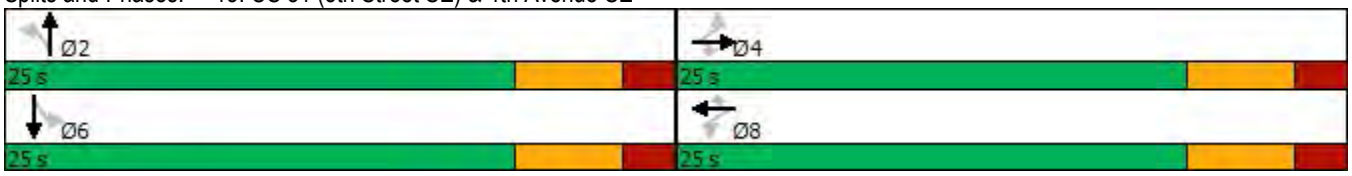


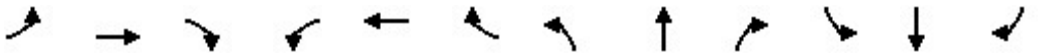
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	105	35	15	45	25	25	630	20	25	585	30
Future Volume (vph)	45	105	35	15	45	25	25	630	20	25	585	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		75	0		75	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.995			0.993	
Flt Protected		0.985			0.987		0.950			0.950		
Satd. Flow (prot)	0	1738	1500	0	1742	1500	1676	3336	0	1676	3329	0
Flt Permitted		0.877			0.863		0.406			0.392		
Satd. Flow (perm)	0	1548	1500	0	1523	1500	716	3336	0	692	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		7			12	
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		870			848			999			1323	
Travel Time (s)		19.8			23.1			19.5			25.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	111	37	16	47	26	26	663	21	26	616	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	158	37	0	63	26	26	684	0	26	648	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)		9.2	9.2		9.2	9.2	18.6	18.6		18.6	18.6	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.52	0.52		0.52	0.52	
v/c Ratio		0.40	0.08		0.16	0.06	0.07	0.39		0.07	0.37	
Control Delay		14.8	2.6		12.0	1.6	7.8	8.4		7.9	8.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		14.8	2.6		12.0	1.6	7.8	8.4		7.9	8.2	
LOS		B	A		B	A	A	A		A	A	
Approach Delay		12.5			9.0			8.4			8.2	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		24	0		9	0	3	46		3	42	
Queue Length 95th (ft)		68	9		32	5	14	94		14	87	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		790			768			919			1243	
Turn Bay Length (ft)			75			75	100			100		
Base Capacity (vph)		840	844		827	844	444	2072		429	2070	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.19	0.04		0.08	0.03	0.06	0.33		0.06	0.31	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 35.7			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 48.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: US 81 (5th Street SE) & 4th Avenue SE

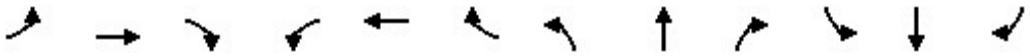




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	105	35	15	45	25	25	630	20	25	585	30
Future Volume (veh/h)	45	105	35	15	45	25	25	630	20	25	585	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	47	111	37	16	47	26	26	663	21	26	616	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	297	328	203	326	328	429	1211	38	415	1184	61
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	329	1357	1502	207	1492	1502	829	3331	105	802	3256	169
Grp Volume(v), veh/h	158	0	37	63	0	26	26	335	349	26	318	330
Grp Sat Flow(s),veh/h/ln	1686	0	1502	1699	0	1502	829	1683	1753	802	1683	1742
Q Serve(g_s), s	0.2	0.0	0.6	0.0	0.0	0.4	0.7	4.5	4.5	0.8	4.3	4.3
Cycle Q Clear(g_c), s	2.2	0.0	0.6	0.8	0.0	0.4	5.0	4.5	4.5	5.3	4.3	4.3
Prop In Lane	0.30		1.00	0.25		1.00	1.00		0.06	1.00		0.10
Lane Grp Cap(c), veh/h	531	0	328	529	0	328	429	612	637	415	612	633
V/C Ratio(X)	0.30	0.00	0.11	0.12	0.00	0.08	0.06	0.55	0.55	0.06	0.52	0.52
Avail Cap(c_a), veh/h	1260	0	994	1250	0	994	676	1114	1160	655	1114	1152
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	9.0	9.1	0.0	8.9	9.1	7.3	7.3	9.4	7.2	7.2
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.1	0.0	0.1	0.1	0.8	0.7	0.1	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.1	0.2	0.0	0.1	0.1	0.9	1.0	0.1	0.9	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.0	9.1	9.2	0.0	9.0	9.2	8.0	8.0	9.4	7.9	7.8
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		195			89			710			674	
Approach Delay, s/veh		9.8			9.1			8.1			7.9	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.4		12.3		16.4		12.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		7.0		4.2		7.3		2.8				
Green Ext Time (p_c), s		3.4		0.8		3.1		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			8.3									
HCM 6th LOS			A									



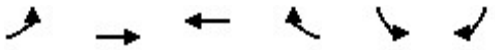
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	145	95	70	175	75	40	165	85	40	130	105
Future Volume (vph)	140	145	95	70	175	75	40	165	85	40	130	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.968			0.961			0.949	
Flt Protected		0.982			0.989			0.993			0.993	
Satd. Flow (prot)	0	1674	0	0	1689	0	0	1684	0	0	1663	0
Flt Permitted		0.982			0.989			0.993			0.993	
Satd. Flow (perm)	0	1674	0	0	1689	0	0	1684	0	0	1663	0
Link Speed (mph)		40			50			65			45	
Link Distance (ft)		2250			2754			1476			1428	
Travel Time (s)		38.4			37.6			15.5			21.6	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	182	188	123	91	227	97	52	214	110	52	169	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	493	0	0	415	0	0	376	0	0	357	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	493	415	376	357
Demand Flow Rate, veh/h	503	424	383	364
Vehicles Circulating, veh/h	318	457	431	378
Vehicles Exiting, veh/h	424	357	390	503
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.9	10.7	9.4	8.3
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	503	424	383	364
Cap Entry Lane, veh/h	998	866	889	938
Entry HV Adj Factor	0.981	0.980	0.981	0.980
Flow Entry, veh/h	493	415	376	357
Cap Entry, veh/h	978	848	872	919
V/C Ratio	0.504	0.490	0.431	0.388
Control Delay, s/veh	9.9	10.7	9.4	8.3
LOS	A	B	A	A
95th %tile Queue, veh	3	3	2	2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	45	215	210	45	35	40
Future Volume (vph)	45	215	210	45	35	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	70	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.976			0.850
Flt Protected		0.991			0.950	
Satd. Flow (prot)	0	1755	1728	0	1710	1530
Flt Permitted		0.991			0.950	
Satd. Flow (perm)	0	1755	1728	0	1710	1530
Link Speed (mph)		25	25		25	
Link Distance (ft)		791	278		1006	
Travel Time (s)		21.6	7.6		27.4	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Adj. Flow (vph)	51	244	239	51	40	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	295	290	0	40	45
Sign Control		Stop	Stop		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	215	210	45	35	40
Future Vol, veh/h	45	215	210	45	35	40
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	51	244	239	51	40	45
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	10.1	9.8	8.8
HCM LOS	B	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	17%	0%	100%	0%
Vol Thru, %	83%	82%	0%	0%
Vol Right, %	0%	18%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	255	35	40
LT Vol	45	0	35	0
Through Vol	215	210	0	0
RT Vol	0	45	0	40
Lane Flow Rate	295	290	40	45
Geometry Grp	2	2	7	7
Degree of Util (X)	0.367	0.352	0.069	0.064
Departure Headway (Hd)	4.473	4.379	6.28	5.067
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	804	823	570	705
Service Time	2.499	2.405	4.028	2.815
HCM Lane V/C Ratio	0.367	0.352	0.07	0.064
HCM Control Delay	10.1	9.8	9.5	8.2
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.7	1.6	0.2	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	235	15	10	225	30	10
Future Volume (vph)	235	15	10	225	30	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992				0.966	
Flt Protected				0.998	0.964	
Satd. Flow (prot)	1745	0	0	1763	1627	0
Flt Permitted				0.998	0.964	
Satd. Flow (perm)	1745	0	0	1763	1627	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	278			1819	482	
Travel Time (s)	7.6			49.6	13.1	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	2%	7%	0%	2%	4%	0%
Adj. Flow (vph)	280	18	12	268	36	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	298	0	0	280	48	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

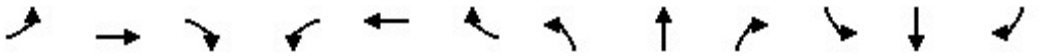
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	235	15	10	225	30	10
Future Vol, veh/h	235	15	10	225	30	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	7	0	2	4	0
Mvmt Flow	280	18	12	268	36	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	298	0	581	289
Stage 1	-	-	-	-	289	-
Stage 2	-	-	-	-	292	-
Critical Hdwy	-	-	4.1	-	6.44	6.2
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.2	-	3.536	3.3
Pot Cap-1 Maneuver	-	-	1275	-	473	755
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	753	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1275	-	468	755
Mov Cap-2 Maneuver	-	-	-	-	468	-
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	517	-	-	1275	-
HCM Lane V/C Ratio	0.092	-	-	0.009	-
HCM Control Delay (s)	12.7	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

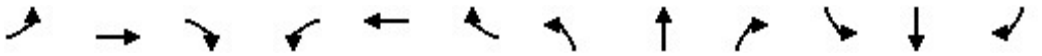


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	110	60	20	125	240	45	295	15	135	240	65
Future Volume (vph)	75	110	60	20	125	240	45	295	15	135	240	65
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	215		215	145		0	150		0	150		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.993			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1693	1782	1530	1710	1782	1515	1629	1771	0	1693	1722	0
Flt Permitted	0.671			0.681			0.562			0.348		
Satd. Flow (perm)	1196	1782	1530	1226	1782	1515	963	1771	0	620	1722	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			258		4			33	
Link Speed (mph)		25			45			35			35	
Link Distance (ft)		1819			1221			1427			5295	
Travel Time (s)		49.6			18.5			27.8			103.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%	5%	1%	0%	1%	1%	2%
Adj. Flow (vph)	81	118	65	22	134	258	48	317	16	145	258	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	118	65	22	134	258	48	333	0	145	328	0
Turn Type	Perm	NA	Perm	Perm	NA	pt+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8	8 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		5.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0	24.0	24.0	24.0		25.0	25.0		11.0	36.0	
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%		41.7%	41.7%		18.3%	60.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None	None	None	None		Min	Min		None	Min	
Act Effct Green (s)	9.3	9.3	9.3	9.3	9.3	20.5	13.3	13.3		24.5	24.5	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.44	0.29	0.29		0.53	0.53	
v/c Ratio	0.33	0.33	0.15	0.09	0.37	0.32	0.17	0.65		0.32	0.35	
Control Delay	20.9	19.3	0.7	16.9	20.0	2.8	14.2	20.9		7.9	7.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	20.9	19.3	0.7	16.9	20.0	2.8	14.2	20.9		7.9	7.0	
LOS	C	B	A	B	C	A	B	C		A	A	
Approach Delay		15.2			9.1			20.0			7.3	
Approach LOS		B			A			C			A	
Queue Length 50th (ft)	18	27	0	5	31	0	9	72		16	37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	53	68	0	20	76	32	31	155		45	91	
Internal Link Dist (ft)		1739			1141			1347			5215	
Turn Bay Length (ft)	215		215	145			150			150		
Base Capacity (vph)	475	708	706	487	708	810	403	745		448	1152	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.17	0.17	0.09	0.05	0.19	0.32	0.12	0.45		0.32	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 46.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 58.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: 19th St NE & 1st Ave NE/Willow Creek Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	110	60	20	125	240	45	295	15	135	240	65
Future Volume (veh/h)	75	110	60	20	125	240	45	295	15	135	240	65
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	1786	1786	1800	1800	1786	1786	1730	1786	1800	1786	1786	1772
Adj Flow Rate, veh/h	81	118	65	22	134	258	48	317	16	145	258	70
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	0	0	1	1	5	1	0	1	1	2
Cap, veh/h	325	387	331	369	387	475	435	431	22	426	672	182
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.26	0.26	0.26	0.10	0.50	0.50
Sat Flow, veh/h	1000	1786	1525	1220	1786	1514	1027	1686	85	1701	1353	367
Grp Volume(v), veh/h	81	118	65	22	134	258	48	0	333	145	0	328
Grp Sat Flow(s),veh/h/ln	1000	1786	1525	1220	1786	1514	1027	0	1771	1701	0	1720
Q Serve(g_s), s	3.1	2.3	1.5	0.6	2.7	5.9	1.5	0.0	7.2	2.3	0.0	5.0
Cycle Q Clear(g_c), s	5.8	2.3	1.5	3.0	2.7	5.9	1.5	0.0	7.2	2.3	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.21
Lane Grp Cap(c), veh/h	325	387	331	369	387	475	435	0	453	426	0	854
V/C Ratio(X)	0.25	0.30	0.20	0.06	0.35	0.54	0.11	0.00	0.74	0.34	0.00	0.38
Avail Cap(c_a), veh/h	539	769	656	630	769	799	639	0	804	463	0	1234
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	13.7	13.4	15.0	13.9	11.9	12.2	0.0	14.3	9.4	0.0	6.6
Incr Delay (d2), s/veh	0.4	0.4	0.3	0.1	0.5	1.0	0.1	0.0	2.3	0.5	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	0.7	0.9	0.5	0.1	0.9	1.5	0.3	0.0	2.6	0.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.7	14.2	13.7	15.0	14.4	12.8	12.3	0.0	16.6	9.9	0.0	6.8
LnGrp LOS	B	B	B	B	B	B	B	A	B	A	A	A
Approach Vol, veh/h		264			414			381			473	
Approach Delay, s/veh		14.8			13.5			16.1			7.8	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.1	16.7		15.1		26.8		15.1				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0		30.0		18.0				
Max Q Clear Time (g_c+I1), s	4.3	9.2		7.8		7.0		7.9				
Green Ext Time (p_c), s	0.0	1.5		0.9		1.9		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			12.6									
HCM 6th LOS			B									

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	5	1	380	260	1
Future Volume (vph)	1	5	1	380	260	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.884				0.999	
Flt Protected	0.993					
Satd. Flow (prot)	1580	0	0	3386	3383	0
Flt Permitted	0.993					
Satd. Flow (perm)	1580	0	0	3386	3383	0
Link Speed (mph)	30			35	45	
Link Distance (ft)	233			583	1620	
Travel Time (s)	5.3			11.4	24.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	1	6	1	422	289	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	0	0	423	290	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.8%		ICU Level of Service A	
Analysis Period (min) 15			

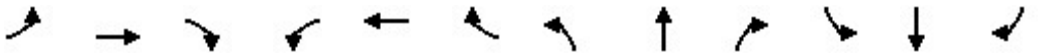
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	1	380	260	1
Future Vol, veh/h	1	5	1	380	260	1
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, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	1	6	1	422	289	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	503	145	290	0	-	0
Stage 1	290	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	503	882	1283	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	882	1283	-	-	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	739	-	-	-	-	-
Stage 2	808	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1283	-	783	-	-
HCM Lane V/C Ratio	0.001	-	0.009	-	-
HCM Control Delay (s)	7.8	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1	10	85	5	150	5	135	15	20	130	5
Future Volume (vph)	10	1	10	85	5	150	5	135	15	20	130	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.935			0.916			0.985			0.995	
Flt Protected		0.976			0.983		0.950			0.950		
Satd. Flow (prot)	0	1517	0	0	1621	0	1024	1587	0	1710	1652	0
Flt Permitted		0.976			0.983		0.950			0.950		
Satd. Flow (perm)	0	1517	0	0	1621	0	1024	1587	0	1710	1652	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	14	1	14	123	7	217	7	196	22	29	188	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	0	0	347	0	7	218	0	29	195	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.1%		ICU Level of Service A	
Analysis Period (min) 15			

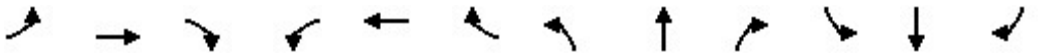
Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	10	85	5	150	5	135	15	20	130	5
Future Vol, veh/h	10	1	10	85	5	150	5	135	15	20	130	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	69	69	69	69	69	69	69	69	69
Heavy Vehicles, %	0	100	10	0	0	0	67	13	0	0	8	20
Mvmt Flow	14	1	14	123	7	217	7	196	22	29	188	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	583	482	192	478	474	207	195	0	0	218	0	0
Stage 1	250	250	-	221	221	-	-	-	-	-	-	-
Stage 2	333	232	-	257	253	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.3	7.1	6.5	6.2	4.77	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.39	3.5	4	3.3	2.803	-	-	2.2	-	-
Pot Cap-1 Maneuver	427	367	830	501	492	839	1069	-	-	1364	-	-
Stage 1	759	552	-	786	724	-	-	-	-	-	-	-
Stage 2	685	564	-	752	701	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	306	357	830	480	478	839	1069	-	-	1364	-	-
Mov Cap-2 Maneuver	306	357	-	480	478	-	-	-	-	-	-	-
Stage 1	754	540	-	780	719	-	-	-	-	-	-	-
Stage 2	499	560	-	721	686	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	16.5	0.3	1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1069	-	-	442	655	1364	-	-
HCM Lane V/C Ratio	0.007	-	-	0.069	0.531	0.021	-	-
HCM Control Delay (s)	8.4	-	-	13.7	16.5	7.7	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	3.1	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1	220	1	1	1	205	60	1	1	55	20
Future Volume (vph)	15	1	220	1	1	1	205	60	1	1	55	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874			0.925			0.998			0.965	
Flt Protected		0.997		0.950			0.950				0.999	
Satd. Flow (prot)	0	1548	0	1710	1657	0	1693	1762	0	0	1691	0
Flt Permitted		0.997		0.950			0.950				0.999	
Satd. Flow (perm)	0	1548	0	1710	1657	0	1693	1762	0	0	1691	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	6%	0%	1%	0%	0%	1%	1%	2%	0%	100%	2%	0%
Adj. Flow (vph)	17	1	256	1	1	1	238	70	1	1	64	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	274	0	1	2	0	238	71	0	0	88	0
Sign Control		Stop			Stop			Stop			Stop	

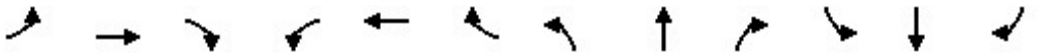
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	1	220	1	1	1	205	60	1	1	55	20
Future Vol, veh/h	15	1	220	1	1	1	205	60	1	1	55	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	6	0	1	0	0	1	1	2	0	100	2	0
Mvmt Flow	17	1	256	1	1	1	238	70	1	1	64	23
Number of Lanes	0	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	11.6	8.8	11.6	11.9
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	6%	100%	0%	1%
Vol Thru, %	0%	98%	0%	0%	50%	72%
Vol Right, %	0%	2%	93%	0%	50%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	61	236	1	2	76
LT Vol	205	0	15	1	0	1
Through Vol	0	60	1	0	1	55
RT Vol	0	1	220	0	1	20
Lane Flow Rate	238	71	274	1	2	88
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.388	0.106	0.395	0.002	0.004	0.179
Departure Headway (Hd)	5.862	5.364	5.18	6.606	5.743	7.305
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	608	662	692	545	626	494
Service Time	3.649	3.151	3.241	4.31	3.447	5.305
HCM Lane V/C Ratio	0.391	0.107	0.396	0.002	0.003	0.178
HCM Control Delay	12.4	8.8	11.6	9.3	8.5	11.9
HCM Lane LOS	B	A	B	A	A	B
HCM 95th-tile Q	1.8	0.4	1.9	0	0	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	130	2	25	130	40	5	70	20	35	50	15
Future Volume (vph)	15	130	2	25	130	40	5	70	20	35	50	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.965			0.971			0.980	
Flt Protected		0.995		0.950				0.998			0.983	
Satd. Flow (prot)	0	1726	0	1629	1691	0	0	1722	0	0	1704	0
Flt Permitted		0.995		0.950				0.998			0.983	
Satd. Flow (perm)	0	1726	0	1629	1691	0	0	1722	0	0	1704	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		577			733			480			518	
Travel Time (s)		15.7			20.0			13.1			14.1	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	0%	4%	0%	5%	2%	5%	0%	0%	6%	5%	0%	0%
Adj. Flow (vph)	19	169	3	32	169	52	6	91	26	45	65	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	191	0	32	221	0	0	123	0	0	129	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.7%		ICU Level of Service A	
Analysis Period (min) 15			

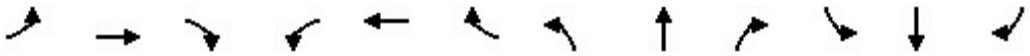
Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	15	130	2	25	130	40	5	70	20	35	50	15
Future Vol, veh/h	15	130	2	25	130	40	5	70	20	35	50	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	0	4	0	5	2	5	0	0	6	5	0	0
Mvmt Flow	19	169	3	32	169	52	6	91	26	45	65	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	221	0	0	172	0	0	510	494	171	526	469	195
Stage 1	-	-	-	-	-	-	209	209	-	259	259	-
Stage 2	-	-	-	-	-	-	301	285	-	267	210	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.1	6.5	6.26	7.15	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.5	4	3.354	3.545	4	3.3
Pot Cap-1 Maneuver	1360	-	-	1387	-	-	477	479	862	458	495	851
Stage 1	-	-	-	-	-	-	798	733	-	739	697	-
Stage 2	-	-	-	-	-	-	712	679	-	732	732	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1360	-	-	1387	-	-	405	461	862	366	476	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	405	461	-	366	476	-
Stage 1	-	-	-	-	-	-	786	722	-	728	681	-
Stage 2	-	-	-	-	-	-	615	663	-	611	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	1	14.4	15.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	507	1360	-	-	1387	-	-	458
HCM Lane V/C Ratio	0.243	0.014	-	-	0.023	-	-	0.284
HCM Control Delay (s)	14.4	7.7	0	-	7.7	-	-	15.9
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	1.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	35	20	15	45	15	25	70	10	10	60	5
Future Volume (vph)	10	35	20	15	45	15	25	70	10	10	60	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		250	0		250	0		0	0		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.987			0.991	
Flt Protected		0.989			0.988			0.988			0.993	
Satd. Flow (prot)	0	1780	1530	0	1778	1530	0	1755	0	0	1771	0
Flt Permitted		0.989			0.988			0.988			0.993	
Satd. Flow (perm)	0	1780	1530	0	1778	1530	0	1755	0	0	1771	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		765			2317			386			480	
Travel Time (s)		20.9			63.2			10.5			13.1	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	42	24	18	54	18	30	84	12	12	72	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	24	0	72	18	0	126	0	0	90	0
Sign Control		Stop			Stop			Stop			Stop	

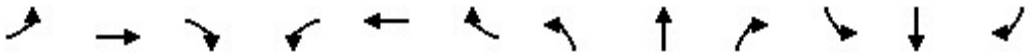
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	35	20	15	45	15	25	70	10	10	60	5
Future Vol, veh/h	10	35	20	15	45	15	25	70	10	10	60	5
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	42	24	18	54	18	30	84	12	12	72	6
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8	8.2	8.2	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	24%	22%	0%	25%	0%	13%
Vol Thru, %	67%	78%	0%	75%	0%	80%
Vol Right, %	10%	0%	100%	0%	100%	7%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	45	20	60	15	75
LT Vol	25	10	0	15	0	10
Through Vol	70	35	0	45	0	60
RT Vol	10	0	20	0	15	5
Lane Flow Rate	127	54	24	72	18	90
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.155	0.078	0.029	0.104	0.022	0.112
Departure Headway (Hd)	4.408	5.197	4.381	5.198	4.368	4.444
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	815	690	817	690	820	808
Service Time	2.426	2.922	2.106	2.922	2.092	2.463
HCM Lane V/C Ratio	0.156	0.078	0.029	0.104	0.022	0.111
HCM Control Delay	8.2	8.4	7.2	8.5	7.2	8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.1	0.3	0.1	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	250	15	5	140	5	20	35	15	5	25	5
Future Volume (vph)	20	250	15	5	140	5	20	35	15	5	25	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.996			0.972			0.982	
Flt Protected		0.996			0.998			0.986			0.993	
Satd. Flow (prot)	0	1765	0	0	1773	0	0	1725	0	0	1755	0
Flt Permitted		0.996			0.998			0.986			0.993	
Satd. Flow (perm)	0	1765	0	0	1773	0	0	1725	0	0	1755	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1515			1128			1396			2664	
Travel Time (s)		41.3			30.8			38.1			72.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	269	16	5	151	5	22	38	16	5	27	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	307	0	0	161	0	0	76	0	0	37	0
Sign Control		Stop			Stop			Stop			Stop	

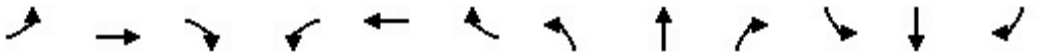
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	250	15	5	140	5	20	35	15	5	25	5
Future Vol, veh/h	20	250	15	5	140	5	20	35	15	5	25	5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	22	269	16	5	151	5	22	38	16	5	27	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	8.7	8.5	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	7%	3%	14%
Vol Thru, %	50%	88%	93%	71%
Vol Right, %	21%	5%	3%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	285	150	35
LT Vol	20	20	5	5
Through Vol	35	250	140	25
RT Vol	15	15	5	5
Lane Flow Rate	75	306	161	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.103	0.369	0.201	0.052
Departure Headway (Hd)	4.918	4.34	4.492	4.987
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	728	830	798	717
Service Time	2.954	2.364	2.521	3.027
HCM Lane V/C Ratio	0.103	0.369	0.202	0.053
HCM Control Delay	8.5	9.9	8.7	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.7	0.7	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	1	265	5	10	155	5	5	1	10	2	1	1
Future Volume (vph)	1	265	5	10	155	5	5	1	10	2	1	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.996			0.913			0.966	
Flt Protected					0.997			0.986			0.976	
Satd. Flow (prot)	0	1796	0	0	1775	0	0	1620	0	0	1457	0
Flt Permitted					0.997			0.986			0.976	
Satd. Flow (perm)	0	1796	0	0	1775	0	0	1620	0	0	1457	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1128			1515			1440			909	
Travel Time (s)		30.8			41.3			39.3			24.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	25%	0%	0%	0%	33%	0%	0%
Adj. Flow (vph)	1	291	5	11	170	5	5	1	11	2	1	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	297	0	0	186	0	0	17	0	0	4	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.8%		ICU Level of Service A	
Analysis Period (min) 15			

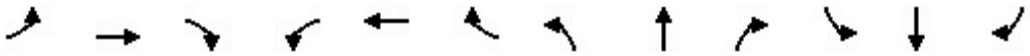
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	265	5	10	155	5	5	1	10	2	1	1
Future Vol, veh/h	1	265	5	10	155	5	5	1	10	2	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	25	0	0	0	33	0	0
Mvmt Flow	1	291	5	11	170	5	5	1	11	2	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	175	0	0	296	0	0	492	493	294	497	493	173
Stage 1	-	-	-	-	-	-	296	296	-	195	195	-
Stage 2	-	-	-	-	-	-	196	197	-	302	298	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.43	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.3
Pot Cap-1 Maneuver	1414	-	-	1277	-	-	490	480	750	437	480	876
Stage 1	-	-	-	-	-	-	717	672	-	740	743	-
Stage 2	-	-	-	-	-	-	810	742	-	646	671	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1414	-	-	1277	-	-	485	475	750	426	475	876
Mov Cap-2 Maneuver	-	-	-	-	-	-	485	475	-	426	475	-
Stage 1	-	-	-	-	-	-	716	671	-	739	736	-
Stage 2	-	-	-	-	-	-	800	735	-	635	670	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	11	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	621	1414	-	-	1277	-	-	504
HCM Lane V/C Ratio	0.028	0.001	-	-	0.009	-	-	0.009
HCM Control Delay (s)	11	7.5	0	-	7.8	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	240	10	10	320	5	5	15	15	10	10	10
Future Volume (vph)	5	240	10	10	320	5	5	15	15	10	10	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.998			0.943			0.955	
Flt Protected		0.999			0.999			0.993			0.984	
Satd. Flow (prot)	0	1773	0	0	1722	0	0	1686	0	0	1691	0
Flt Permitted		0.999			0.999			0.993			0.984	
Satd. Flow (perm)	0	1773	0	0	1722	0	0	1686	0	0	1691	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	6	270	11	11	360	6	6	17	17	11	11	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	0	377	0	0	40	0	0	33	0
Sign Control		Stop			Stop			Stop			Stop	

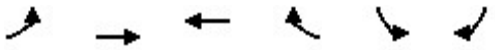
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	240	10	10	320	5	5	15	15	10	10	10
Future Vol, veh/h	5	240	10	10	320	5	5	15	15	10	10	10
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	6	270	11	11	360	6	6	17	17	11	11	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	11.1	8.5	8.6
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	2%	3%	33%
Vol Thru, %	43%	94%	96%	33%
Vol Right, %	43%	4%	1%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	255	335	30
LT Vol	5	5	10	10
Through Vol	15	240	320	10
RT Vol	15	10	5	10
Lane Flow Rate	39	287	376	34
Geometry Grp	1	1	1	1
Degree of Util (X)	0.056	0.355	0.459	0.049
Departure Headway (Hd)	5.165	4.46	4.388	5.269
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	691	805	821	677
Service Time	3.217	2.488	2.414	3.323
HCM Lane V/C Ratio	0.056	0.357	0.458	0.05
HCM Control Delay	8.5	9.9	11.1	8.6
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.2	1.6	2.4	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	20	20	5	2	10
Future Volume (vph)	5	20	20	5	2	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973		0.884	
Flt Protected		0.990			0.993	
Satd. Flow (prot)	0	1341	1635	0	1181	0
Flt Permitted		0.990			0.993	
Satd. Flow (perm)	0	1341	1635	0	1181	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		250	315		248	
Travel Time (s)		5.7	7.2		5.6	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	100%	5%	0%	0%	0%	29%
Adj. Flow (vph)	6	24	24	6	2	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	30	30	0	14	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	20	20	5	2	10
Future Vol, veh/h	5	20	20	5	2	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	100	5	0	0	0	29
Mvmt Flow	6	24	24	6	2	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	30	0	-	0	63	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	5.1	-	-	-	6.4	6.49
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	3.1	-	-	-	3.5	3.561
Pot Cap-1 Maneuver	1127	-	-	-	948	976
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	992	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1127	-	-	-	943	976
Mov Cap-2 Maneuver	-	-	-	-	943	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	992	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1127	-	-	-	970
HCM Lane V/C Ratio	0.005	-	-	-	0.015
HCM Control Delay (s)	8.2	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Introduction

The purpose of this memorandum is to present and assess the crash history throughout the City of Watertown. Crashes on all roads within the city limits were examined on a high-level perspective. The focus of this review is on state highways, urban arterial and collector roadways, and study corridors, with a cursory examination of other roadways within city limits. The following sections summarize findings from a city-wide perspective, intersections and corridors with specific safety concerns, pedestrian and bicycle crashes, and railroad crossing crashes. This review will ultimately help identify the safety needs on the city road network and support the development of the Watertown Master Transportation Plan.

Crash History Review

Crash data was obtained from the South Dakota Department of Transportation (SDDOT) for reportable crashes on public roadways within the City of Watertown. This review looked at the five most recent, complete calendar years of crash data, 2015-2019. The data includes all motor vehicle crashes, including motor vehicle crashes with pedestrians and bicyclists. For the purpose of this analysis, several variables were identified based on safety performance measures, which are detailed below. The analysis consists of three elements:

1. Crash Frequency: total number of crashes occurring at intersections within Watertown city limits
2. Crash Rates: the number of crashes occurring at intersections per million entering vehicles
3. 2019 South Dakota Strategic Highway Safety Plan (SHSP) Emphasis Areas[1]: crash attribute focal points that guide future South Dakota safety investments

Throughout the review, crashes were reported by two main crash fields, injury severity and manner of collision. Injury severity is delineated into:

- **Fatal Injury:** An injury resulting in death, or an injury caused death occurring within 30 days of the crash.
- **Incapacitating Injury:** Any injury, other than fatal, that prevents the injured person from walking, driving, or continuing the activities they were capable of performing prior to the crash.
- **Non-Incapacitating Injury:** Any injury, other than a fatal or incapacitating injury, that is evident to observers at the crash scene.
- **Possible Injury:** Any injury reported that is not a fatal injury, incapacitating injury, or non-incapacitating injury.
- **Property Damage Only:** A reported crash with no injuries.

Manner of collision is the identification of the manner in which two motor vehicles in transport initially came together without regard to the direction of force. Manner of collision is delineated into **Angle Crashes**, **Rear-end Crashes**, **Head-on**, and **Sideswipe Crashes**.

City-wide Summary

A total of 2,013 crashes were reported within Watertown city limits, between 2015 and 2019. Location of these crashes, in terms of crash severity, is depicted in **Figure 1**.

The following tables present a summary of crash characteristics for the 2,013 crashes, aligning with several of the SDDOT's 2019 Strategic Highway Safety Plan emphasis areas:

- **Table 1:** Crash Severity
- **Table 2:** Manner of Collision
- **Table 3:** Light Condition
- **Table 4:** Pavement Condition
- **Table 5:** Crashes by Month
- **Table 6:** 2019 SHSP Emphasis Area Crash Characteristics[1]

495 of the 2,013 crashes (nearly 25 percent) resulted in a fatality, injury, or possible injury (**Table 1**). Five crashes resulted in a fatality and 29 resulted in an incapacitating injury. Locations of these severe crashes are shown in **Figure 2**. The following provides additional characteristics of the 5 fatal crashes:

- 3 occurred on US 212
- 1 occurred on SD 20
- 3 occurred at an intersection
  - 2 angle crashes
- 4 occurred during dry road conditions
- 4 involved an unbelted vehicle occupant
- 3 involved speeding
- 2 involved a motorcycle
- 2 involved alcohol use
- 1 involved drug use
- 1 involved a pedestrian

Table 1: Crash Severity

Crash Severity	Total # Crashes[2]	
Fatal Injury	5	<1%
Incapacitating Injury	29	1%
Non-Incapacitating Injury	139	7%
Possible Injury	322	16%
No Injury	1,456	72%
Wild Animal Hit	62	3%
Total Crashes	**2,013**	

Table 2: Manner of Collision

Manner of Collision	Total # Crashes[2]	
Single Vehicle	606	30%
Rear-end	383	19%
Angle	933	46%
Sideswipe	83	4%
Head-on	8	<1%

Table 3: Light Condition

Light Condition	Total # Crashes[2]	
Dark – Lighted Roadway	307	15%
Dark – Roadway not Lighted	87	4%
Dark – Unknown Roadway Lighting	25	1%
Dawn	17	<1%
Daylight	1,528	76%
Dusk	34	2%
Unknown/Other	15	<1%

[1] South Dakota Strategic Highway Safety Plan (SHSP), August 2019. https://dot.sd.gov/media/documents/SHSP_FINAL_Reduced.pdf

[2] Total number of crashes includes all crashes within Watertown city limits. Crash Source: SDDOT Crash Database

In addition to crash location maps classified by severity, crash density maps were developed to better indicate where greater frequencies of crashes are occurring. These are shown for total crashes and severe crashes in **Figure 3** and **Figure 4** respectively.

1,407 of the 2,013 crashes (nearly 70 percent) involved two or more vehicles, while 606 crashes involved a single vehicle (about 30 percent) (**Table 2**). In order of frequency, multi-vehicle crashes included 933 angle crashes, 383 rear-end crashes, 83 sideswipe crashes, and 8 head-on crashes. A majority of crashes (1,528) occurred during daylight hours (76 percent), which is typically during the higher volume periods of the day (**Table 3**). 307 crashes occurred on a dark, lighted roadway (15 percent) and 87 crashes occurred on a dark, not lighted roadway (4 percent).

1,261 of the 2,013 study area crashes occurred on dry surface roads (**Table 4**). In comparing dry and weather-impacted roads, 63% of crashes occurred on dry surface roads while 37% of crashes occurred on roads with frost, ice, slush, snow, or wet surfaces. Specifically, 351 crashes occurred on snow surface roads (17 percent), 203 crashes occurred on ice surface roads (10 percent), and 203 crashes on wet surface roads (8 percent).

Crash frequency was notably higher from November to February (**Table 5**). January exhibited the most crashes with 244, followed by December with 216 crashes. Monthly total crash trends exhibit typical trends for cities in this region, with peak total crashes occurring in winter months.

Table 6 lists crash characteristics of the 2,013 crashes city-wide to support emphasis areas identified in the 2019 SDDOT Strategic Highway Safety Plan[1].

Table 4: Pavement Condition

Pavement Condition	Total # Crashes[2]	
Dry	1,261	63%
Frost	10	<1%
Ice	203	10%
Slush	15	<1%
Snow	351	17%
Wet	152	8%
Sand/Mud/Dirt/Gravel	3	<1%
Unknown/Other	18	<1%

Table 5: Crashes by Month

Month	Total # Crashes[2]	
January	244	12%
February	193	10%
March	162	8%
April	148	7%
May	107	5%
June	150	7%
July	128	6%
August	155	8%
September	155	8%
October	167	8%
November	188	9%
December	216	11%

Table 6: 2019 SHSP Emphasis Area Crash Characteristics[1]

Crash Characteristic	Total # Crashes[2]	
Alcohol/Drugs	161	8%
Intersections	1,105	55%
Lane Departures	184	9%
Unbuckled Vehicle Occupants	88	4%
Motorcycles	42	2%
Distracted Driving	126	6%
Speeding/Aggressive Driving	294	15%

[1] South Dakota Strategic Highway Safety Plan (SHSP), August 2019. https://dot.sd.gov/media/documents/SHSP_FINAL_Reduced.pdf

[2] Total number of crashes includes all crashes within Watertown city limits. Crash Source: SDDOT Crash Database

The following are expanded summaries of each 2019 SDDOT SHSP Emphasis Area crash type:

- Alcohol/drug use
  - 161 total crashes
  - 9 involved fatal or incapacitating injuries
  - 28 were angle crashes

- Intersections
  - 1,105 total crashes
  - 15 involved fatal or incapacitating injuries
  - 711 were classified as angle crashes
  - 362 occurred at signalized intersections
  - 328 occurred at stop-controlled intersections
  - 26 occurred at yield sign-controlled intersections

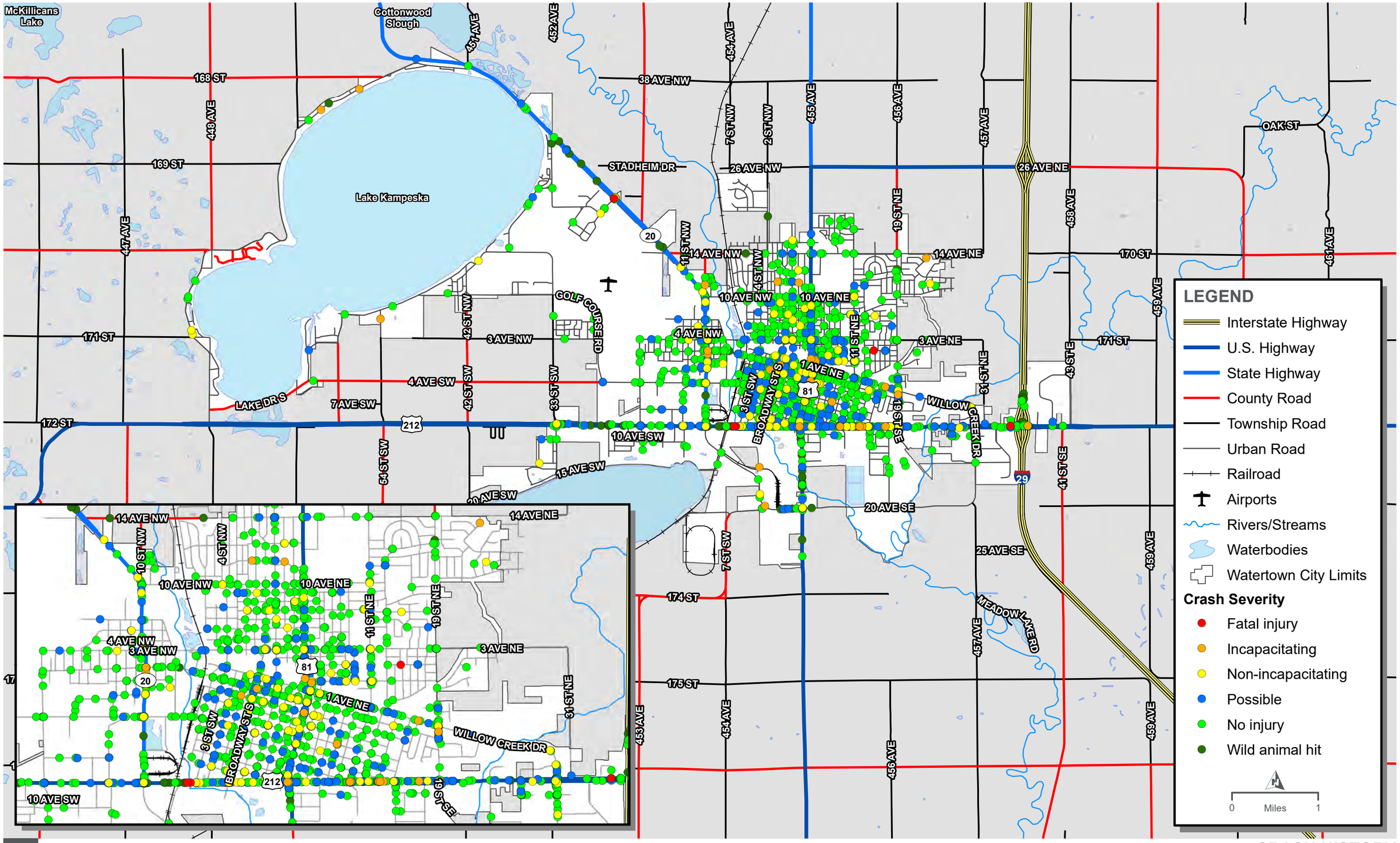
- Lane Departures
  - 184 total crashes
  - 1 incapacitating crashes
  - 50 sideswipe crashes

- Unbuckled Vehicle Occupants
  - 88 total crashes
  - 10 fatal or incapacitating injuries
  - 18 angle crashes

- Motorcycles
  - 42 total crashes
  - 11 involved fatal or incapacitating injuries
  - 15 angle crashes

- Distracted Driving
  - 126 total crashes
  - 1 involved an incapacitating injury
  - 55 rear-end crashes

- Speeding/Aggressive Driving
  - 294 total crashes
  - 7 involved a fatal or incapacitating injury
  - 104 angle crashes

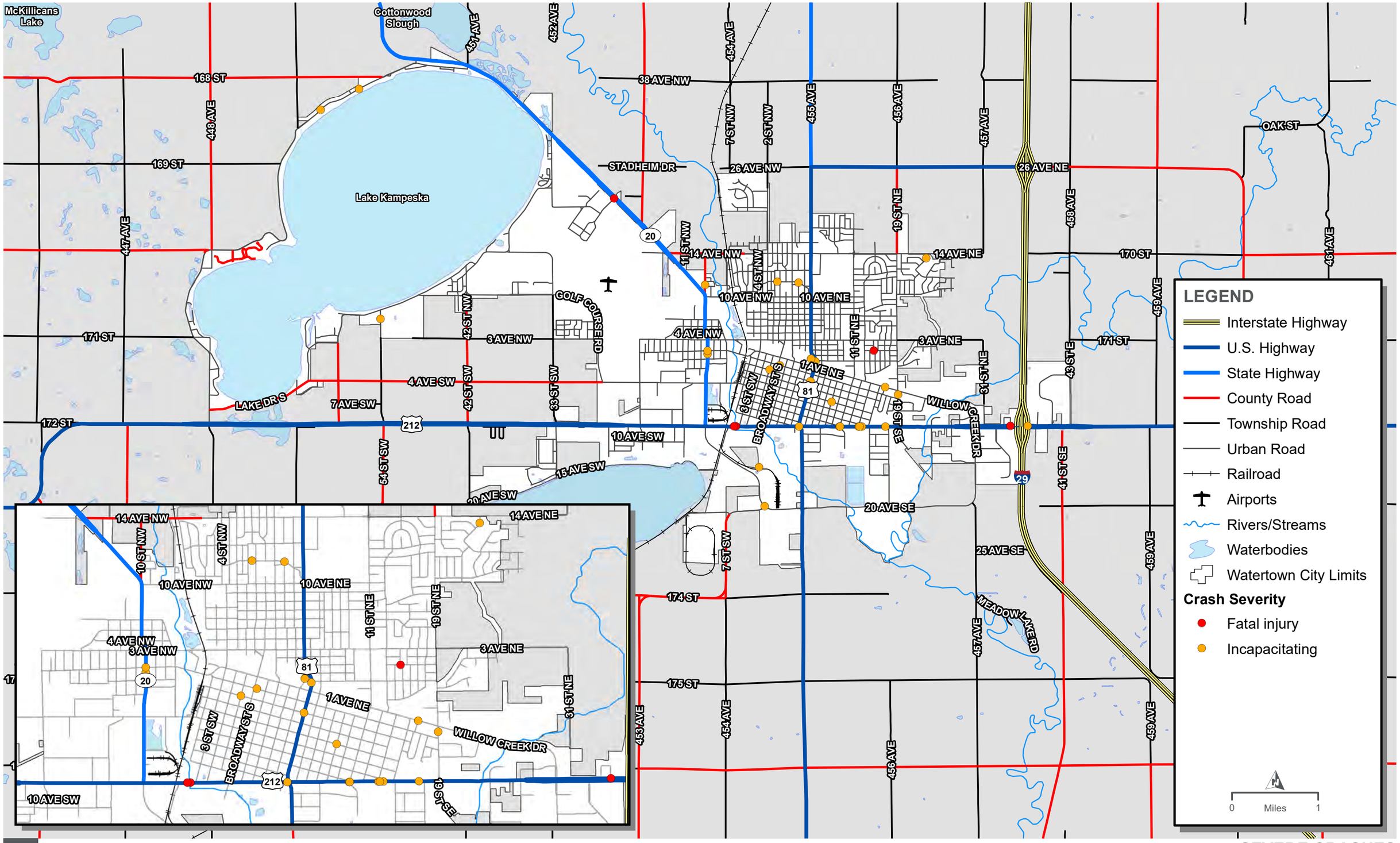


HDR

CRASH HISTORY

(2015-2019)

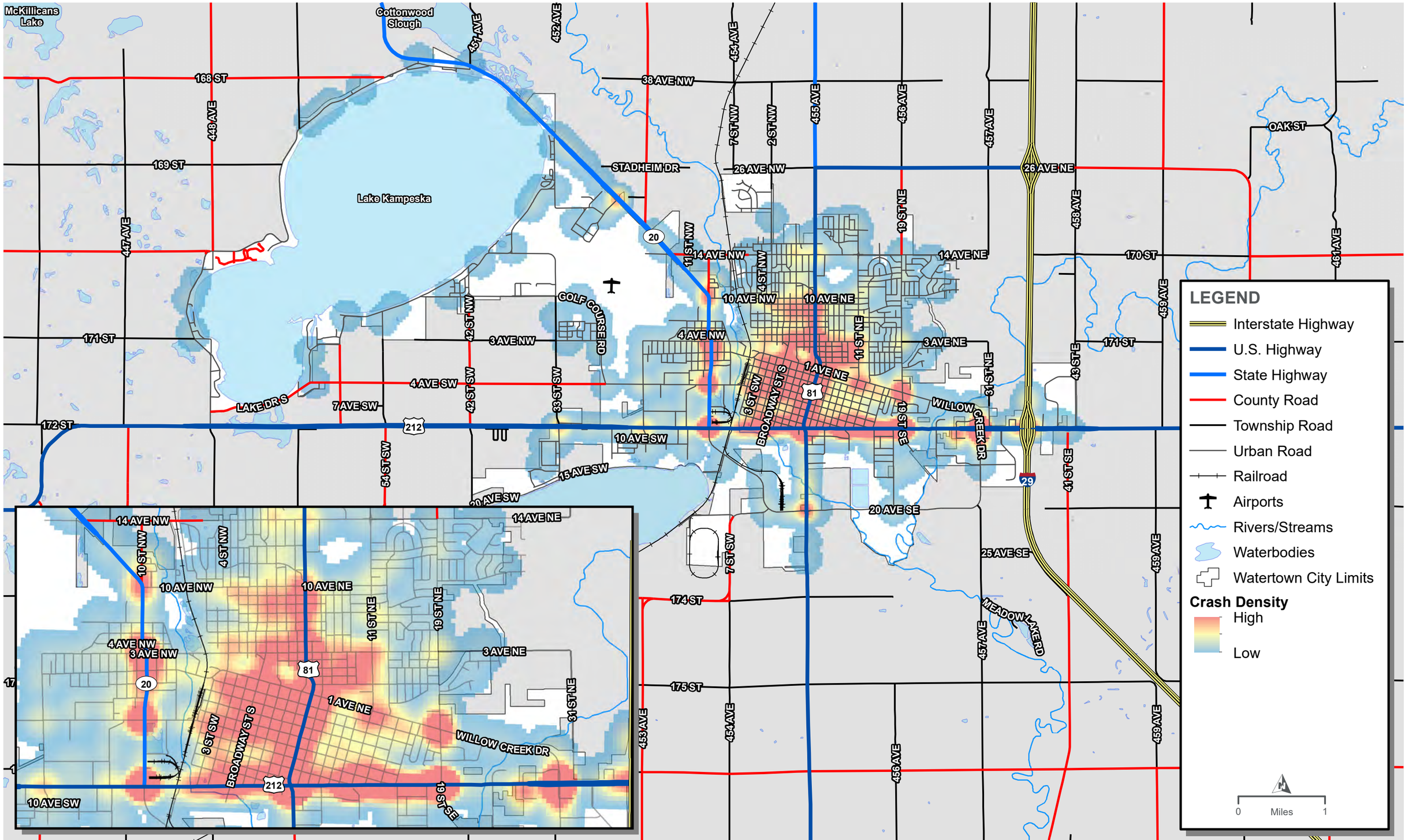
FIGURE 1



SEVERE CRASHES
(2015-2019)

FIGURE 2

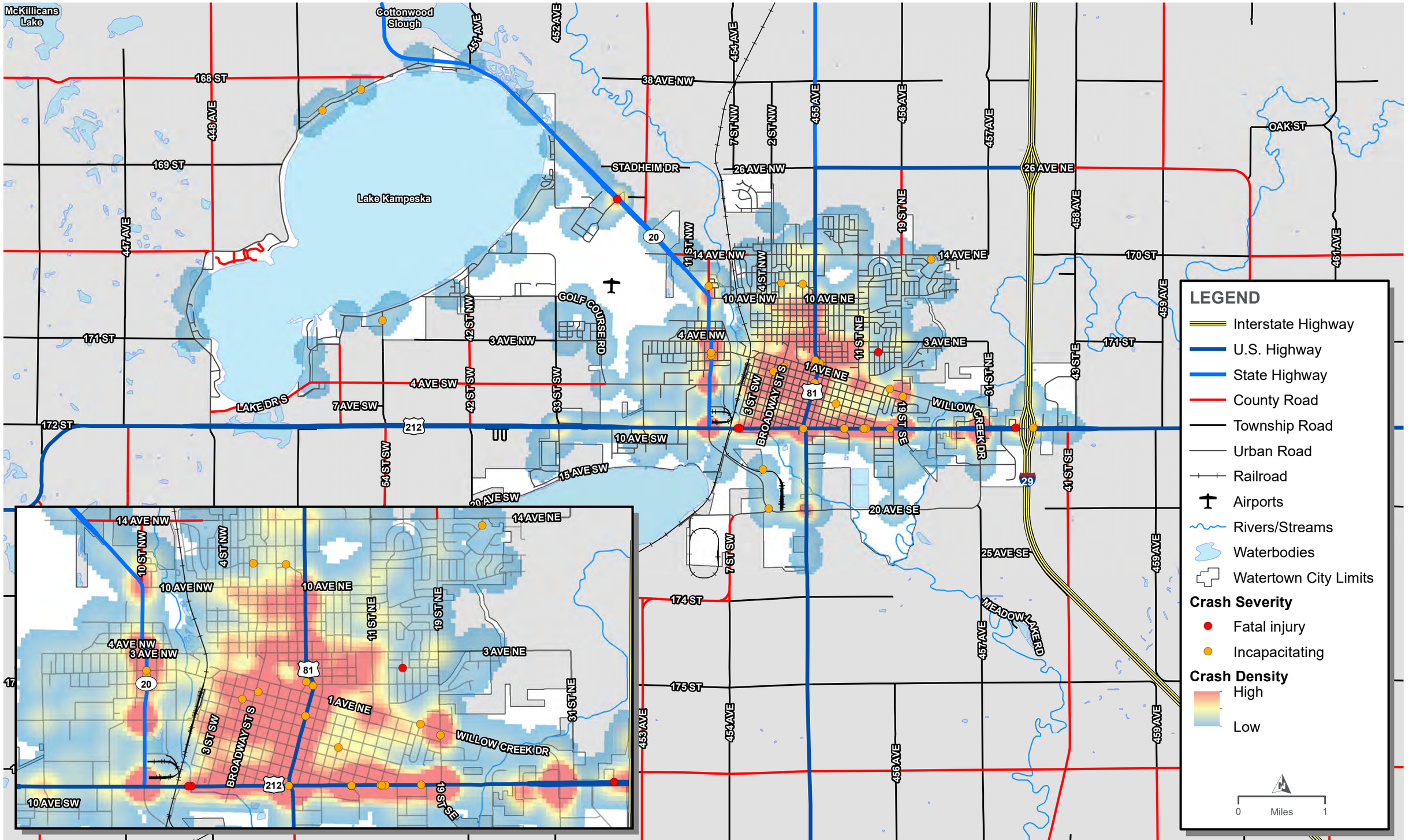
WATERTOWN MASTER TRANSPORTATION PLAN - CRASH HISTORY REVIEW MEMO



CRASH DENSITY

(2015-2019)

FIGURE 3



SEVERE CRASH DENSITY

(2015-2019)

FIGURE 4

Intersections

Crashes occurring within a 250-foot radius of an intersection in the GIS crash database were categorized as an intersection crash for this analysis. 1,105 of 2,013 crashes met this criterion. Intersections were analyzed and ranked based on the twenty highest crash frequencies and the twenty highest crash rates.

CRASH FREQUENCY

Crash frequency is defined as the total number of crashes that occurred at an intersection. Crash frequency is important as it indicates locations that record frequent crash events, but it does not consider traffic exposure which can lead to an under-emphasis of intersections with lower volumes and an overemphasis of intersections with higher traffic volumes. The twenty highest ranked crash frequency intersections are presented in **Figure 5**, **Table 7** (in terms of injury severity), and **Table 8** (in terms of manner of collision).

In terms of crash frequency, the following was found to have occurred on the major corridors within Watertown:

- **US 212:** 1st, 2nd, and 3rd highest crash frequency intersections (8 of 20 total)
- **US 81:** 1st and 4th highest crash frequency intersection (5 of 20 total)
- **SD 20:** 5th highest crash frequency intersections (6 of 20 total)

Overall, the US 212 and US 81 intersection exhibited the greatest number of crashes with 54. This intersection is signalized with 2 through lanes, a left-turn lane, and a channelized right-turn lane at each approach. While no fatal or incapacitating injury crashes were observed, 3 crashes were non-incapacitating injury crashes. 29 of these crashes were rear-end crashes, 22 were angle crashes, and 3 were sideswipe crashes. The US 212 intersections with 19th St SE and Willow Creek Drive had the next highest crash frequency, with 42 and 34 crashes respectively.

Table 7: Watertown Intersection Crash Frequency Rankings – Injury Severity (2015-2019)[2]

Rank	Intersection Name	Crashes (5 years)						Daily Entering Volume	Crash Rate (Crashes / MEV**)
		Total	Fatal Injury	*Major Injury	*Minor Injury	Possible Injury	Property Damage Only		
1	US 212 and US 81	54	0	0	3	14	37	25,398	1.17
2	US 212 and 19th St SE	42	0	0	2	13	27	20,499	1.12
3	US 212 and Willow Creek Dr	34	0	0	1	4	29	11,453	1.63
4	US 81 and 1st Ave NE	27	0	0	2	7	18	16,807	0.88
5	US 212 and SD 20	26	0	0	1	7	18	21,701	0.66
6	US 212 and 11th St SE	24	0	2	3	5	14	19,421	0.68
7	US 81 and 3rd Ave NE	22	0	0	1	3	18	13,588	0.89
8	SD 20 and 4th Ave SW	20	0	0	2	5	13	15,759	0.70
9	SD 20 and 3rd Ave NW	17	0	0	3	5	9	15,962	0.58
10	US 212 and 13th St SE	16	0	1	2	2	11	21,580	0.41
11	US 81 and 4th Ave SE	15	0	0	3	4	8	11,662	0.70
12	US 81 and E Kemp Ave	14	0	0	1	1	12	12,516	0.61
13	19th St SE and Willow Creek Dr	13	0	0	2	4	7	12,157	0.59
14	US 212 and I-29 NB	12	0	1	1	3	7	6,371	1.03
15	US 212 and Broadway St	12	0	0	3	1	8	18,244	0.36
16	SD 20 and Airport Dr	11	1	0	3	3	4	5,084	1.19
17	11th St NE and 3rd Ave NE	10	0	0	1	3	6	5,756	0.95
18	SD 20 and 10th Ave NW	10	0	0	0	0	10	9,530	0.57
19	SD 20 and W Kemp Ave	9	0	1	0	1	7	13,109	0.38
20	N Maple St & 3rd Ave NE	9	0	0	1	1	7	5,764	0.86

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles

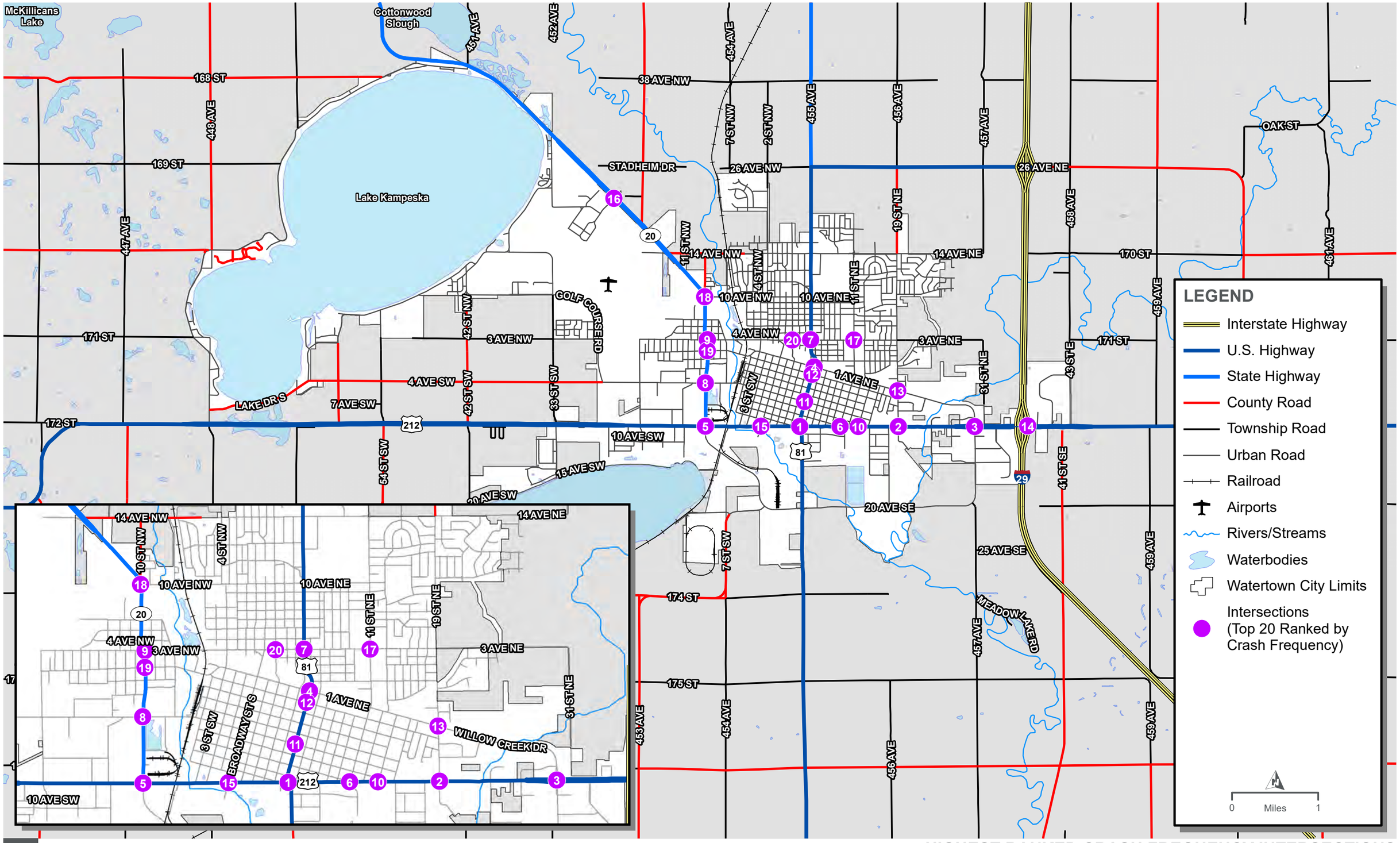
[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database

Table 8: Watertown Intersection Crash Frequency Rankings – Manner of Collision (2015-2019)[2]

Rank	Intersection Name	Crashes (5 years)						Daily Entering Volume	Crash Rate (Crashes / MEV**)
		Total	Angle	Rear-end	Head-on	Sideswipe	No Collision		
1	US 212 and US 81	54	22	29	0	3	0	25,398	1.17
2	US 212 and 19th St SE	42	19	19	0	1	3	20,499	1.12
3	US 212 and Willow Creek Dr	34	20	11	0	3	0	11,453	1.63
4	US 81 and 1st Ave NE	27	19	7	0	1	0	16,807	0.88
5	US 212 and SD 20	26	12	11	1	2	0	21,701	0.66
6	US 212 and 11th St SE	24	9	14	0	1	0	19,421	0.68
7	US 81 and 3rd Ave NE	22	10	10	0	1	1	13,588	0.89
8	SD 20 and 4th Ave SW	20	16	3	1	0	0	15,759	0.70
9	SD 20 and 3rd Ave NW	17	10	5	0	0	2	15,962	0.58
10	US 212 and 13th St SE	16	8	6	0	0	2	21,580	0.41
11	US 81 and 4th Ave SE	15	14	1	0	0	0	11,662	0.70
12	US 81 and E Kemp Ave	14	7	5	0	1	1	12,516	0.61
13	19th St SE and Willow Creek Dr	13	10	1	0	0	2	12,157	0.59
14	US 212 and I-29 NB	12	8	4	0	0	0	6,371	1.03
15	US 212 and Broadway St	12	4	6	0	0	2	18,244	0.36
16	SD 20 and Airport Dr	11	8	2	0	0	1	5,084	1.19
17	11th St NE and 3rd Ave NE	10	4	4	0	0	2	5,756	0.95
18	SD 20 and 10th Ave NW	10	7	2	0	0	1	9,530	0.57
19	SD 20 and W Kemp Ave	9	7	1	0	0	1	13,109	0.38
20	N Maple St & 3rd Ave NE	9	7	1	0	0	1	5,764	0.86

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database



HIGHEST RANKED CRASH FREQUENCY INTERSECTIONS

(2015-2019)

FIGURE 5

CRASH RATES

Crash rates were calculated to further assess traffic safety conditions within Watertown city limits. A **crash rate** is the calculation of the number of vehicular crashes per million entering vehicles (MEV) and normalizes crash frequencies based on traffic exposure. The method used for calculating crash rates utilized crash and traffic count data sourced from SDDOT. For intersections without available traffic counts, daily traffic volumes were estimated to be 1,500 ADT. The highest ranked crash rate intersections are presented in **Figure 6**.

Crash rates are based on the daily entering volumes at each intersection, which were estimated based on the data discussed above. The daily entering volumes that were calculated give insight into roadway usage and specifically the average number of vehicles using an intersection during typical weekday travel. This high-level overview provides a snapshot of traffic safety and its relationship with roadway usage throughout Watertown city limits in normal conditions.

In addition to crash rates, critical crash rates and critical index ratios were calculated for each of the twenty intersections. Critical crash rates are the comparison of a site crash rate to an average crash rate of a reference group, which in this case was intersections that observed 8 or more crashes. If a crash rate exceeds the critical crash rate, shown in the Critical Index Ratio, there is likely a safety issue.

The highest crash rate intersections are presented in terms of injury severity and manner of collision in **Table 9** and **Table 10**, respectively.

Regarding the critical index ratio, five intersections had crash rates that exceeded the critical crash rate:

- US 212 and Willow Creek Drive (1.63 crashes/MEV, 1.5 ratio)
- SD 20 and Airport Drive (1.19 crashes/MEV, 1.3 ratio)
- US 212 and US 81 (1.17 crashes/MEV, 1.2 ratio)
- US 212 and 19th Street SE (1.12 crashes/MEV, 1.1 ratio)
- N Maple Street and 3rd Avenue NE (1.03 crashes/MEV, 1.0 ratio)

ROUNDABOUTS

During the observed 5-year period, two roundabout intersections were constructed at US 81 and 20th Avenue SE (constructed between April and August 2018) and 11th Street NE and 14th Avenue NE (completed in July 2015). While direct crash data comparisons to other study area intersections cannot be made due to these major geometric changes, crash data was examined for any indications of changes in safety trends. For this examination, SDDOT crash data from 2014 was employed in order to have at least one full year of data prior to the construction of the roundabout at 11th Street NE and 14th Avenue NE. Crash data from these intersections is shown in **Table 11**.

Table 9: Watertown Intersection Crash Rates Rankings – Injury Severity (2015-2019)[2]

Rank	Intersection Name	Crashes (5 years)						Daily Entering Volume	Crash Rate (Crashes / MEV**)	Critical Crash Rate	Critical Index Ratio
		Total	Fatal Injury	*Major Injury	*Minor Injury	Possible Injury	Property Damage Only				
1	US 212 and Willow Creek Dr	34	0	0	1	4	29	11,453	1.63	1.11	1.5
2	SD 20 and Airport Dr	11	1	0	3	3	4	5,084	1.19	0.91	1.3
3	US 212 and US 81	54	0	0	3	14	37	25,398	1.17	0.99	1.2
4	US 212 and 19th St SE	42	0	0	2	13	27	20,499	1.12	1.02	1.1
5	US 212 and I-29 NB	12	0	1	1	3	7	6,371	1.03	1.24	0.8
6	11th St NE and 3rd Ave NE	10	0	0	1	3	6	5,756	0.95	1.26	0.8
7	US 81 and 3rd Ave NE	22	0	0	1	3	18	13,588	0.89	1.08	0.8
8	US 81 and 1st Ave NE	27	0	0	2	7	18	16,807	0.88	1.05	0.8
9	N Maple St and 3rd Ave NE	9	0	0	1	1	7	5,764	0.86	0.88	1.0
10	Broadway St and 4th Ave SW	8	0	0	0	1	7	6,198	0.71	1.24	0.6
11	SD 20 and 4th Ave SW	20	0	0	2	5	13	15,759	0.70	1.06	0.7
12	US 81 and 4th Ave SE	15	0	0	3	4	8	11,662	0.70	1.11	0.6
13	US 212 and 11th St SE	24	0	2	3	5	14	19,421	0.68	1.03	0.7
14	29th St SE and 26th St SE	8	0	0	0	0	8	6,600	0.66	0.85	0.8
15	US 212 and SD 20	26	0	0	1	7	18	21,701	0.66	1.01	0.6
16	US 81 and E Kemp Ave	14	0	0	1	1	12	12,516	0.61	1.09	0.6
17	11th St NE and 1st Ave NE	8	0	0	0	1	7	7,218	0.61	0.83	0.7
18	19th St SE and Willow Creek Dr	13	0	0	2	4	7	12,157	0.59	1.10	0.5
19	6th St NE and 1st Ave NE	8	0	0	1	4	3	7,599	0.58	0.82	0.7
20	SD 20 and 3rd Ave NW	17	0	0	3	5	9	15,962	0.58	1.05	0.6

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database

Table 10: Watertown Intersection Crash Rate Rankings – Manner of Collision (2015-2019)[2]

Rank	Intersection Name	Crashes (5 years)						Daily Entering Volume	Crash Rate (Crashes / MEV**)	Critical Crash Rate	Critical Index Ratio
		Total	Angle	Rear-end	Head-on	Sideswipe	No Collision				
1	US 212 and Willow Creek Dr	34	20	11	0	3	0	11,453	1.63	1.11	1.5
2	SD 20 and Airport Dr	11	8	2	0	0	1	5,084	1.19	0.91	1.3
3	US 212 and US 81	54	22	29	0	3	0	25,398	1.17	0.99	1.2
4	US 212 and 19th St SE	42	19	19	0	1	3	20,499	1.12	1.02	1.1
5	US 212 and I-29 NB	12	8	4	0	0	0	6,371	1.03	1.24	0.8
6	11th St NE and 3rd Ave NE	10	4	4	0	0	2	5,756	0.95	1.26	0.8
7	US 81 and 3rd Ave NE	22	10	10	0	1	1	13,588	0.89	1.08	0.8
8	US 81 and 1st Ave NE	27	19	7	0	1	0	16,807	0.88	1.05	0.8
9	N Maple St and 3rd Ave NE	9	7	1	0	0	1	5,764	0.86	0.88	1.0
10	Broadway St and 4th Ave SW	8	5	3	0	0	0	6,198	0.71	1.24	0.6
11	SD 20 and 4th Ave SW	20	16	3	1	0	0	15,759	0.70	1.06	0.7
12	US 81 and 4th Ave SE	15	14	1	0	0	0	11,662	0.70	1.11	0.6
13	US 212 and 11th St SE	24	9	14	0	1	0	19,421	0.68	1.03	0.7
14	29th St SE and 26th St SE	8	8	0	0	0	0	6,600	0.66	0.85	0.8
15	US 212 and SD 20	26	12	11	1	2	0	21,701	0.66	1.01	0.6
16	US 81 and E Kemp Ave	14	7	5	0	1	1	12,516	0.61	1.09	0.6
17	11th St NE and 1st Ave NE	8	5	3	0	0	0	7,218	0.61	0.83	0.7
18	19th St SE and Willow Creek Dr	13	10	1	0	0	2	12,157	0.59	1.10	0.5
19	6th St NE and 1st Ave NE	8	5	2	0	0	1	7,599	0.58	0.82	0.7
20	SD 20 and 3rd Ave NW	17	10	5	0	0	2	15,962	0.58	1.05	0.6

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database

Table 11: Roundabout Intersections (2014-2019)[2]

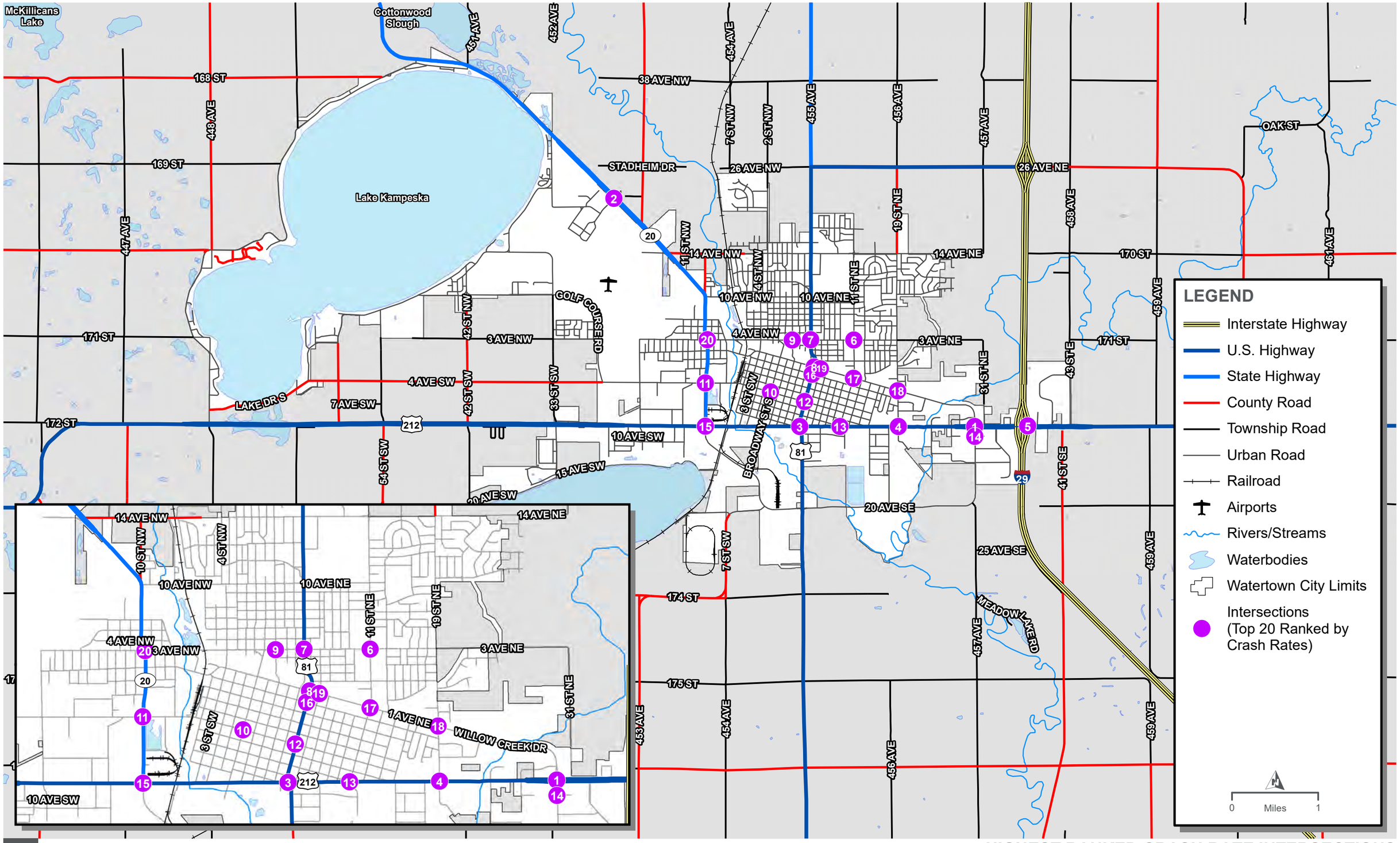
Intersection Name	Crashes (6 years)							Crashes Before Roundabout Construction	Crashes After Roundabout Construction
	Total	2014	2015	2016	2017	2018	2019		
US 81 and 20th Avenue SE*	**16**	5	3	6	0	0	2	**14 Crashes (4 years)** **Injury Severity** • 6 non-incapacitating injury crashes • 3 possible injury crashes • 5 no injury crashes **Manner of Collision** • 12 angle crashes • 2 rear-end crashes	**2 Crashes (1 year)** **Injury Severity** • 1 possible injury crash • 1 no injury crash **Manner of Collision** • 1 angle crash
11th Street NE and 14th Avenue NE**	**2**	0	1	0	0	0	1	**1 Crash (1 year)** **Injury Severity** • 1 no injury crash **Manner of Collision** • 1 rear-end crash	**1 Crash (4 years)** **Injury Severity** • 1 no injury crash **Manner of Collision** • 1 rear-end crash

*Roundabout was constructed in between April 2018 and August 2018. 2018 crashes at this intersection occurred during construction and are not considered in the before and after crash totals.

**Roundabout construction was completed by July 2015. The one 2015 crash observed occurred on January 20th of that year and thus was included in the before total.

Color Code: Gray – crashes occurred before roundabout construction, Yellow – crashes occurred during roundabout construction year, Green – crashes occurred after roundabout construction

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database



HIGHEST RANKED CRASH RATE INTERSECTIONS

(2015-2019)

FIGURE 6

Corridor Segments

Fourteen corridors, including the three study corridors, were evaluated for segment crash rates. These segments are identified in **Figure 7** and segment crash densities are shown in **Figure 8**. Corridor segment crash rates were calculated in terms of crashes per million vehicle miles traveled (MVMT) using 2015-2019 reported crashes and traffic volumes from the most recently available daily traffic counts. The corridor crash totals and rates include only segment crashes with the respective study corridor (intersection crashes are excluded). In addition, critical crash rates were calculated based on the average segment crash rate. The crash rates and critical crash rates were compared to determine if a safety concern. Corridor segment crash rates are shown in **Table 12**, **Table 13**, and **Table 14**, categorized by functional classification.

Table 12: Interstate Corridor Segment Crash Rates (2015-2019)[2]

Corridor No.	Roadway Corridor	Limits	Length (miles)	Crash Rate (Crashes / MVMT)	Critical Crash Rate	Critical Index Ratio
1	Interstate 29 (NB)	US 212 Interchange Area	0.91	1.77	2.51	0.7
		US 212 Off Ramp (Exit 177)	0.31	0.00	3.75	0.0
		US 212 On Ramp (Exit 177)	0.29	2.67	4.51	0.6
2	Interstate 29 (SB)	US 212 Interchange Area	0.90	0.89	2.00	0.4
		US 212 Off Ramp (Exit 177)	0.32	3.54	4.29	0.8
		US 212 On Ramp (Exit 177)	0.30	0.86	3.81	0.2

Table 13: U.S. and State Highway Corridor Segment Crash Rates (2015-2019)[2]

Corridor No.	Roadway Corridor	Limits	Length (miles)	Crash Rate (Crashes / MVMT)	Critical Crash Rate	Critical Index Ratio
3	US 212	Willow Creek Dr to 43rd St E	1.11	0.34	1.91	0.2
		19th St SE to Willow Creek Dr	0.89	0.80	1.84	0.4
		11th St NE to 19th St SE	0.68	2.00	1.74	**1.1**
		US 81 to 11th St NE	0.47	1.74	1.83	0.9
		Broadway St to US 81	0.45	1.70	1.86	0.9
		SD 20 to Broadway St	0.65	1.43	1.79	0.8
		21st St SW to SD 20	0.76	0.86	1.79	0.5
		33rd St SW to 21st St SW	0.98	1.63	2.02	0.8
4	US 81	10th Ave NE to 18th Ave NE	0.80	0.33	2.00	0.2
		3rd Ave NE to 10th Ave NE	0.50	1.03	2.06	0.5
		1st Ave NE to 3rd Ave NE	0.33	1.37	2.13	0.6
		4th Ave SE to 1st Ave NE	0.42	1.46	2.04	0.7
		US 212 to 4th Ave SE	0.30	2.04	2.28	0.9
		20th Ave SE to US 212	0.95	2.22	1.93	**1.1**
5	SD 20	Airport Dr to N Lake Dr	2.90	0.73	1.80	0.4
		14th Ave NW to Airport Dr	0.89	1.00	2.05	0.5
		10th Ave NW to 14th Ave NW	0.67	0.42	1.99	0.2
		3rd Ave NW to 10th Ave NW	0.51	1.21	2.00	0.6
		4th Ave SW to 3rd Ave NW	0.50	0.49	1.96	0.3
		US 212 to 4th Ave SW	0.50	1.30	2.00	0.7

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database

Table 14: Urban Arterial and Collector Corridor Segment Crash Rates (2015-2019)[2]

Corridor No.	Roadway Corridor	Limits	Length (miles)	Crash Rate (Crashes / MVMT)	Critical Crash Rate	Critical Index Ratio
6	Broadway Street	3rd Ave NW to 10th Ave NW	0.50	2.78	3.01	0.9
		1st Ave NW to 3rd Ave NW	0.21	2.89	3.66	0.8
		4th Ave SW to 1st Ave NW	0.42	6.22	2.65	2.3
		US 212 to 4th Ave SW	0.41	0.92	2.83	0.3
7	11th Street	10th Ave NE to 14th Ave NE	0.50	0.64	3.15	0.2
		3rd Ave NE to 10th Ave NE	0.50	0.00	2.80	0.0
		1st Ave NE to 3rd Ave NE	0.44	3.08	2.80	1.1
		4th Ave SE to 1st Ave NE	0.42	0.88	2.79	0.3
		US 212 to 4th Ave SE	0.17	2.43	4.01	0.6
8	19th Street	3rd Ave NE to 14th Ave NE	1.00	0.21	1.98	0.1
		1st Ave NE to 3rd Ave NE	0.58	0.87	2.05	0.4
		US 212 to 1st Ave NE	0.42	1.49	2.30	0.6
9	4th Avenue S	US 81 to 14th St SE	0.79	0.00	4.13	0.0
		Broadway St to US 81	0.41	2.24	2.39	0.9
		3rd St SW to Broadway St	0.25	2.16	2.31	0.9
		SD 20 to 3rd St SW	0.52	1.66	2.23	0.7
		21st St SW to SD 20	0.76	0.53	2.97	0.2
10	1st Avenue N	11th St NE to 19th St NE	0.54	2.24	2.39	0.9
		US 81 to 11th St NE	0.48	2.16	2.31	0.9
		Broadway St to US 81	0.41	1.66	2.23	0.7
		3rd St NW to Broadway St	0.25	0.53	2.97	0.2
11	3rd Avenue N	11th St NE to 19th St NE	0.50	1.30	2.78	0.5
		US 81 to 11th St NE	0.50	2.87	2.55	1.1
		Broadway St to US 81	0.30	0.86	2.78	0.3
		3rd St NW to Broadway St	0.29	1.35	2.81	0.5
		SD 20 to 3rd St NW	0.62	1.12	2.16	0.5
		21st St SW to SD 20	0.79	1.55	2.41	0.6
12	10th Avenue N*	US 81 to 13th St NE	0.62	0.52	2.93	0.2
		Broadway St to US 81	0.21	0.60	3.09	0.2
		Skyline Dr to Broadway St	0.46	0.50	2.39	0.2
		SD 20 to Skyline Dr	0.49	0.00	2.54	0.0
13	14th Avenue N*	11th St NE to 19th St	0.50	0.00	2.38	0.0
		US 81 to 11th St NE	0.50	0.83	2.46	0.3
		Maple St N to US 81	0.22	0.00	2.76	0.0
		2nd St NW to Maple St N*	0.28	0.36	2.64	0.1
		SD 20 to 2nd St NW	1.15	0.35	2.03	0.2
14	16th Avenue N*	2nd St NW to Maple St N*	0.28	1.30	2.78	0.5

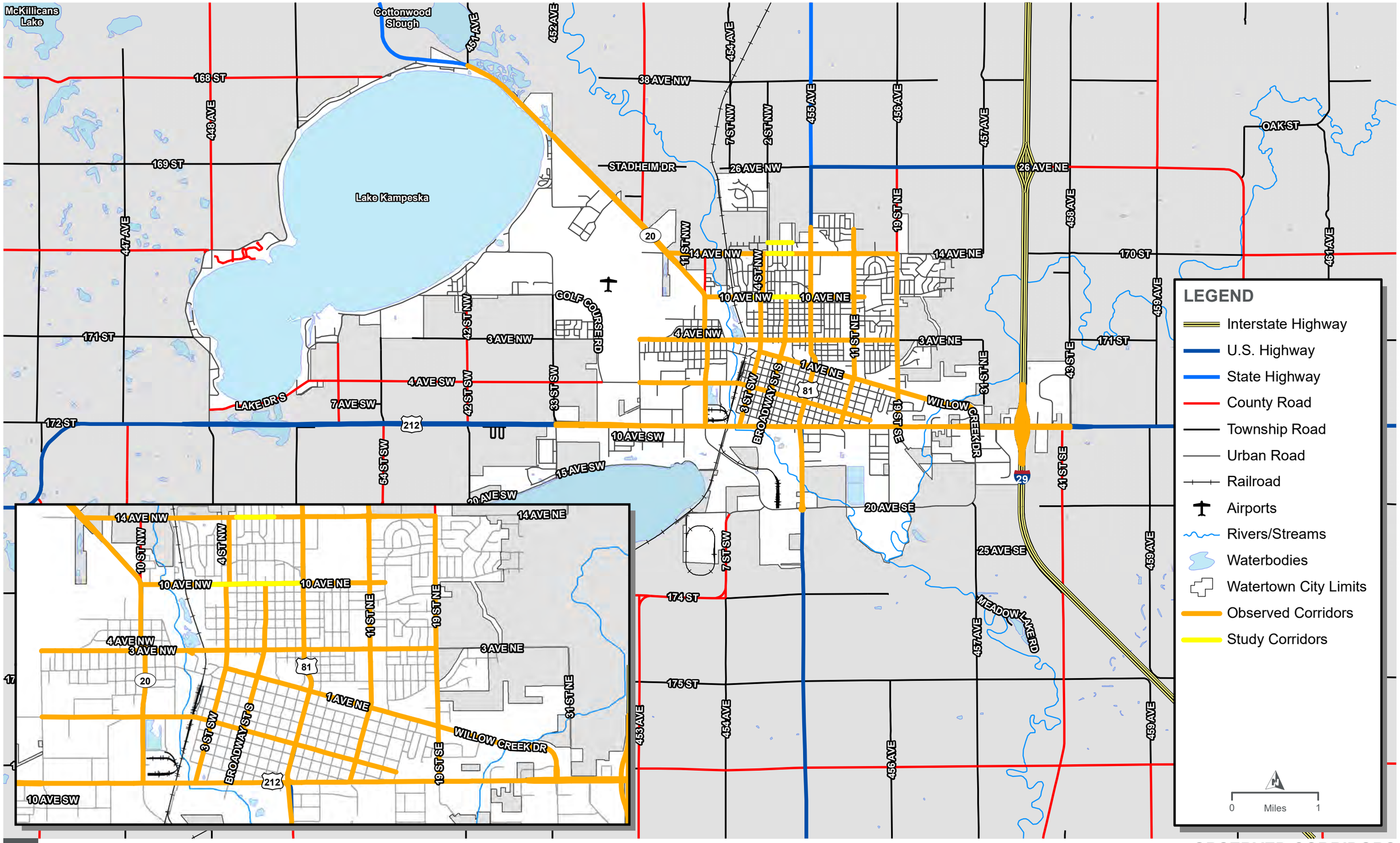
[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database

Overall, only four corridor segments exceeded the critical index ratio. These segments were along portions of US 212, US 81, 11th Street, and 3rd Avenue N. The following attributes were present among these corridor segments:

- US 212: 11th Street SE to 19th Street SE
  - 45 total crashes
  - 3 Incapacitating crashes
  - 4 Non-Incapacitating crashes
  - 22 angle crashes
  - 16 rear-end crashes
  - 5 sideswipe crashes
- US 81: 20th Avenue SE to US 212
  - 25 total crashes
  - 3 Possible injury crashes
  - 9 angle crashes
  - 11 wild animal hit crashes
- 11th Street: 1st Avenue NE to 3rd Avenue NE
  - 7 total crashes
  - 2 angle crashes
- 3rd Avenue N: US 81 to 11th Street NE
  - 9 total crashes
  - 5 rear-end crashes

For segments within the three study corridors, few crashes and no significant safety trends were found. Crash totals for study segments are as follows:

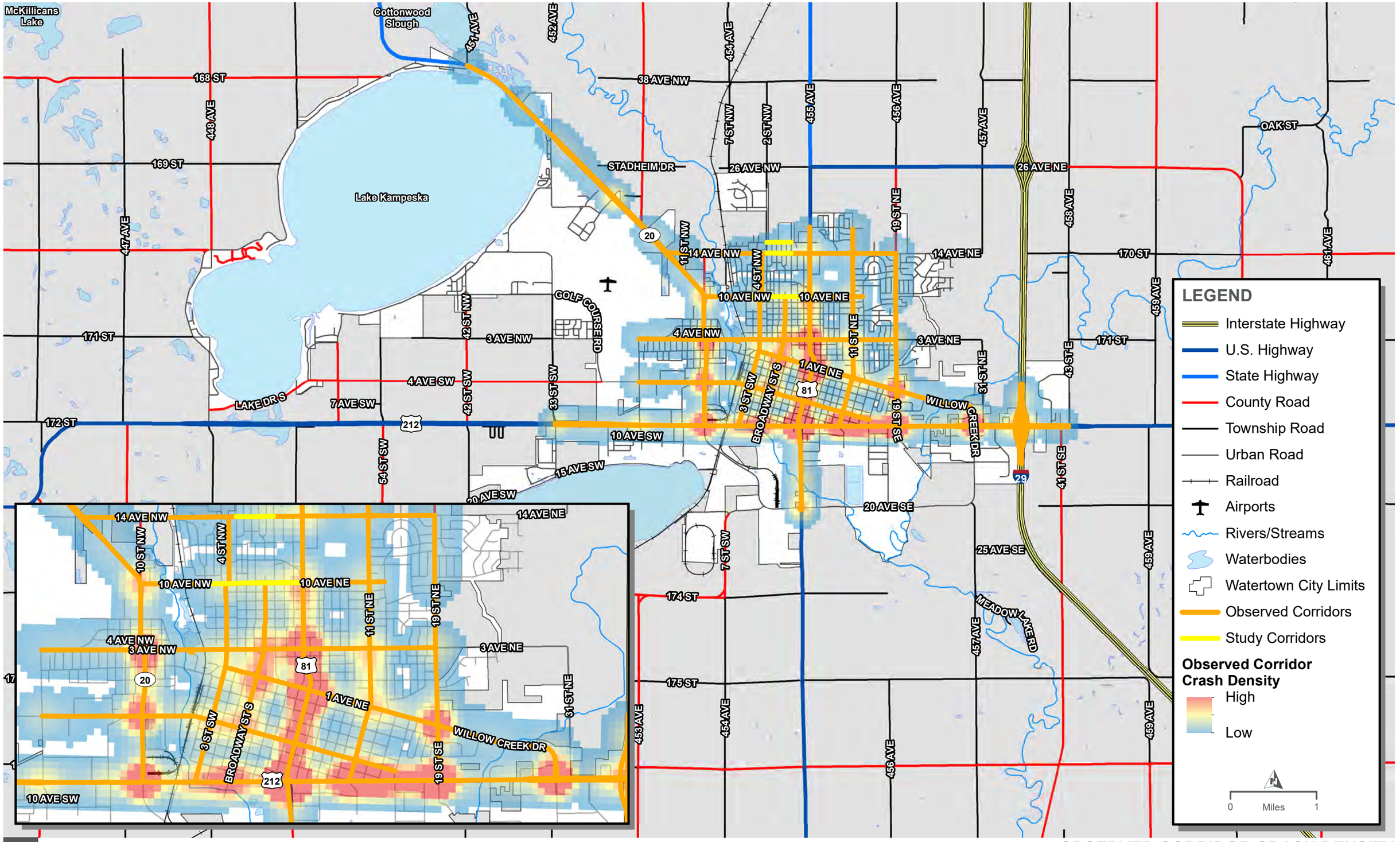
- 10th Avenue N: Broadway Street to US 81
  - 1 total crash
- 10th Avenue N: Skyline Drive to Broadway Street
  - 2 total crashes
- 14th Avenue N: 2nd Street NW to Maple Street N
  - 1 total crash
- 16th Avenue N: 2nd Street NW to Maple Street N
  - No crashes



OBSERVED CORRIDORS

(2015-2019)

FIGURE 7



OBSERVED CORRIDOR CRASH DENSITY

(2015-2019)

FIGURE 8

Bicycles and Pedestrians

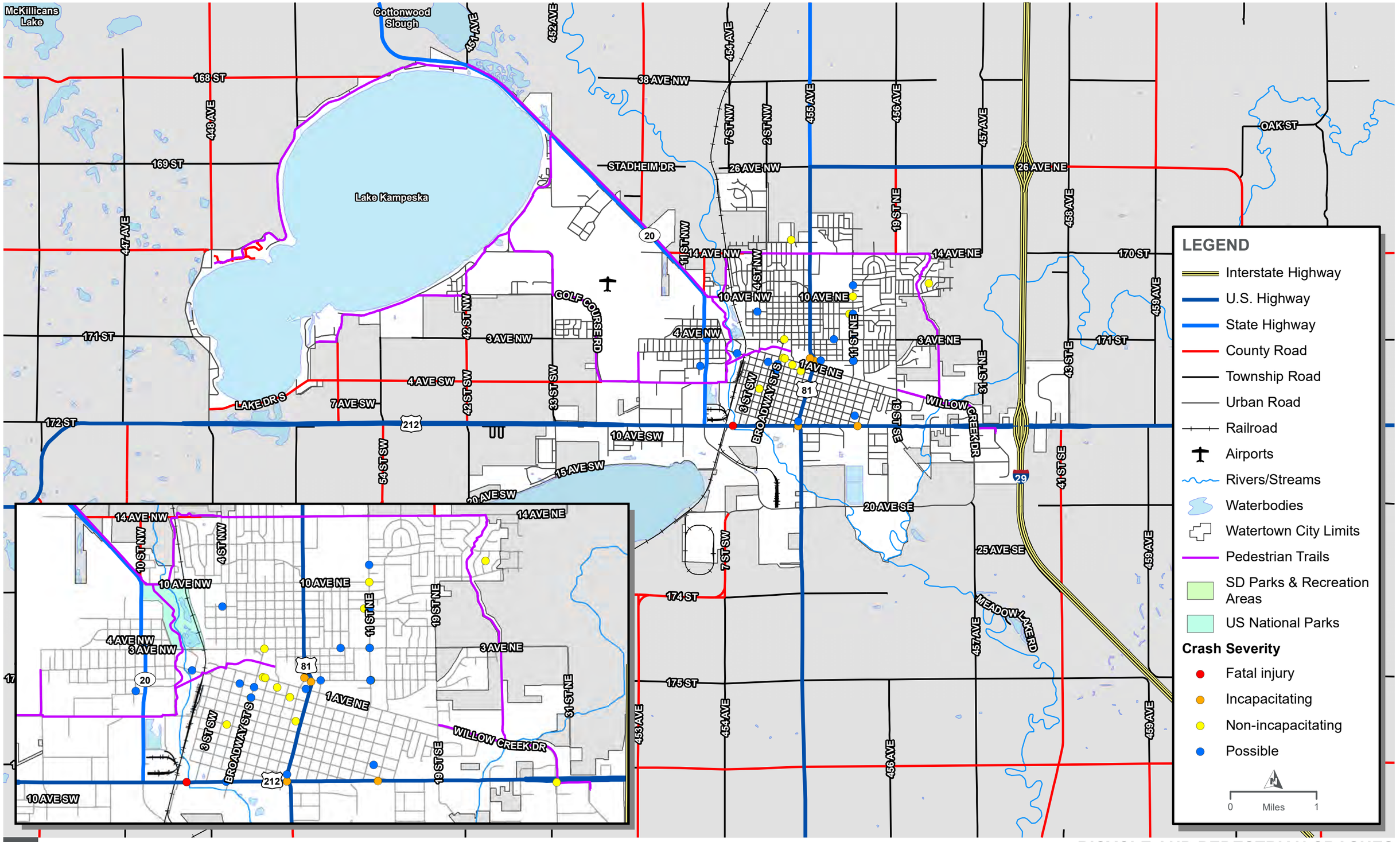
Table 15 presents the number of bicycle and pedestrian crashes by injury severity for the 5-year period of 2015-2019. In total, forty bicycle or pedestrian-related crashes occurred with sixteen bicycle crashes and twenty-four pedestrian crashes. All crashes resulted in an injury and seven of the forty crashes (18 percent) resulted in a fatal or serious injury. The one fatal injury occurred in 2018 on US 212, west of 3rd Street SW. **Figure 9** below displays the locations of all bicycle and pedestrian crashes.

Table 15: Bicycle and Pedestrian Crashes by Injury Severity[2]

Year	Fatal Injury	*Major Injury	*Minor Injury	Possible Injury	No Injury	Unknown	Total
2015	0	1	7	6	0	0	14
2016	0	0	0	5	0	0	5
2017	0	1	2	3	0	0	6
2018	1	3	2	2	0	0	8
2019	0	1	4	2	0	0	7
Total	**1**	**6**	**15**	**18**	**0**	**0**	**40**

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury

[2] Total number of crashes includes all crashes within Watertown city limits.
Crash Source: SDDOT Crash Database



BICYCLE AND PEDESTRIAN CRASHES

(2015-2019)

FIGURE 9

Railroad Crossings

Rail lines cross through Watertown in the north/south direction on the western-central side of the city. This line is owned and operated by BNSF Railway and is part of a connection between Huron, SD and Benson, MN. There is one 54-car loading facility in Watertown. An ethanol plant is located northwest of the intersection of US 81 and 20th Avenue SE.

The Federal Railroad Administration (FRA) maintains an inventory of rail crossings throughout the United States. Their inventory indicates 10 public and private highway/rail crossings within Watertown city limits.

The crash history at highway/rail crossings was reviewed between 2015 and 2019. Twelve reported crashes occurred at or were related to a rail crossing, which are summarized in **Table 16** and shown in **Figure 10**.

Table 16: Rail Crossing Crashes (2015-2019)[2, 3]

Roadway Corridor	Crossing Location	Crossing Number	Railroad	Total Crashes	Trains/ Day	Crossing Control
3rd Avenue NW	West of Skyline Drive	075499N	BNSF	2	2	Active – flashing lights (mast mounted)
W Kemp Avenue	East of 6th Street NW	075502U	BNSF	2	2	Active – flashing lights (mast and cantilever mounted)
4th Avenue SW	West of 5th Street SW	075503B	BNSF	4#	1 per week	Active – flashing lights (mast and cantilever mounted) and gate arms
US 212	West of 3rd Street SW	075504H	BNSF	3#	1 per week	Active – flashing lights (mast and cantilever mounted)
10th Street SW	West of Fish Road	929051F	BNSF	1	1 per week	Passive – ENS sign

Includes a vehicle-train crash

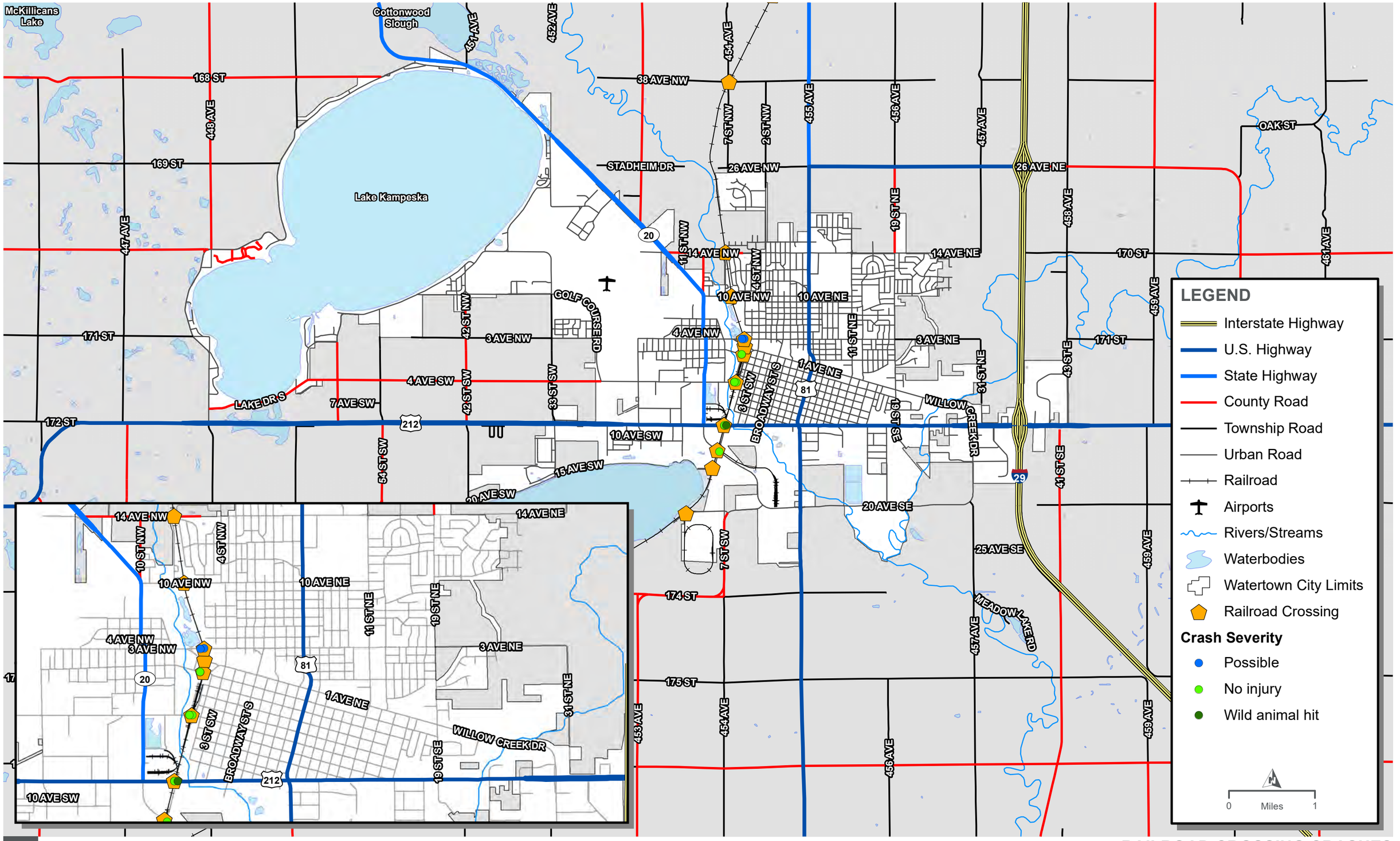
Crashes were largely dispersed across the five crossing locations with observed crashes. The most, four crashes, were reported at the BNSF crossing on 4th Avenue SW just west of 5th Street SW. Other than half of these crashes being labeled as rear-end crashes, no discernable trends appeared for the crashes at this crossing.

There were two vehicle-train collisions reported in the 5-year analysis period. One occurred at the 4th Avenue SW crossing and the other occurred at the US 212 crossing just west of 3rd Street SW. Both crashes resulted in no injury.

Overall, the dispersion of crashes across five crossing locations illustrate the random nature of crossing crashes, even in urban areas with higher volumes. It is important to continually improve crossings through a systematic process of identifying and addressing potential issues of vehicle-train, vehicle-pedestrian, and vehicle-vehicle conflicts as well as single-vehicle roadway departure risks.

[2] Total number of crashes includes all crashes within Watertown city limits. Crash Source: SDDOT Crash Database

[3] Federal Railroad Administration (FRA) GIS Database https://fragis.fra.dot.gov/GISFRASafety/



RAILROAD CROSSING CRASHES

(2015-2019)

FIGURE 10

General Findings

The following are the main trends and general findings derived from the crash history review:

City-wide Summary

- A total of 2,013 crashes occurred within City limits between 2015 and 2019.
- 34 severe crashes (4 fatal injury crashes and 29 incapacitating injury crashes) occurred.
- 63 percent of crashes occurred on dry pavement conditions.
- December, January, and February were the 3 highest crash frequency months.

Intersections

- The US 212 and US 81 intersection had the highest crash frequency with 54 crashes.
- 6 study intersections were amongst the top twenty highest crash frequency intersections.
- 5 study intersections were amongst the top twenty highest crash rate intersections.
- Five intersections had crash rates that exceeded the critical crash rate:
    - US 212 and Willow Creek Drive (1.63 crashes/MEV, 1.5 ratio)
    - SD 20 and Airport Drive (1.19 crashes/MEV, 1.3 ratio)
    - US 212 and US 81 (1.17 crashes/MEV, 1.2 ratio)
    - US 212 and 19th Street SE (1.12 crashes/MEV, 1.1 ratio)
    - N Maple Street and 3rd Avenue NE (1.03 crashes/MEV, 1.0 ratio)
- Recently installed roundabouts at the US 81 and 20th Avenue SE intersection and 11th Street NE and 14th Avenue NE intersection were analyzed for early safety trends. Due to either a lack of post-installation data or minimal crash occurrences, no notable safety trends can be deduced at this time.

Corridor Segments

- The following 4 corridor segments exceeded the critical index ratio:
    - US 212 from 11th Street SE to 19th Street SE
    - US 81 from 20th Avenue SE to US 212
    - 11th Street from 1st Avenue NE to 3rd Avenue NE
    - 3rd Avenue N from US 81 to 11th Street NE
- Few crashes and no significant safety trends were found on the 3 study corridor segments.

Bicycle and Pedestrian-Related Crashes

- 40 total bicycle/pedestrian-related crashes occurred with 16 bicycle crashes and 24 pedestrian crashes.
- All bicycle/pedestrian-related crashes resulted in an injury. 7 bicycle or pedestrian-related crashes resulted in a fatal or serious injury.
- 1 fatal injury bicycle/pedestrian-related crash occurred on US 212, west of 3rd Street SW.

Railroad Crossing-Related Crashes

- 12 total crashes occurred at or were related to a railroad crossing.
- The railroad crossing on 4th Avenue SW observed the most crashes (4).
- Railroad crossing-related crashes were largely dispersed across 5 crossing locations. These crashes had no notable trends and were random in nature.

Origin-Destination Analysis

To analyze the movements of traffic passing through the Watertown region, traffic patterns data were accessed from StreetLight Data. StreetLight uses the movements of smartphones to provide on-demand historic measurements of activity on all streets. The data for the Watertown region covered the year of 2019 excluding the months of June, July and August. Summer months were withheld from the data because traffic in Watertown is impacted seasonally by the local college and K-12 school traffic. The analysis describes traffic patterns during the academic calendar year.

Counts of smart phones crossing the region are adjusted to represent estimated daily vehicle trips by streetlight using a proprietary algorithm. This analysis adjusts these StreetLight volumes with the use of local traffic counts. The data describe external to external traffic and its movements through corridors in the form of a 2019 average daily traffic or ADT.

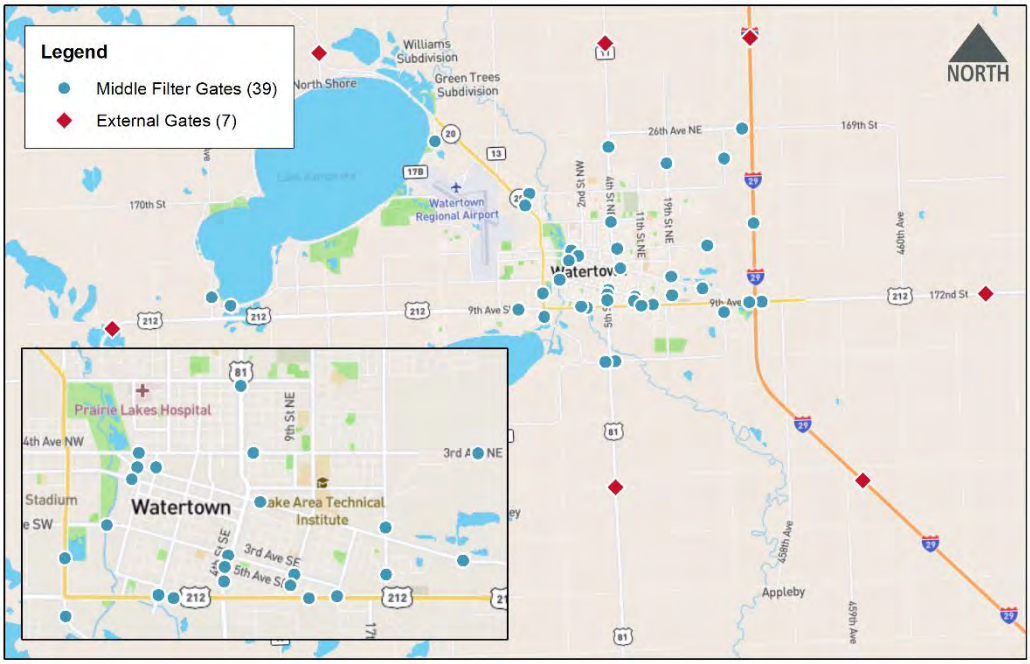
Additional information on StreetLight Data including documentation, methodologies and validation reports are available at streetlightdata.com.

This analysis, called a “select link” analysis, measures amounts of traffic moving to and from external gates through locations called middle filter gates. The external gates are locations on the edges of the regional network where traffic enters and exits. The middle filter gates are located through Watertown on arterial or collector roadways to capture traffics movement through the area.

When configuring the analysis on StreetLightData.com gates are drawn over a combination of satellite imagery and roadway network to define areas for which data are recorded when smart phones cross them on the network.

Illustrated in Figure 1 are the locations of the external gates and middle filters analyzed. External gates are located on the north and south sides of Interstate 29, the east and west sides of the US Highway 212, 455th Ave north opposite to US Highway 81 to the south, US Highway 81, and State Highway 20 to the northwest. Middle filters are placed throughout Watertown with a focus on capturing traffic which follows or deviates from direct routes on Highway 212, Highway 20, and Highway 81.

Figure 1: External gates and middle filters defined for select link analysis



StreetLight volumes were compared to 2019 observed South Dakota Department of Transportation (SDDOT)[1] average daily traffic (ADT) counts, and the ratio between the two was recorded as an adjustment factor. Factors were calculated from traffic counts and StreetLight's measurements of average daily actively at external gate locations. As shown in Table 1, the StreetLight volumes and SDDOT counts were relatively consistent, with StreetLight volumes on average 2.4% lower than SDDOT counts. The adjustment factors were applied to the StreetLight data to derive traffic analysis numbers consistent with SDDOT observed traffic.

Table 1: StreetLight Zone Activity vs. SDDOT Traffic Counts (2019)

External	StreetLight Zone Activity	SDDOT 2019 ADT	Adjustment Factor
455th Ave	1,163	1,100*	0.94583
Hwy 20	2,194	2,030	0.925251
Hwy 212 E	2,963	3,045	1.027675
Hwy 212 W	2,955	3,090	1.045685
Hwy 81	3,275	3,150	0.961832
I-29 N	6,665	7,900	1.185296
I-29 S	7,565	8,140	1.076008

**Estimated from nearby counts*

[1] https://dot.sd.gov/transportation/highways/traffic

External to External Traffic

Illustrated in Table 2 are the ADTs traveling between external gates (after applying the adjustment factors). The highest volumes of external to external travel through Watertown occurs on Interstate 29 followed by Highway 212 and Highway 81.

Table 2: Traffic Count Adjusted External to External Traffic (ADT, 2019)

		Destination							
		455th Ave	**Hwy 20**	**Hwy 212 E**	**Hwy 212 W**	**Hwy 81**	**I-29 N**	**I-29 S**	**Total**
Origin	**455th Ave**	0	3	5	4	9	6	4	31
	Hwy 20	7	0	10	5	29	3	53	107
	Hwy 212 E	7	7	0	41	42	28	33	157
	Hwy 212 W	3	3	38	0	25	57	91	218
	Hwy 81	10	22	31	17	0	50	7	137
	I-29 N	6	4	20	45	48	0	1,690	1,814
	I-29 S	6	36	21	74	6	1,648	0	1,792
	Total	38	75	125	186	159	1,793	1,878	

For each external gate, Table 3 presents observed SDDOT ADTs and the number and percentage of daily external to external traffic. As shown in Table 3, 55% of Interstate 29 traffic has a trip end in Watertown, while 87% to 94% of traffic at the other stations stops in Watertown. According to StreetLight Data's documentation, a "stop" occurs when a smartphone stops moving in accordance with a vehicle's cadence for more than 5 minutes; for example a stop for services (gas, food, etc.) while passing through Watertown would not be counted as an external to external movement if the stop is longer than five minutes.

Table 3: Percentage of External to External Traffic at Gates (2019)

External Gate	SDDOT ADT	EE	% EE
455th	1,100*	69	6.29%
Hwy 20	2,030	181	8.93%
Hwy 212 E	3,045	282	9.26%
Hwy 212 W	3,090	404	13.07%
Hwy 81	3,150	296	9.39%
I-29 N	7,900	3,607	45.66%
I-29 S	8,140	3,670	45.09%

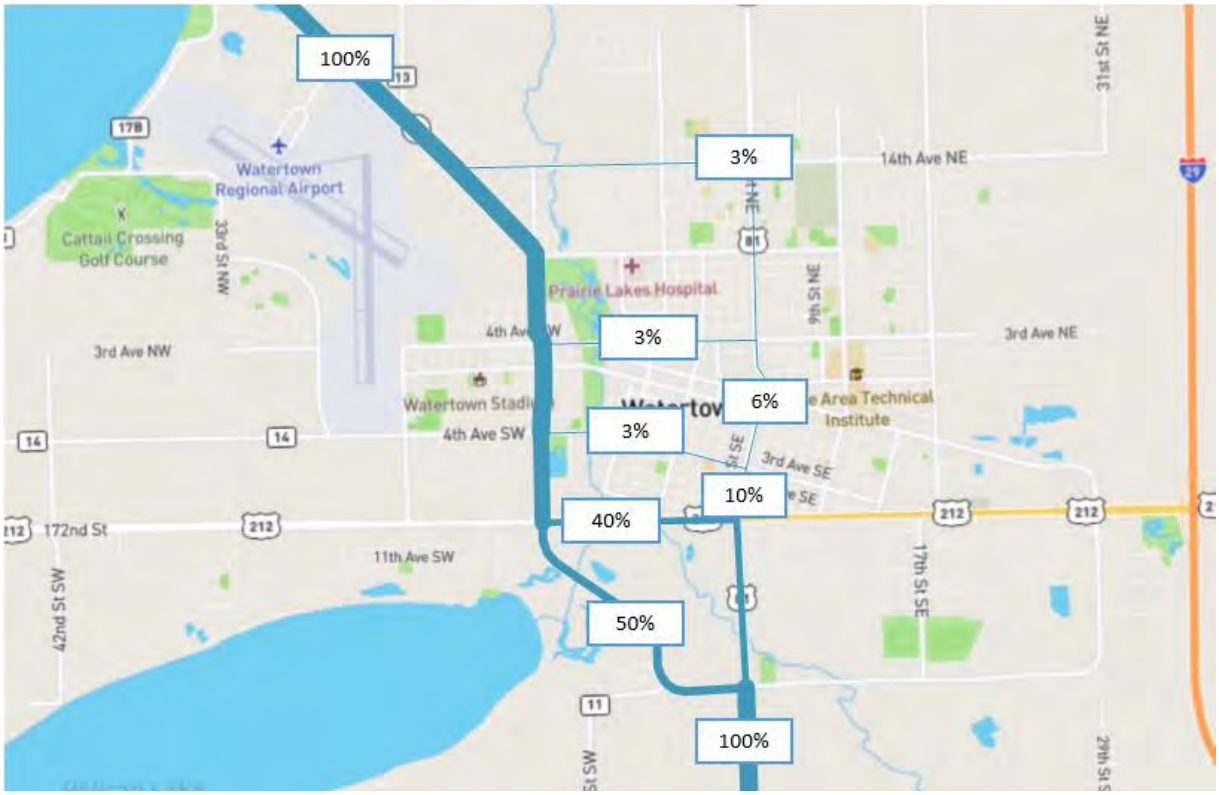
**Estimated from nearby counts*

Traffic Through Middle Filters

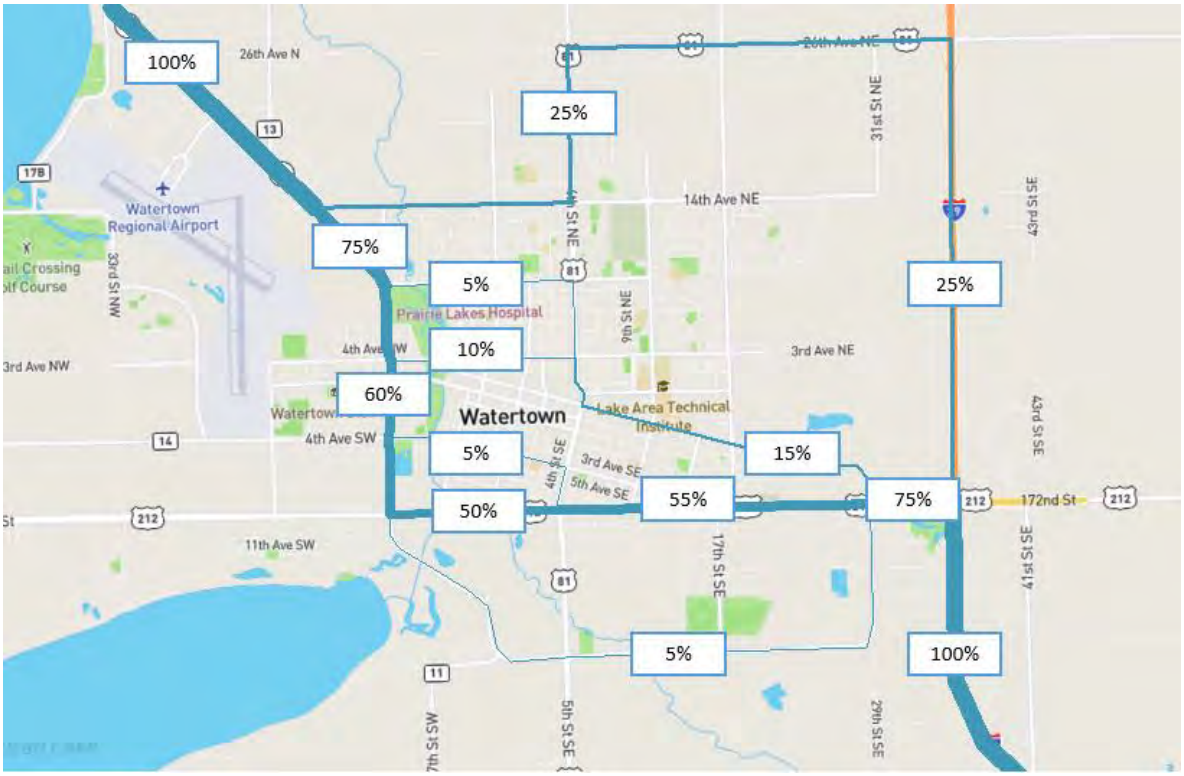
The following figures provide a summary of external travel flow results, using the StreetLight analysis of middle filter gates. ADT at middle filter information has been converted to reflect the total percentage of external to external flows across a roadway network. Flows are documented in a ***one-way direction*** for the following external to external travel movements:

- Highway 81 to Highway 20
- I-29 south to Highway 20
- I-29 north to Highway 212 west
- I-29 south to Highway 212 west
- Highway 212 east to Highway 8
- Highway 212 west to Highway 81
- Highway 81 to I-29 north
- Highway 212 west to Highway 212 east
- Highway 20 to Highway 81
- Highway 20 to I-29 south
- Highway 212 east to Highway 212 west
- Highway 212 west to I-29 north
- Highway 212 west to I-29 south
- Highway 81 to Highway 212 east
- Highway 81 to Highway 212 west
- I-29 north to Highway 81

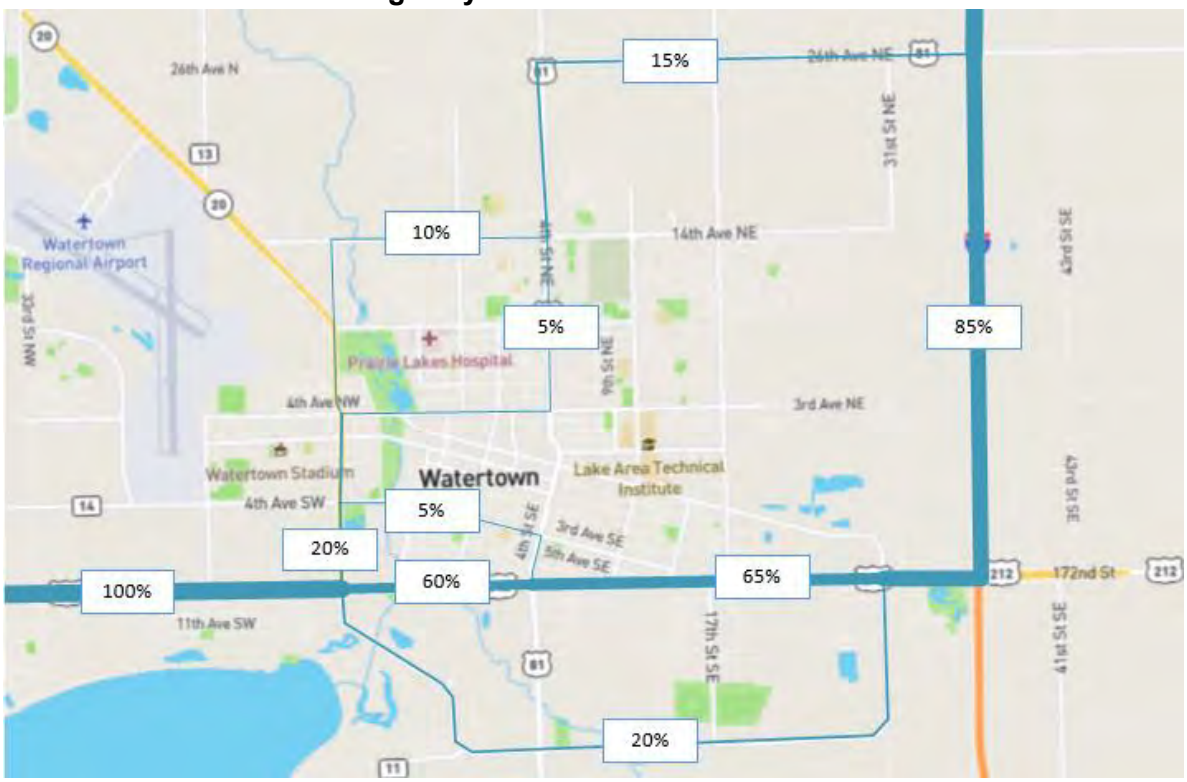
Highway 81 S External Station to Highway 20 External Station



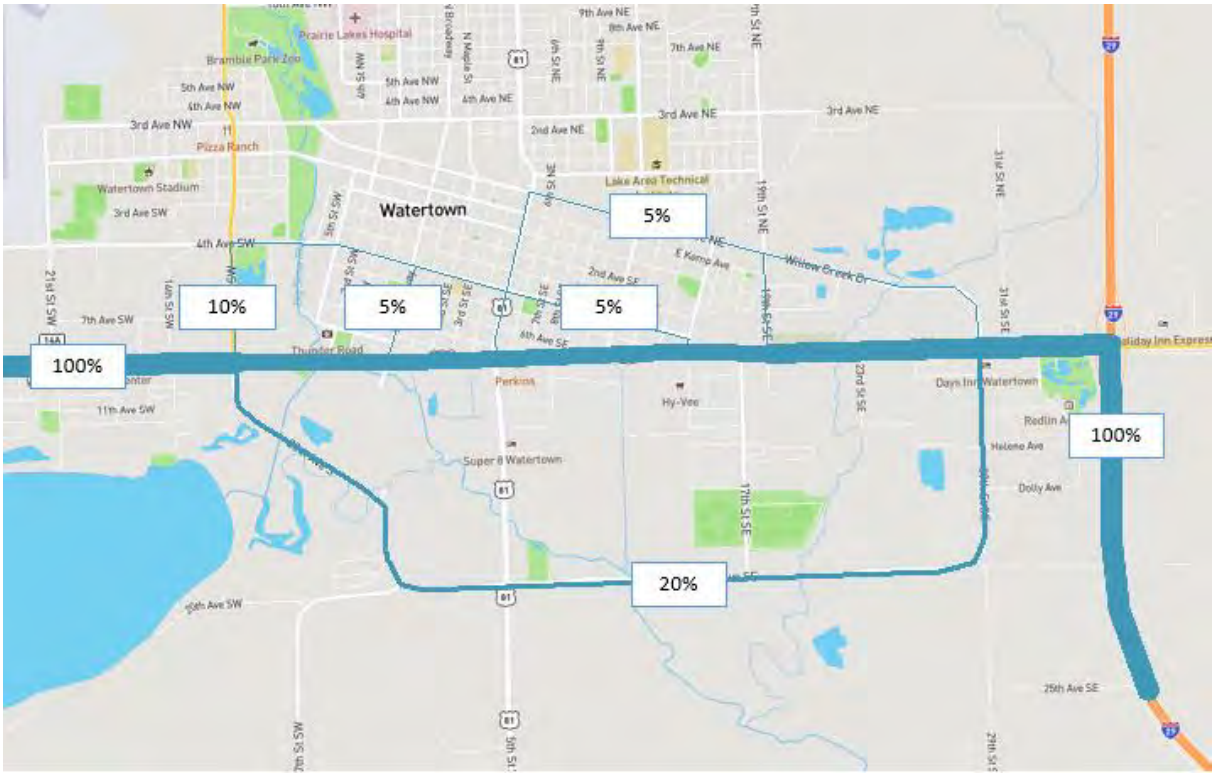
I-29 S External Station to Highway 20 External Station



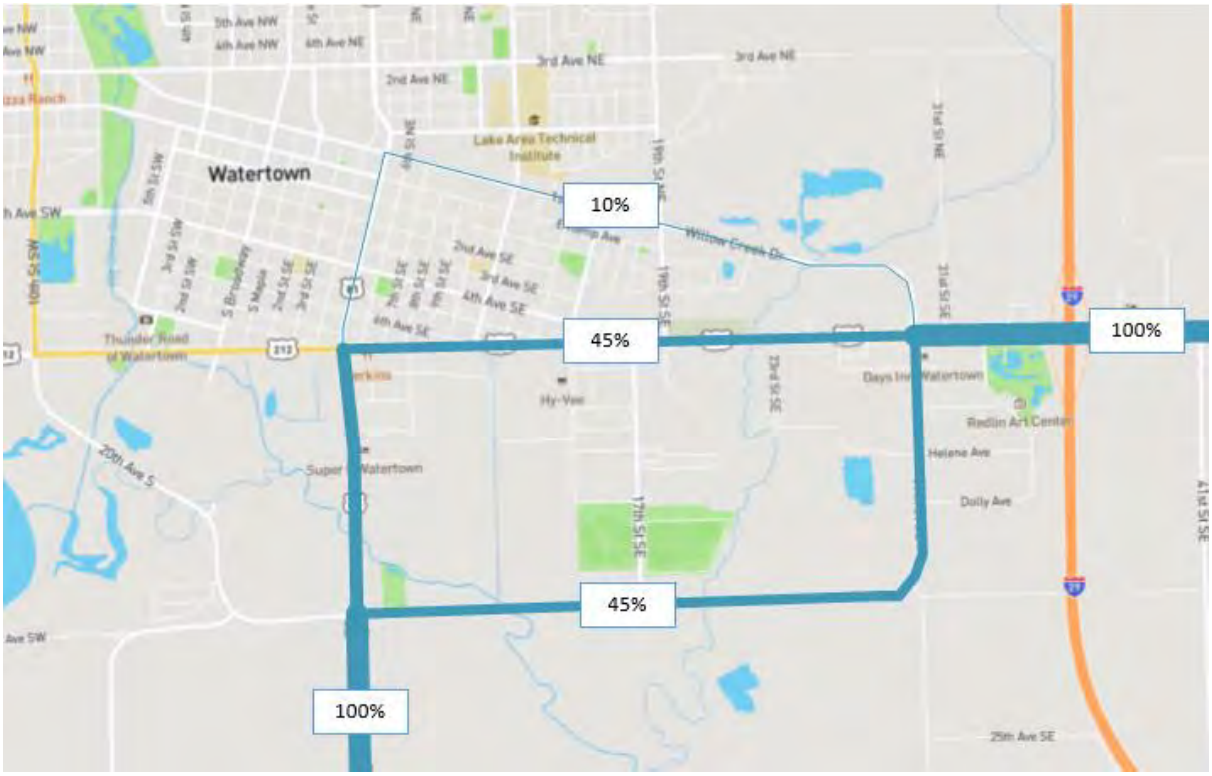
I-29 N External Station to Highway 212 W External Station



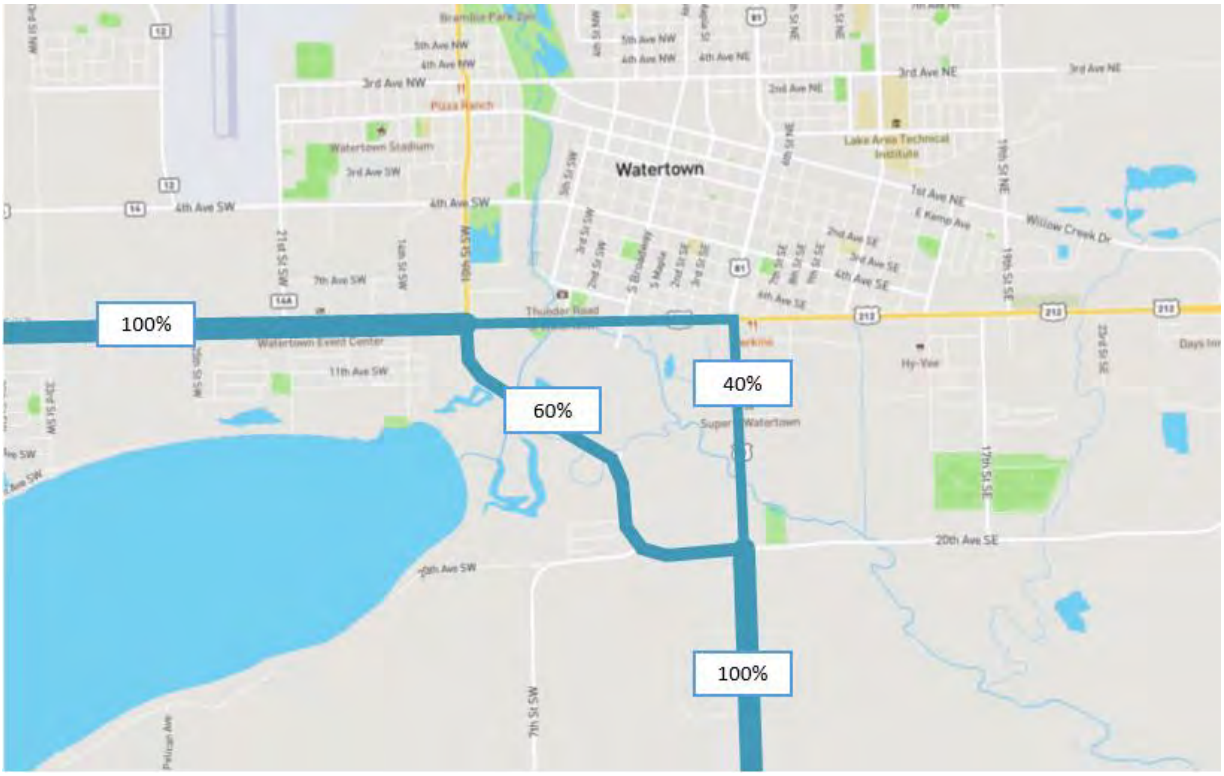
I-29 S External Station to Highway 212 W External Station



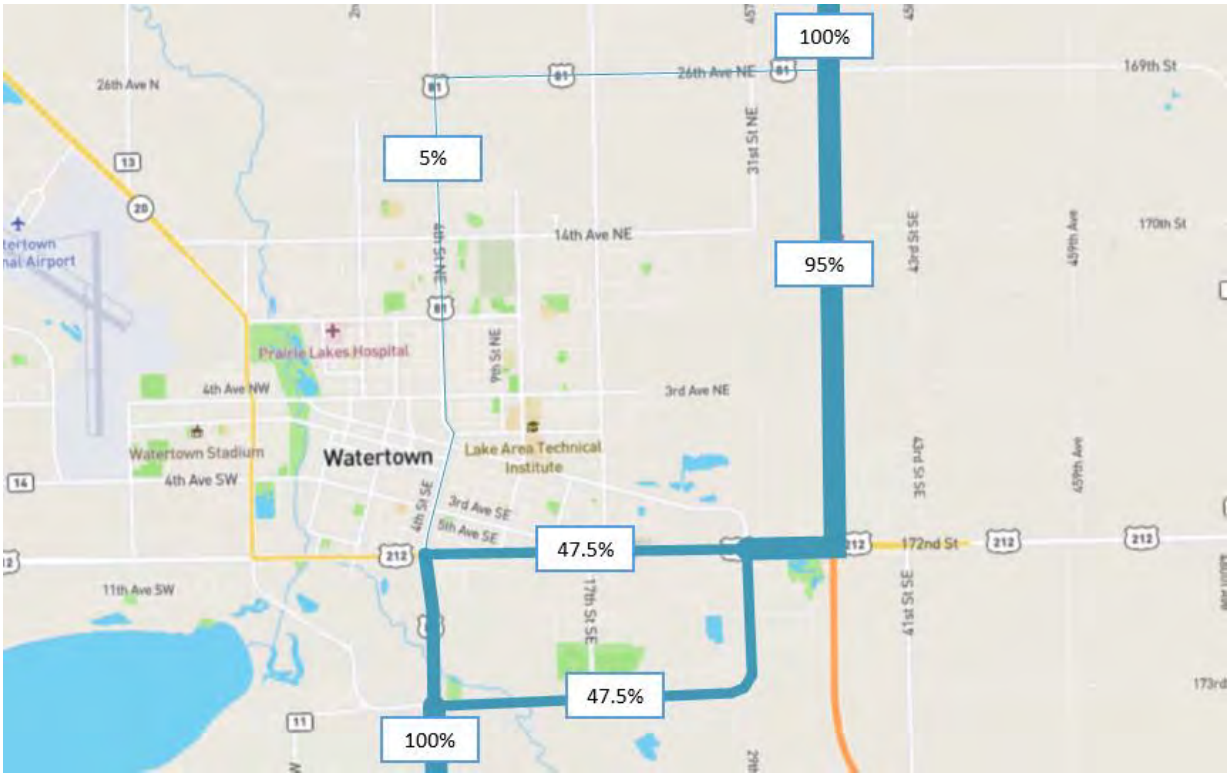
Highway 212 E External Station to Highway 81 External Station



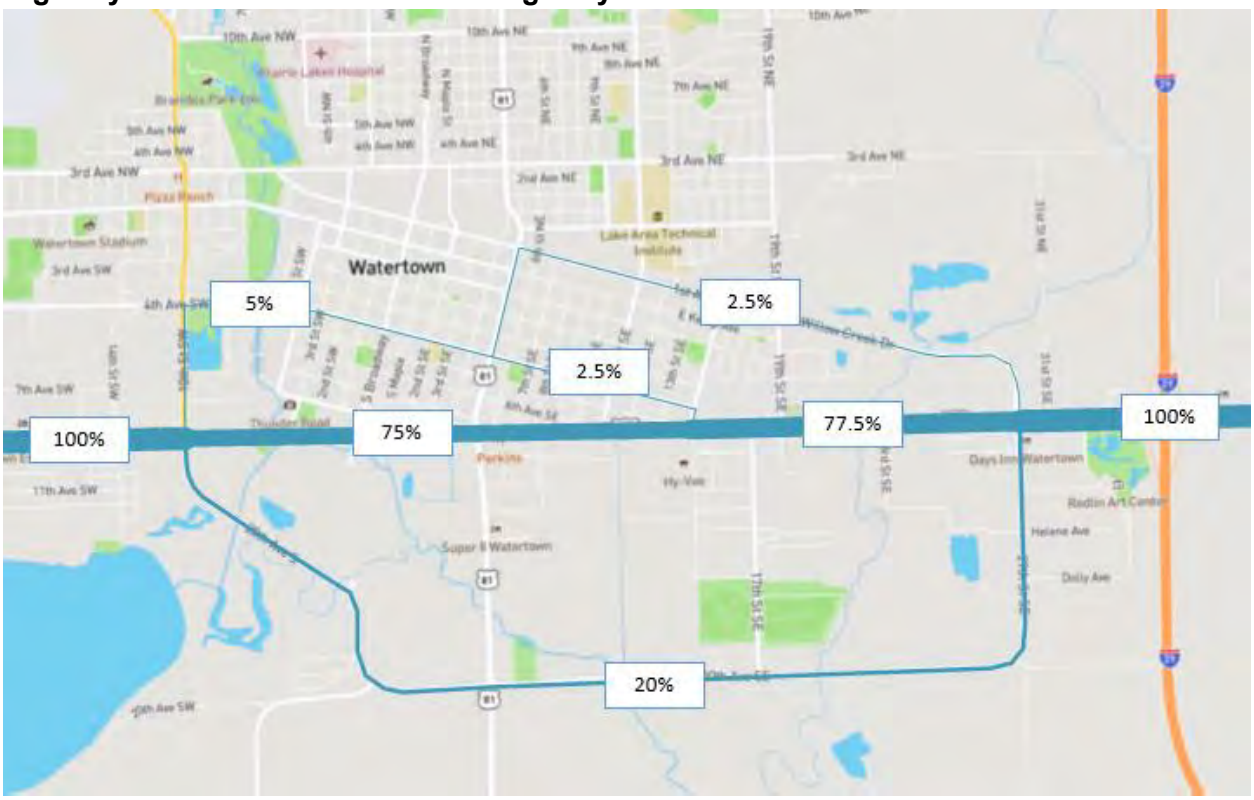
Highway 212 W External Station to Highway 81 S External Station



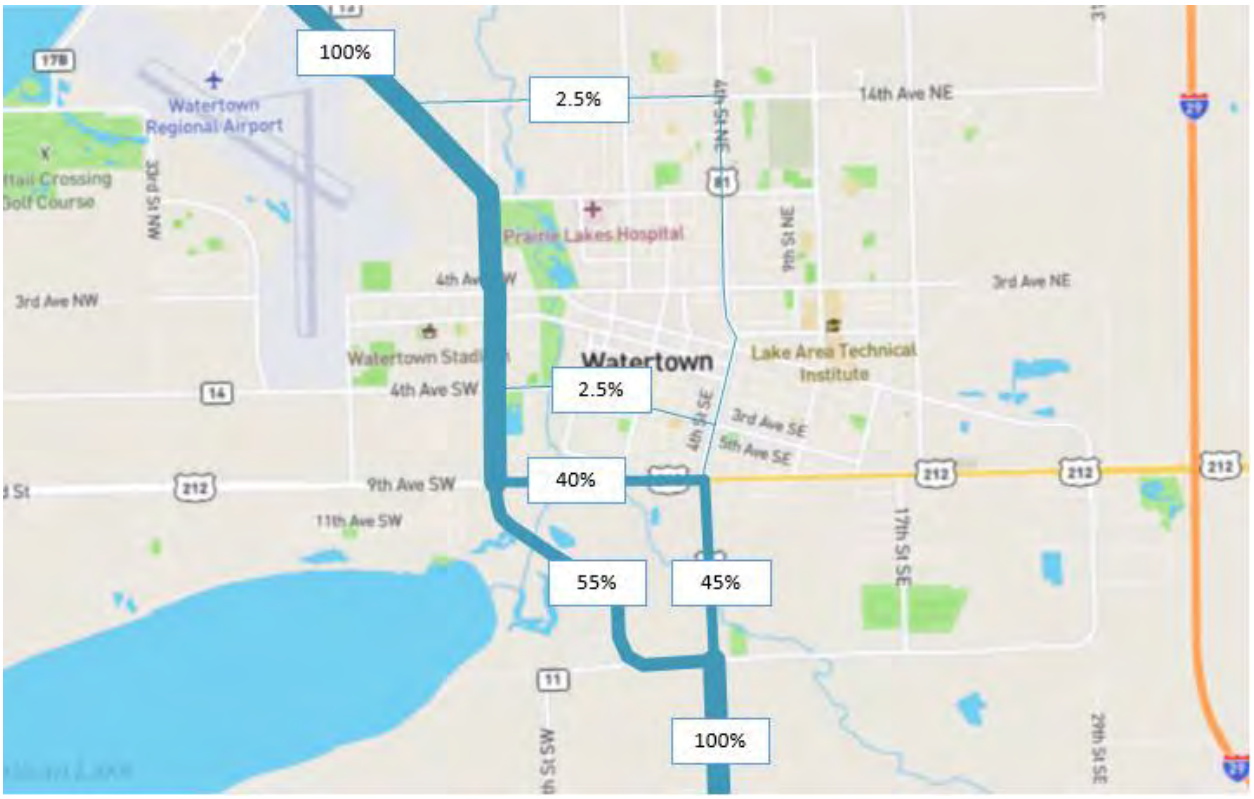
Highway 81 S External Station to I-29 North External Station



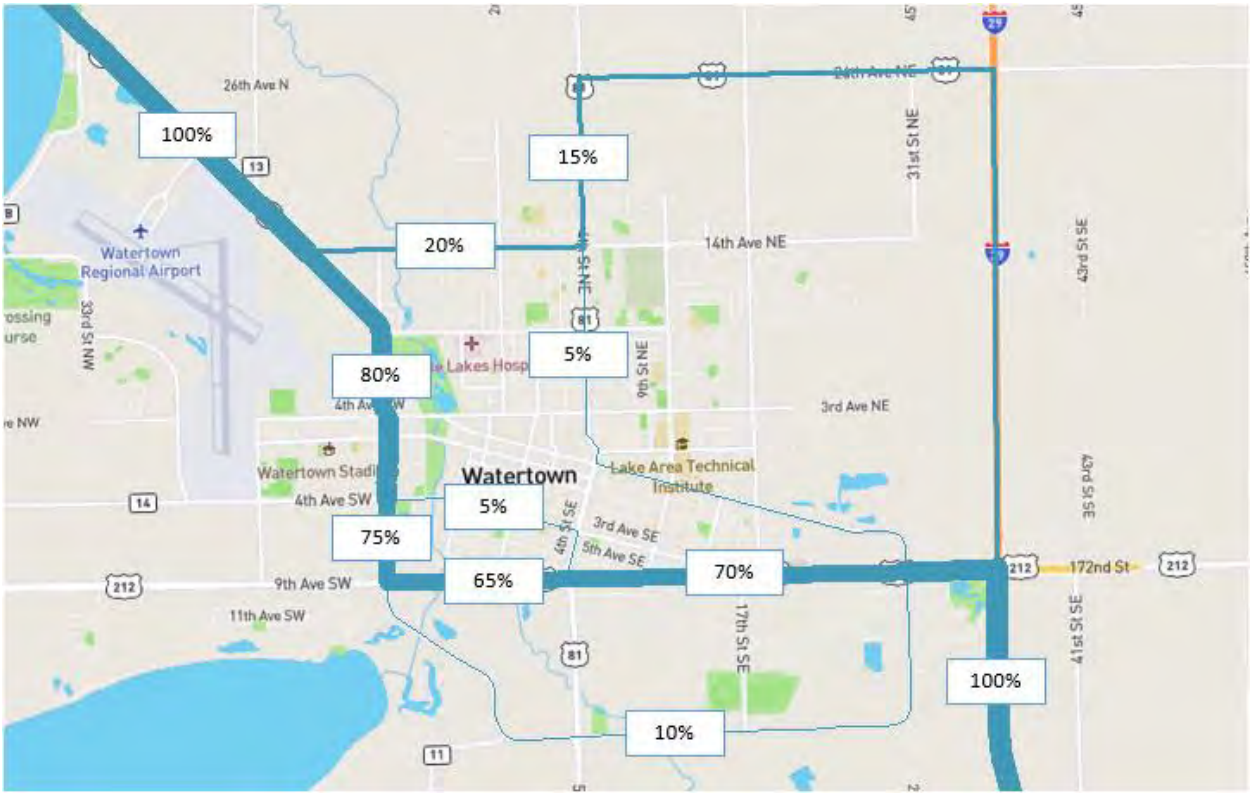
Highway 212 W External Station to Highway 212 E External Station



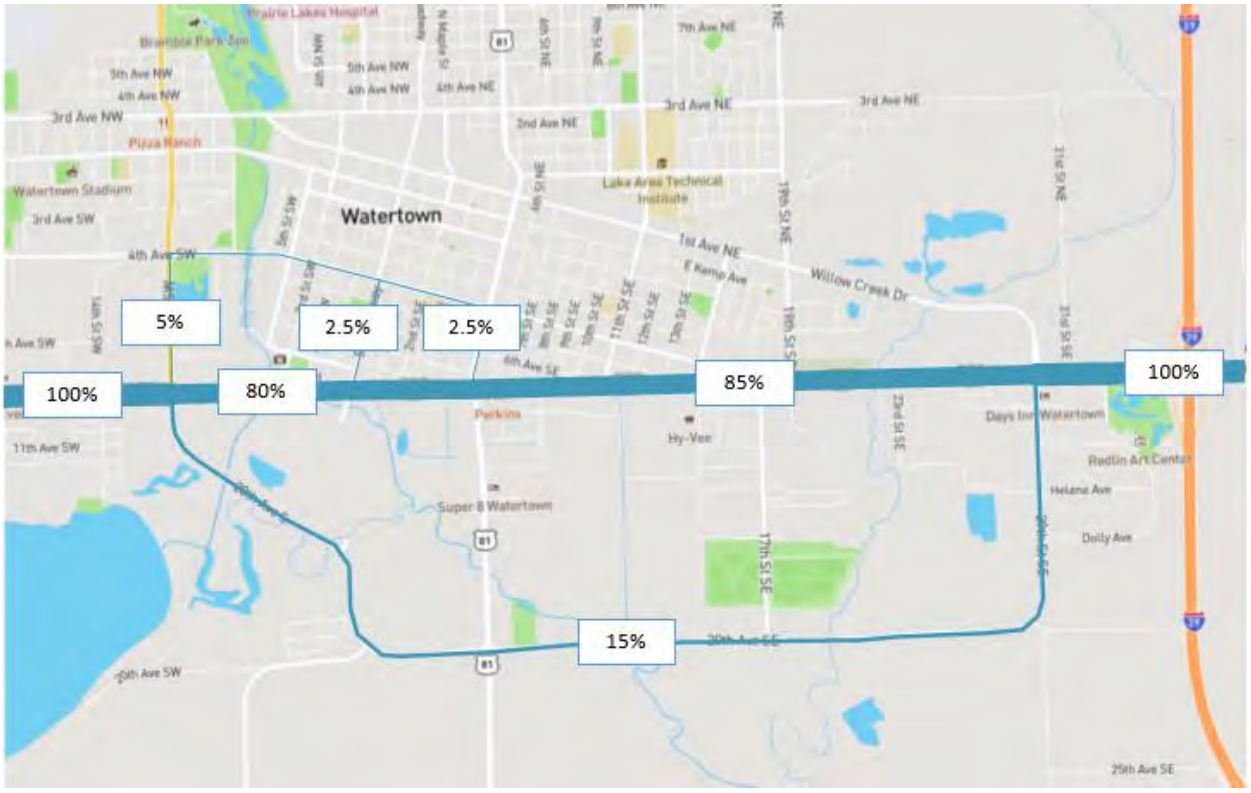
Highway 20 External Station to Highway 81 External Station



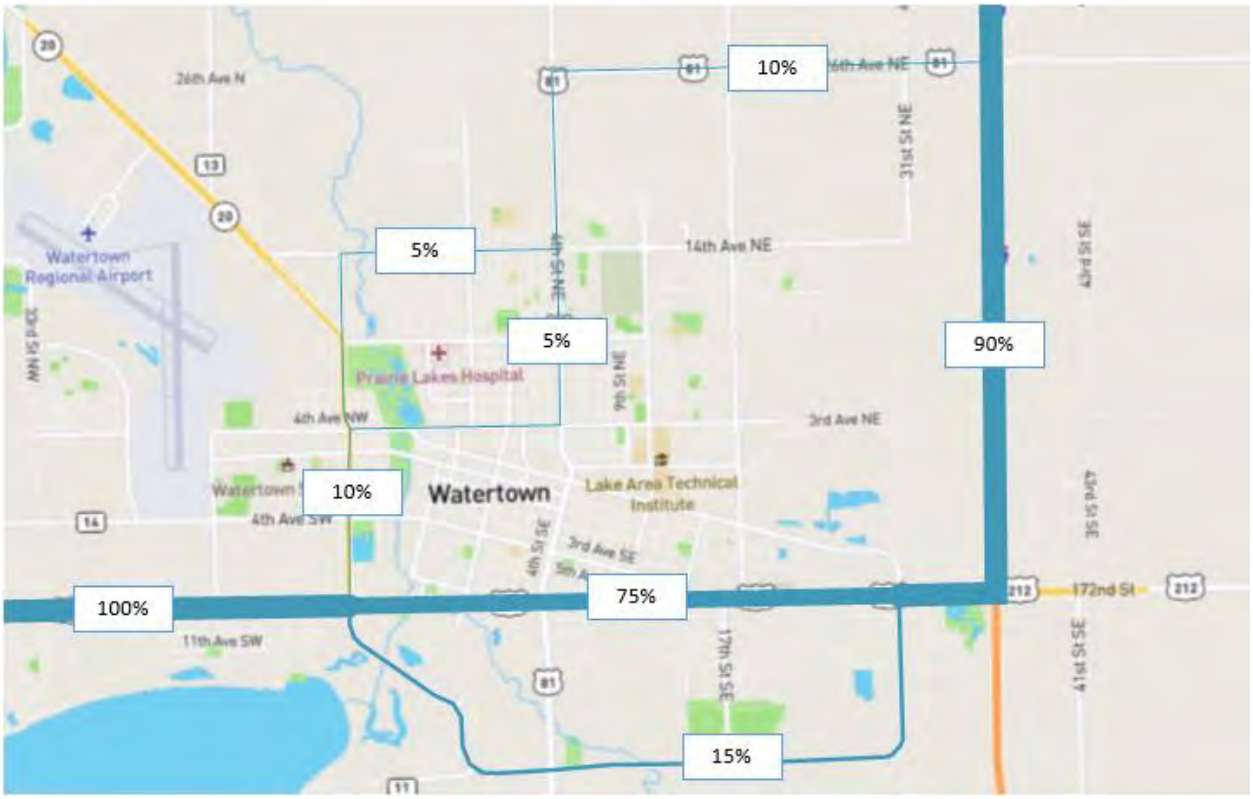
Highway 20 External Station to I-29 South External Station



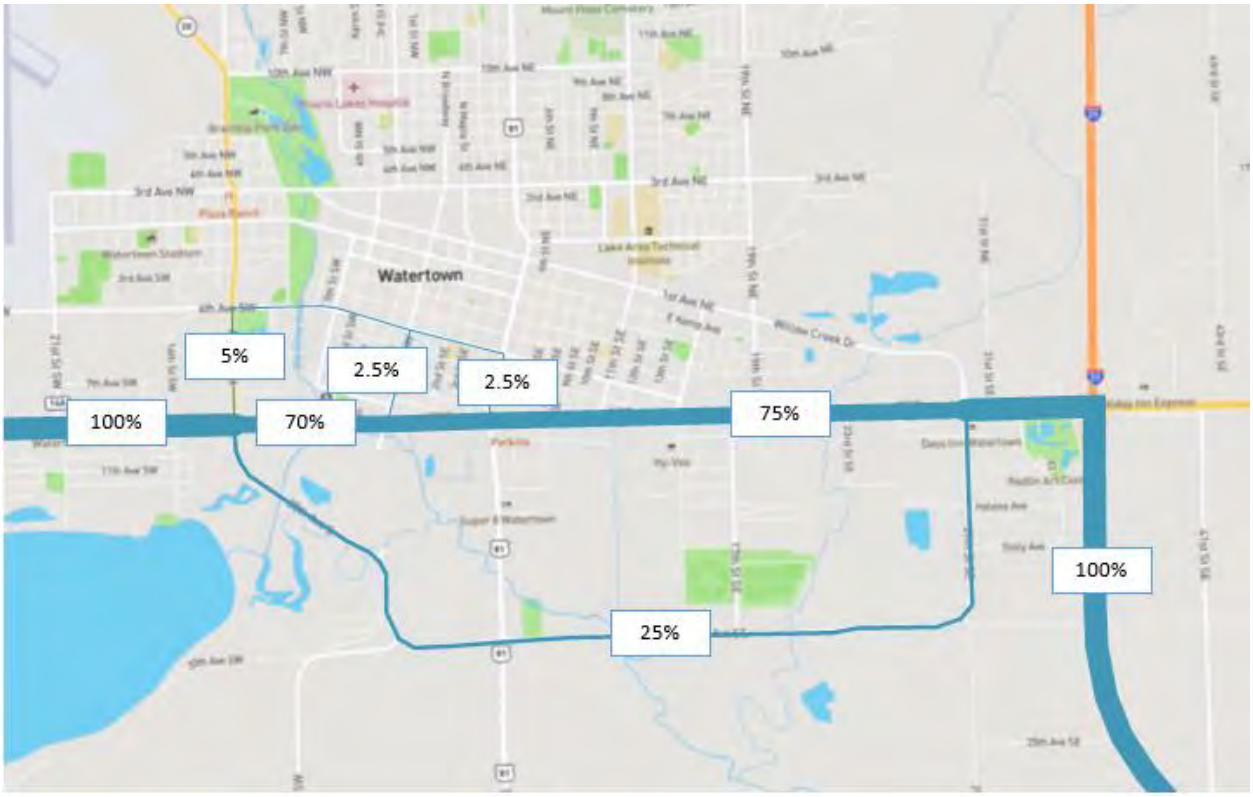
Highway 212 E External Station to Highway 212 W External Station



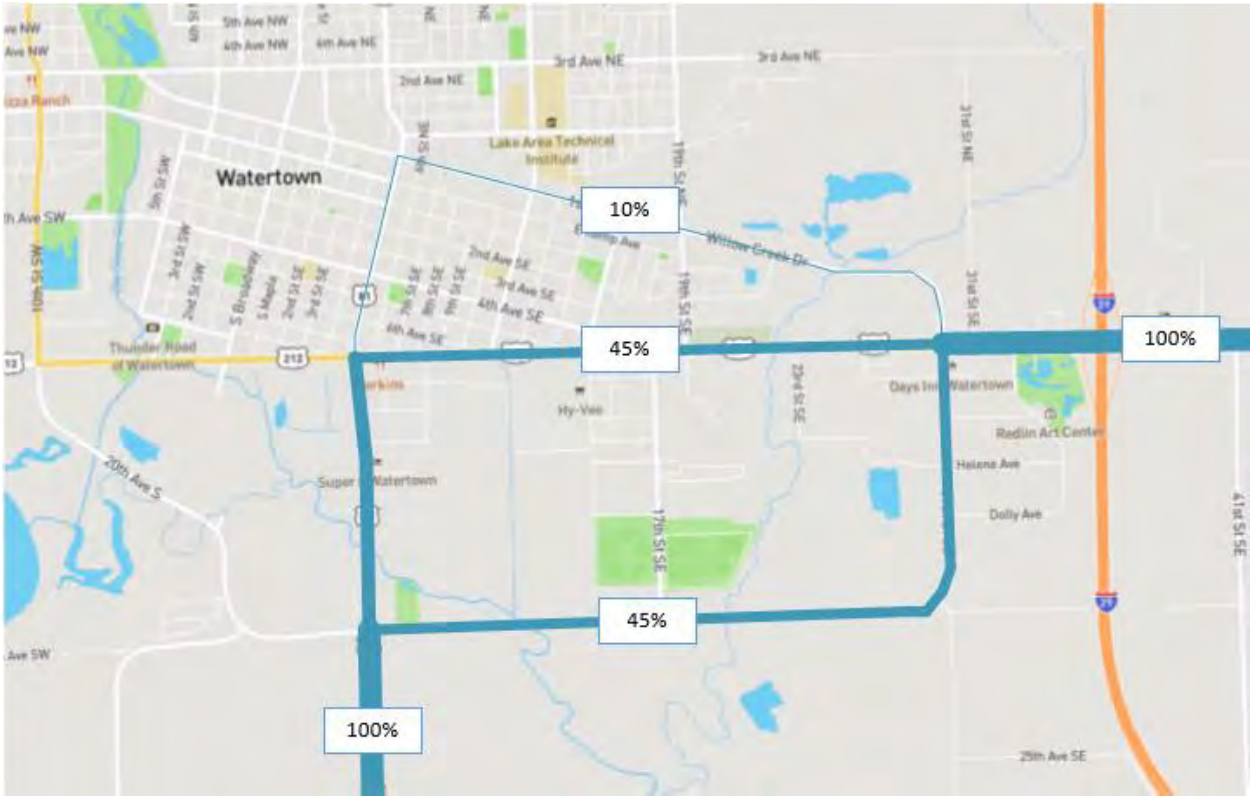
Highway 212 W External Station to I-29 N External Station



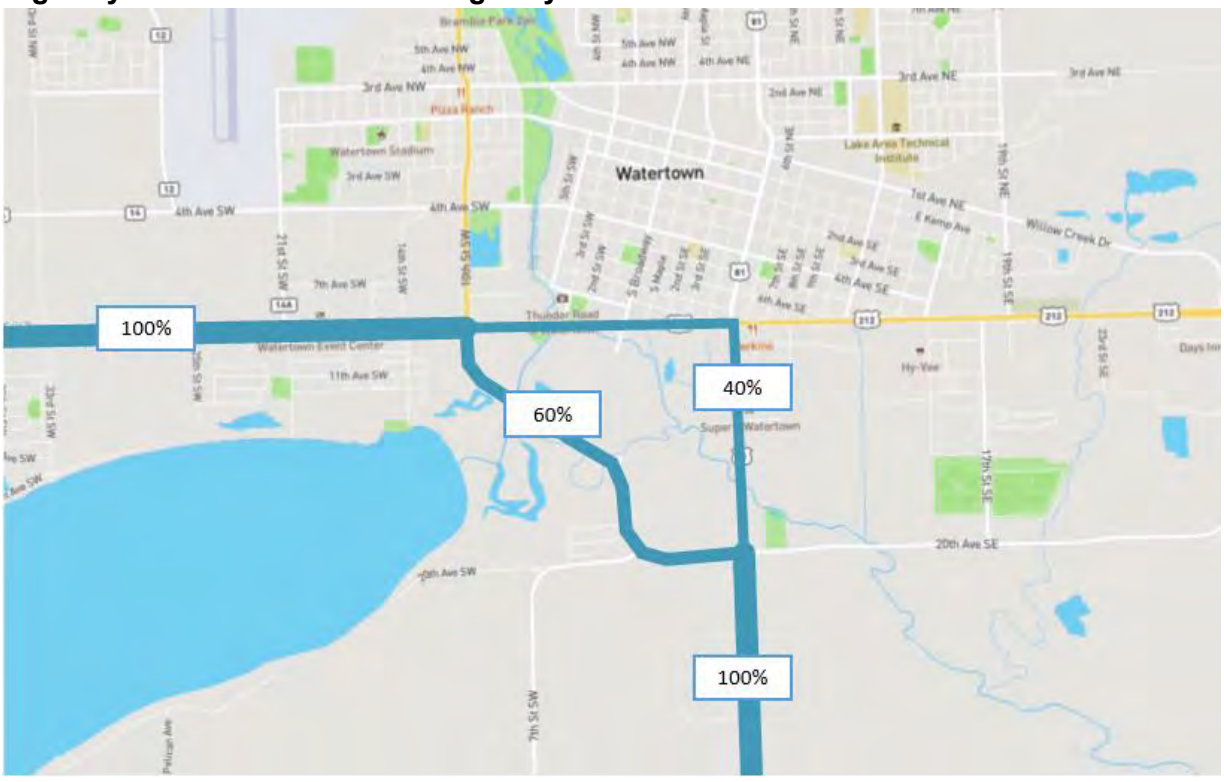
Highway 212 W External Station to I-29 S External Station



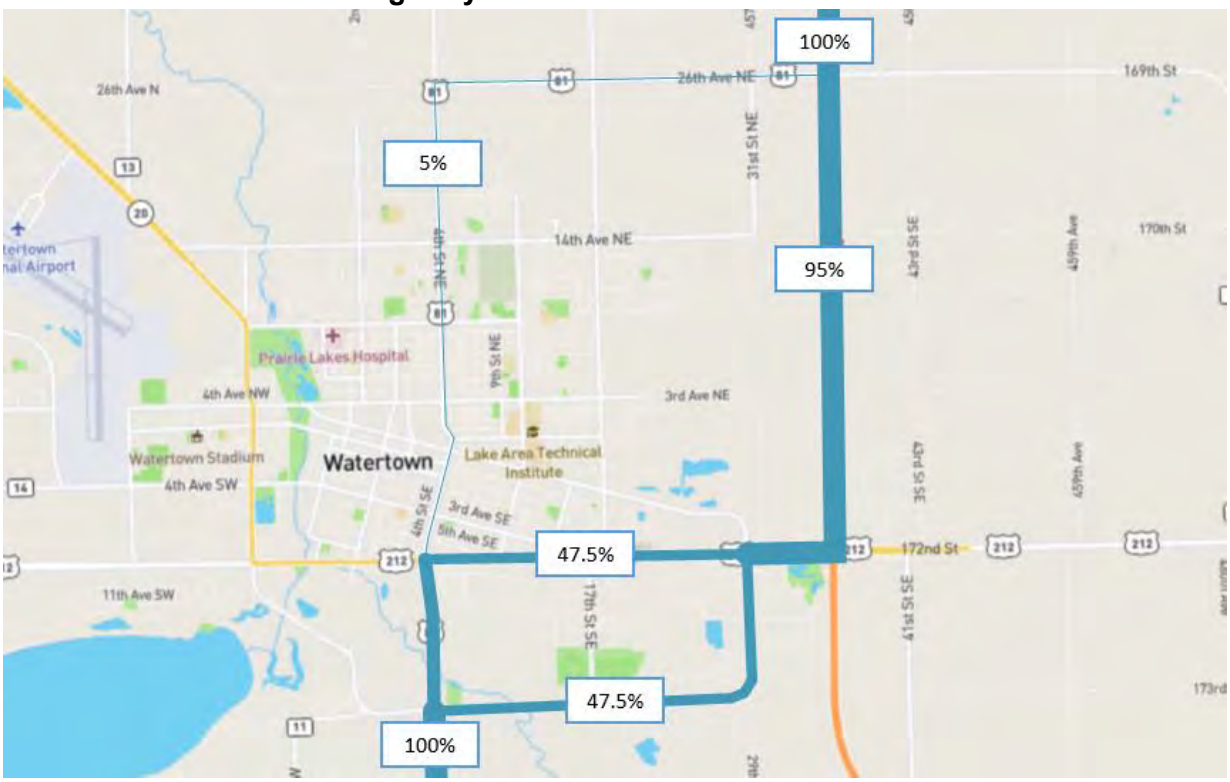
Highway 81 External Station to Highway 212 E External Station



Highway 81 External Station to Highway 212 W External Station



I-29 N External Station to Highway 81 External Station



Appendix B

Standards Development Analysis

Major Streets/Roadway Classification System

The existing roadway functional classification system was refined to meet specific needs for the City of Watertown and to correspond to the Federal Highway Administration (FHWA) functional classification system. The functional classification describes the type of service a road segment provides and is also used to determine federal funding eligibility. The owner of the roadway coordinates with the State to define the functional classification. The State then recommends the designation to FHWA for approval.

Currently, the City of Watertown has road functional classification designated in their 2020 Major Street Plan, however, these designations do not include all FHWA classifications or rural/urban location distinctions. The 2005 Watertown Master Transportation Plan functional classification map did designate roadways more closely to the FHWA system but again did not make rural/urban distinctions.

Roadway classifications within the study area were designated based on facility type, the Watertown 2020 Master Street Plan, and FHWA classifications defined in SDDOT GIS data. For both rural and urban areas, classifications were designated as follows:

- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local Road/Street

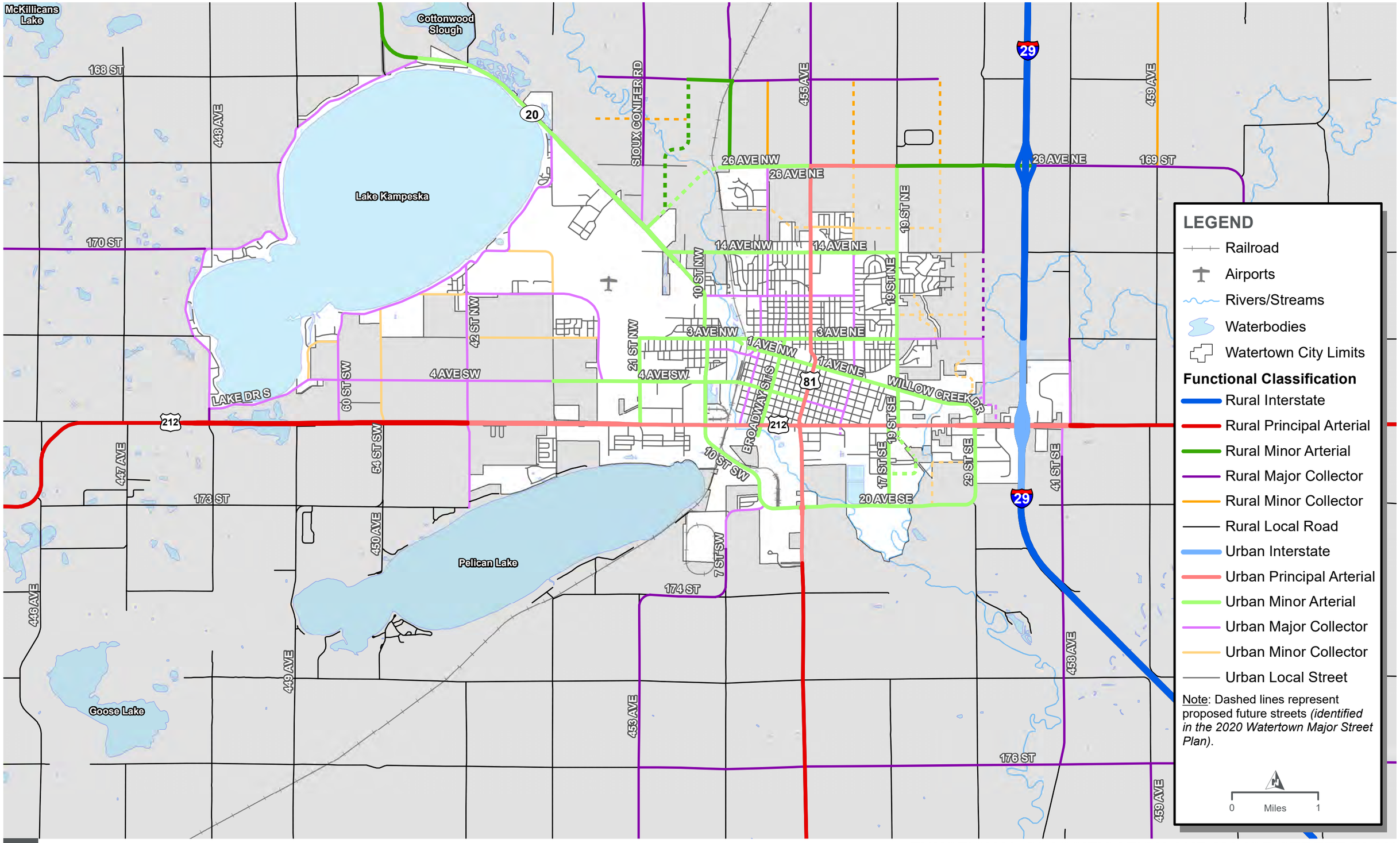
The US / State highways (Interstates and Principal Arterials) within the surrounding area of Watertown provide the greatest connectivity and highest level of mobility for a variety of users. These roadways include I-29, US81, and SD20. While these roadways provide a high level of mobility, minor arterials, collectors, and local roads are important for local access. **Figure 1** shows the current roadway functional classification.

Concurrently with functional classification, the Watertown 2020 Major Street Plan was reviewed and updated for a 20-year planning horizon. This review incorporated future major and minor collectors as well as planned roadway improvements. Planned improvements outlined in the 2020 Watertown Comprehensive Plan and US Highway 212 Phase II Traffic Impact Study include:

- **Northern Connector:** Complete a northern collector from SD20 to I-29 for cross-town traffic. Routes considered were a direct connection from 26th Avenue NW to SD20 and an indirect connection via 7th Street W, 38th Avenue N, and new roadway to SD20. The proposed indirect route would not require a second railroad crossing.
- **11th Street SE:** Extend 11th Street SE south of the US212/11th Street SE intersection to 10th Avenue SE.
- **14th Street SE:** Reconfigure corridor at the north leg of the US212/14th Street SE intersection to better align with the south leg.

- **17th Street SE:**
  - Remove access to US212 in order to limit potential conflict points.
  - Extend 10th Avenue SE east to 19th Street SE.
  - Consider a possible extension from 19th Street SE that would connect 17th Street SE via a new road on the northern edge of the Anza Soccer Complex.
- **19th Street SE:** Remove frontage road access near US212/19th Street SE intersection to improve access spacing and reduce conflict points.

The updated Major Street Plan is also shown in **Figure 1**. Dashed lines indicate proposed future minor arterials and major and minor collectors.



FUNCTIONAL CLASSIFICATION AND MAJOR STREET PLAN

Truck Route Network

The City of Watertown currently addresses Truck Routes in Section 19.1202 of the Revised Ordinances of the City of Watertown. As follows:

19.1202: TRUCK ROUTES

When deemed necessary for the safety or convenience of the public, the Mayor, pursuant to powers granted in Section 19.0501, shall have the authority to establish truck routes within this City and to prohibit truck traffic upon such streets as deemed necessary. The Mayor may, in his or her discretion, limit the size of trucks upon certain streets or ban such traffic completely. Such action of the Mayor shall be referred to the full Council for vote. (E-222-1) (Ord 16-21; Rev 12-30-16)

The primary truck routes through Watertown are on the State and National Highway System and include:

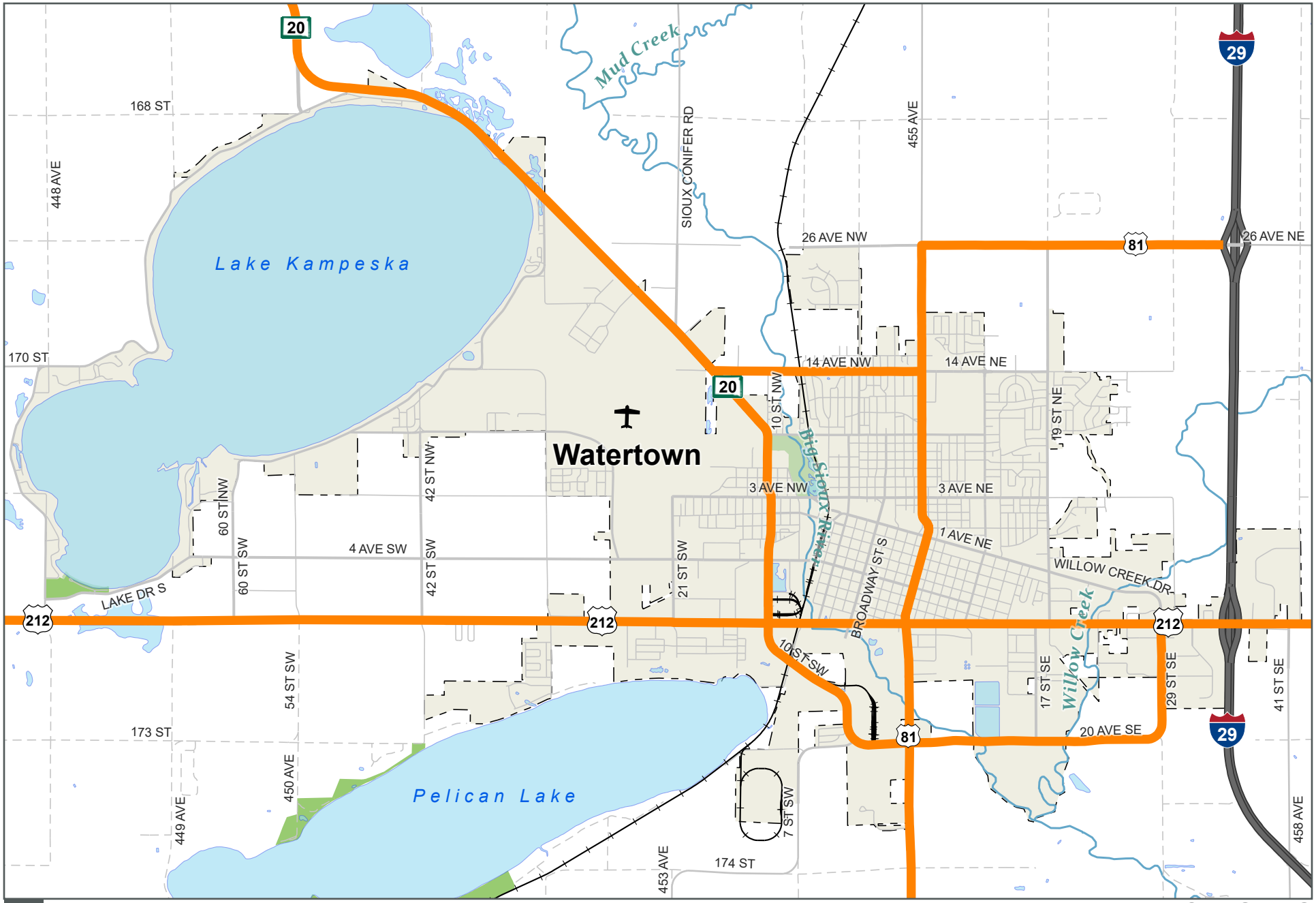
- Interstate 29
- US Highway 212
- US Highway 81
- SD Highway 20

At this time, the City of Watertown has designated the South By-Pass (20th Ave. S./SE) as a City Truck Route. City staff also noted that while not formally designated as a truck route, 14th Ave. NE/NW between US81 and SD20 is frequently used by truck traffic. This segment of road is a 2-lane section with shoulder bike route that traverses through a residential neighborhood from US81 west to 4th Street NW, before transitioning to a rural 2 lane section and to County jurisdiction prior to the intersection of SD20. No additional City routes have been identified as a truck route or seeing a significant amount of through truck traffic.

Typically, it is not preferred to have a through truck route traverse residential areas due to safety concerns as well as implications to the design of the road/pavement section. When designing local/collector streets, a significant amount of truck traffic is generally not anticipated and a lighter pavement section is generally provided. Should the route become more frequently used by trucks, the pavement section will likely degrade in condition prematurely due to the heavier traffic loadings.

The intersections on 14th Ave. NE/NW corridor between US81 and SD20, did not rank in the top 20 crash frequency or crash rate intersections nor have a fatal/incapacitating/non-capacitating injury crash in the past 5-year period. City staff indicated the pavement section along this route was 4” of asphalt pavement with 11” of aggregate base course. Although currently not formally designated as a truck route and no known concerns with regard to truck traffic being raised, this corridor should be monitored and re-evaluated if safety issues and/or pavement condition become a concern. Ultimately, as the roadway network continues to expand, a northwest truck by-pass from I-29/US81 to SD20 could be considered.

The current truck route ordinance could be modified to define a truck Gross Vehicle Weight Rating should the use of local/collector network streets become an issue. The ordinance could include an official Truck Route map depicting the primary truck routes through Watertown using specific/identified routes on the Urban Minor Arterial network. Stipulations for local delivery trucks could also be required for delivery to a destination point and back to a designated truck route using the most direct route.



TRUCK ROUTES

FIGURE 2

WATERTOWN MASTER TRANSPORTATION PLAN - STANDARDS DEVELOPMENT MEMO

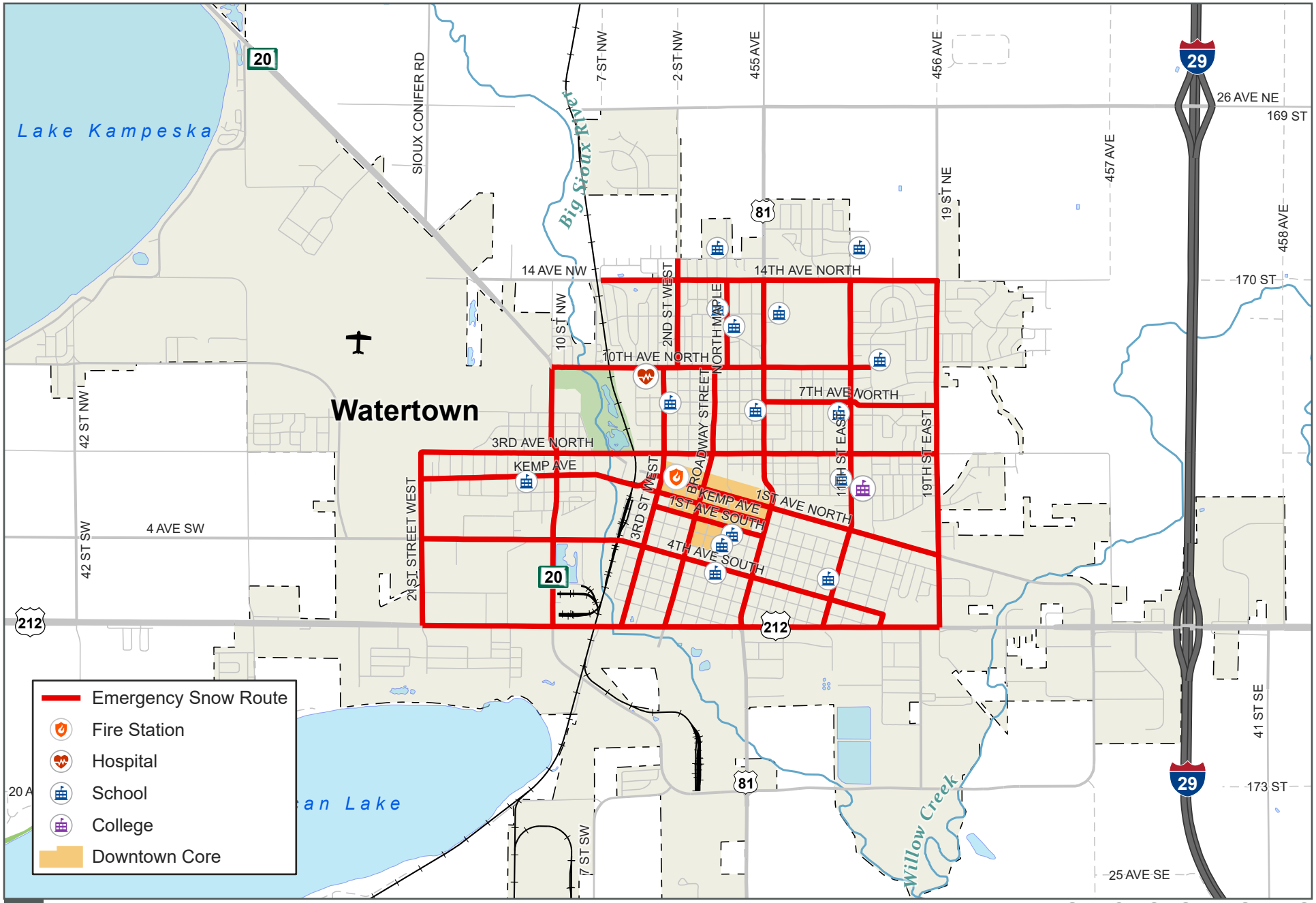
Emergency/Hospital Routes

The City of Watertown has developed a network of Emergency Snow Routes to provide access to critical facilities and infrastructure during adverse winter weather conditions. The signed emergency snow routes span west to east from 21st Street West to 19th Street East and north to south from 14th Avenue North to US212, serving the urban core. During winter events with more that 2" of snow accumulation, parking is prohibited on the routes to provide the space necessary to ensure access to critical infrastructure and services. One item of consideration is there are currently no grade separated railroad crossings within Watertown. The Fire Station and Hospital are both located east of the railroad. The following figure depicts Watertown's current Emergency/Snow Routes.

The established priorities for snow removal are as follows:

1. Highway US212, US81 and SD20
2. Emergency Snow Routes
3. Schools and Hospitals
4. Uptown business core
5. Police, Fire, and Rescue calls which need assistance, which may become priority #1
6. All other streets by efficiency of routes as determined by the Street Department

It is recommended as the street network continues to expand and the urban minor arterial and urban major collector grid is further developed, Emergency Snow Routes should be amended/extended to include the new road facilities which provide access to critical services. The future urban minor arterials/major collectors identified on the Major Street Plan would be the first routes to consider when reviewing additional Emergency Snow Routes.



EMERGENCY SNOW ROUTES

FIGURE 3

WATERTOWN MASTER TRANSPORTATION PLAN - STANDARDS DEVELOPMENT MEMO

Pavement Maintenance/Rehabilitation

The City of Watertown completed a Pavement Management Analysis Study in May of 2017 to analyze the pavement condition of approximately 155 miles of pavement within the City and make recommendations to guide pavement rehabilitation and maintenance for the immediate future. The 2017 study estimated the City has $138 million invested in the paved roadway network making it a high priority asset for the community.

As funding levels become stressed, it is more imperative to maximize the dollars allocated to street maintenance and rehabilitation and extend the life of the asset. Pavement management is a comprehensive cyclical program which includes evaluating, planning, budgeting, designing, constructing/rehabilitating, and monitoring. While it may be counterintuitive to fund repairs on streets that are generally good condition, repairs or rejuvenation on these streets will cost less over the lifetime of the asset versus streets that have deteriorated to a poor condition and require intensive rehabilitation or complete reconstruction. Pavement deterioration accelerates rapidly once the pavement hits a tipping point where age and environmental factors converge. A graph to demonstrate this principal is shown below.

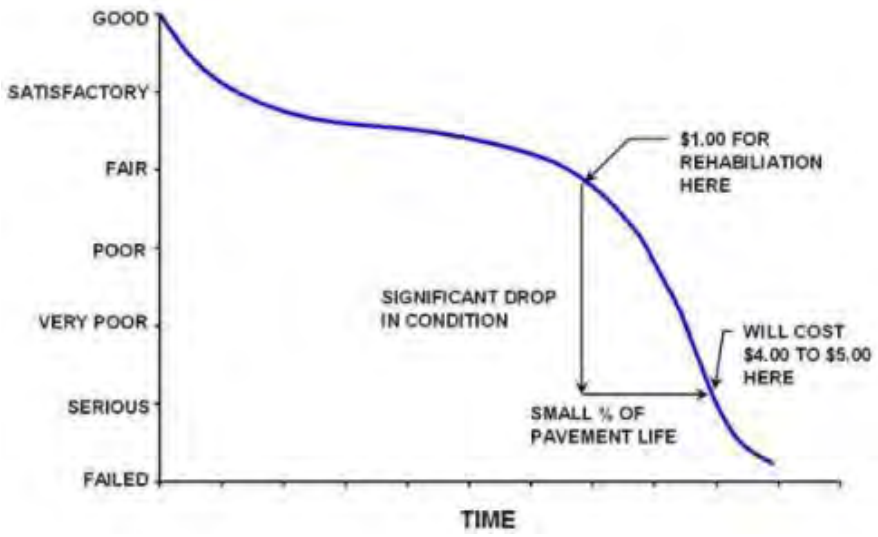


Figure 4: Typical Pavement Condition Life Cycle[1]

A successful pavement management program follows policies and practices which delay the total reconstruction of a pavement section as long as possible while remaining in the cost effective zone for rejuvenation/rehabilitation. The ultimate goal of a pavement management program is to keep the overall road network at the targeted pavement condition level through strategic maintenance and rehabilitation which will ultimately optimize funding and spend the dollars where they are most impactful. The graph in **Figure 5** below depicts how targeted pavement preservation techniques can extend the life of the asset.

[1] Airport Pavement Management Program (PMP) Advisory Circular (U.S. Department of Transportation), 2014. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-7B.pdf

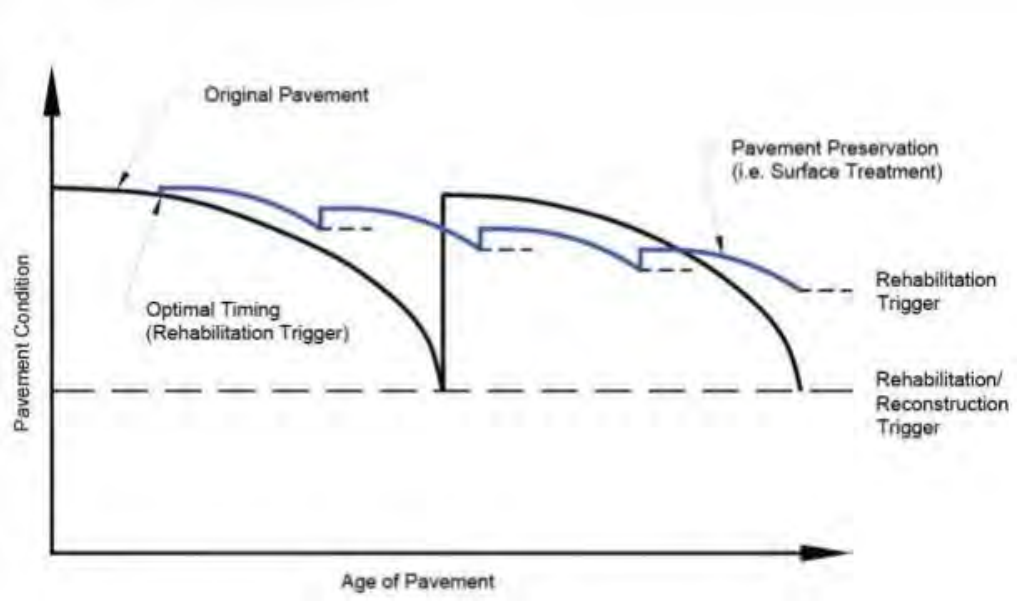


Figure 5: Pavement Preservation Concept[1]

As part of the 2017 Pavement Management Analysis Study, approximately 155 miles of pavement was field surveyed and assigned a Pavement Condition Index (PCI) score based upon the findings in the field and categorized with a descriptive rating. **Table 1** below describes the rating system used to classify pavement condition as part of the study.

Table 1: Pavement Condition Index (PCI) Rating System[2]

PCI Range	Description	Relative Remaining Life	Definition
85 – 100	Excellent	15 to 25 Years	Like new condition – little to no maintenance required when new; routine maintenance such as crack and joint sealing.
70 – 85	Very Good	12 to 20 Years	Routine maintenance such as patching and crack sealing with surface treatments such as seal coats or slurries.
60 – 70	Good	10 to 15 Years	Heavier surface treatments and thin overlays. Localized panel replacements.
40 – 60	Fair to Marginal	7 to 12 Years	Heavy surface-based inlays or overlays with localized repairs. Moderate to extensive panel replacements.
25 – 40	Poor	5 to 10 Years	Sections will require very thick overlays, surface replacement, base reconstruction, and possible subgrade stabilization.
0 – 25	Very Poor	0 to 5 Years	High percentage of full reconstruction.

The PCI rating for a street segment can help determine the type of rejuvenation or rehabilitation required to restore the pavement to a better condition. The PCI scale ranges from 0 (worst) to 100 (best) condition. **The overall results of the 2017 analysis found the average PCI of the roadway network in Watertown to be 61, or at the lower end of the "good" classification.** The 2017 study also noted that for other agencies surveyed by the study contractor, most overall network average ratings for other communities they have surveyed fell in the 60 to 65 range.

[1] Airport Pavement Management Program (PMP) Advisory Circular (U.S. Department of Transportation), 2014. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-7B.pdf

[2] Pavement Management Analysis Report (City of Watertown, SD), May 2017.

Additionally, “backlog” or streets that have dropped to a point where partial or total reconstruction is necessary was identified. The backlog is typically expressed as a percentage of the roads requiring reconstruction as compared to the network total. The 2017 study found a backlog of 4%, which will be hard to maintain from a funding standpoint due to the fact there is a fair amount of streets which are about to hit the tipping point and will require a higher level of more costly rehabilitation. In order to keep funding manageable, a targeted backlog of 10% to 15% would be desired.

The 2017 study reviewed several budget scenarios and identified funding levels to achieve different overall PCI ratings and associated backlog. Ultimately, a pavement maintenance program with an annual funding level of $2.4M was identified which calculated the PCI to improve to 63 and maintain a backlog controlled at the 15% threshold. The plan also identified a 5 year rehabilitation plan by street segment/year.

Based upon discussions with the City during this study, the City has funded annual pavement maintenance in the $2.4M range as per the recommendations of the prior study. The City currently is funding pavement maintenance in several annual projects as follows:

- Schedule A: $1M – large mill and overlay project
- Schedule B: $.5M – neighborhood reconstruct/mill/overlay
- Schedule C: $.5M – neighborhood reconstruct/mill/overlay
- Crack sealing/fog sealing: $.4M – various streets
- Large patching project/miscellaneous concrete repairs: $.15M – various streets

Figure 6 and **Figure 7** show an example of a typical yearly pavement management projects (year 2020) for the City are provided for reference for pavement milling and overlays as well as seal coating/chip seals.

As the City has generally followed the $2.4M annual pavement maintenance funding appropriation and is in year 4 of 5 following the implementation of the 5-year identified plan/funding, it is recommended to complete year 5 of the program and consider a follow-up PCI study in 2023 or 2024. A follow-up PCI study will determine if the targeted funding allocation and program is resulting in the overall PCI increasing to an average of 63 and keeping a backlog of less than 15%, thus achieving the goals/strategy of the 5-year plan and providing measurable data to justify continuance of the program.

Figure 6: 2020 PMS A Milling & AC Mat Construction Map

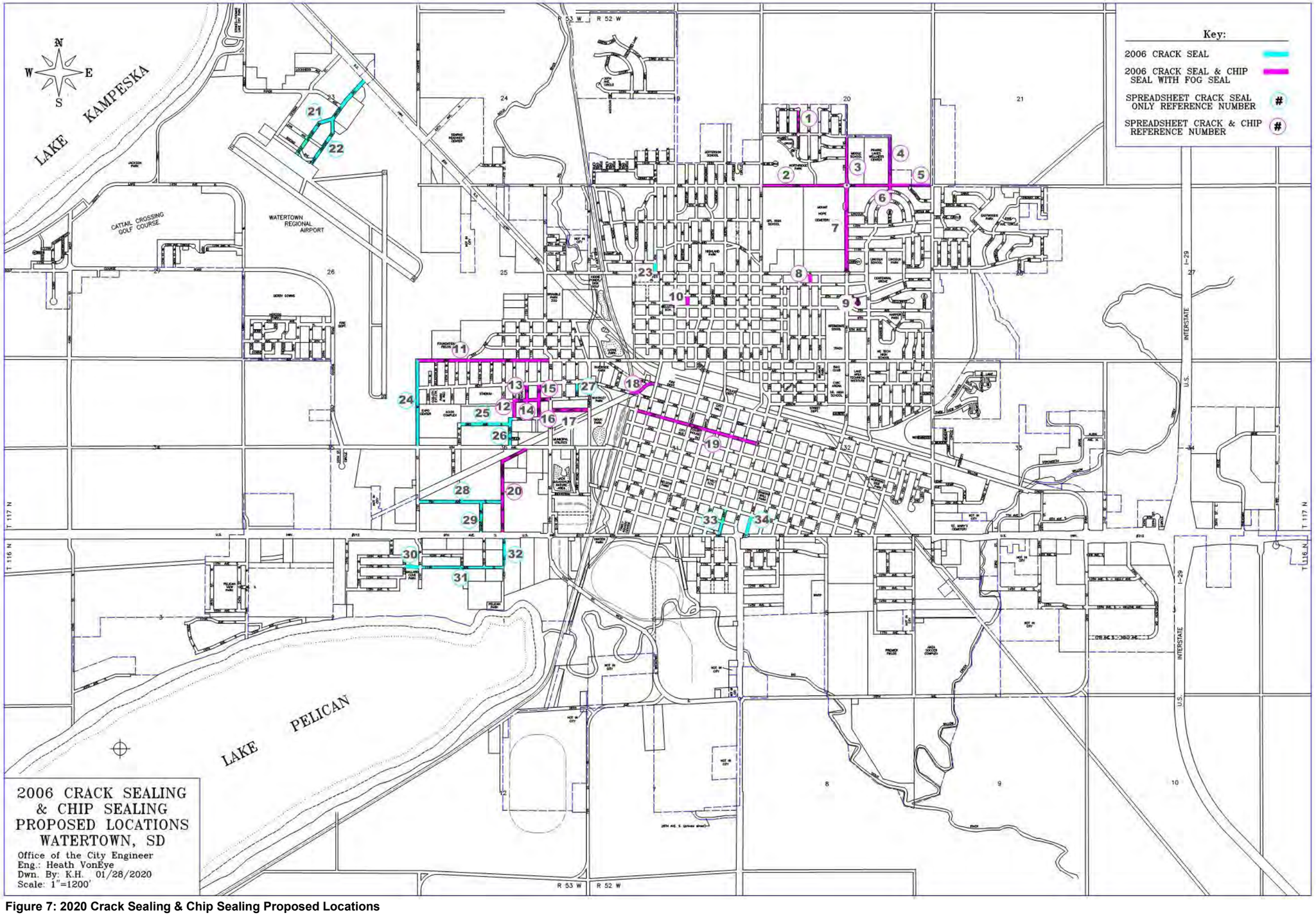


Figure 7: 2020 Crack Sealing & Chip Sealing Proposed Locations

Design Standards/Development Coordination

The City of Watertown adopted the City of Watertown Engineering Design Standards for Public Improvements on March 16, 2020. These standards apply to all public improvements within the incorporated area of the City of Watertown except where superseded by federal or state requirements. The Design Standards apply to transportation related improvements and infrastructure, which are highlighted in Chapter 5, Street Access and Parking Lot Criteria and Chapter 8, Street Design and Pavement Thickness. A review of each segment of the transportation related standards for Watertown follows.

Chapter 5 - Street Access and Parking Lot Criteria

Section 5.1 Traffic Studies, defines the development parameters when a Traffic Impact Study is necessary for proposed development. Unless waived by the City Engineer, a Traffic Impact Study is required when a proposed development will generate in excess of 100 peak hour trips or residential development is proposed with 150 or more dwelling units. These thresholds are generally in line with development intensities requiring traffic impact studies/analysis for most municipalities and other state agencies.

Section 5.1 also identifies the requirements for Traffic Impact Study Report format and general content. The defined requirements are thorough and address development site specifics, background traffic, trip generation, trip distribution, trip assignment, capacity analysis, traffic signals, Level of Service (LOS) goals, traffic accidents and recommendations.

Items for consideration to potentially include in a future update to this section would be to add sub-sections for:

> *Access Points – a new section would describe the proposed new or revised access and need. Review and evaluate the proposed access in accordance with access spacing and design criteria as well as a review of needs/warrants for turning lanes.*
>
> *Multimodal/Bike/Pedestrian – a new section to discuss the development impact to, and accommodations for, pedestrian and bicycle access related to the proposed project. This would address any improvements or needed connections from the development to the network as well as any improvements internal to the development.*

Section 5.2 Access Control, provides provisions for accessing the street network for new and re-developing areas. Access management is the process of providing a safe and efficient means of getting on and off streets and highways. Access Management has been proven in many cases to reduce congestion and allow for the flow of traffic in and out of business locations. This in turn improves property value and in most cases the value of the business. The design of appropriately spaced access locations and reduction in conflict points are also aspects of Access Management that greatly improve the safety of street networks.

Access control requirements in Watertown have been developed for each street classification. Arterial and Collector streets have the most stringent access requirements. They are primarily designed to move traffic and providing access is a secondary priority, where as local streets are

intended to provide access to adjacent property. Table 5.1 and Figure 5.1 of the Design Standards provides the access control criteria which address the location and design of accesses. Additional requirements for the number of access openings on a parcel, surfacing, signage, rural streets, and mutual accesses are also provided.

The access control requirements appear to be in general conformance with other municipalities within the region for municipally operated streets. For accesses on US212, US81, and SD20 Chapter 17 of the South Dakota Department of Transportation Road Design manual should be used when reviewing accesses on these state highway corridors.

Section 5.3 Access Design, provides criteria for intersection sight distance, allowable driveway design grades and pavement thickness requirements, as well as standard configurations for access treatments and controls. The access design requirements also appear to be in general conformance with other municipalities within the region.

Section 5.4 Off-Street Parking Area, specifies the design guidelines for off-street parking lots within the City including minimum parking stall widths, aisle widths and configurations, and backing prohibitions. The provisions outlining the minimum number of off-street parking spaces is provided in the City's Zoning Ordinance - Chapter 21.63 of the Revised Ordinances – City of Watertown, South Dakota. The Zoning Ordinance and the Design Standards complement each other with regard to parking criteria and adequately address all necessary parking criteria.

Chapter 8 – Street Design and Pavement Thickness

Chapter 8 of the Watertown Design Standards addresses several components of street design including:

- Access Management
- Roadway Design and Technical Criteria
- Sidewalks
- Bicycle Paths
- Drainage
- Horizontal Alignment
- Vertical Alignment
- Off-Site Design
- Construction Traffic Control
- Speed Change Lanes
- Pavement Thickness
- Rural Urban Street Standards
- Rural Subdivision Road Standards

The Design Standards identify specific criteria for street design based upon street functional classification, including traffic volumes, design speeds, right-of-way widths, number of driving lanes, roadway widths, sidewalk requirements, minimum-maximum longitudinal grades, curve

radii, horizontal curve radius, and grades at intersections. The City has also identified Typical Street cross sections for each street classification as shown in **Figure 8**.

Figure 8.1: Typical Arterial Street Section

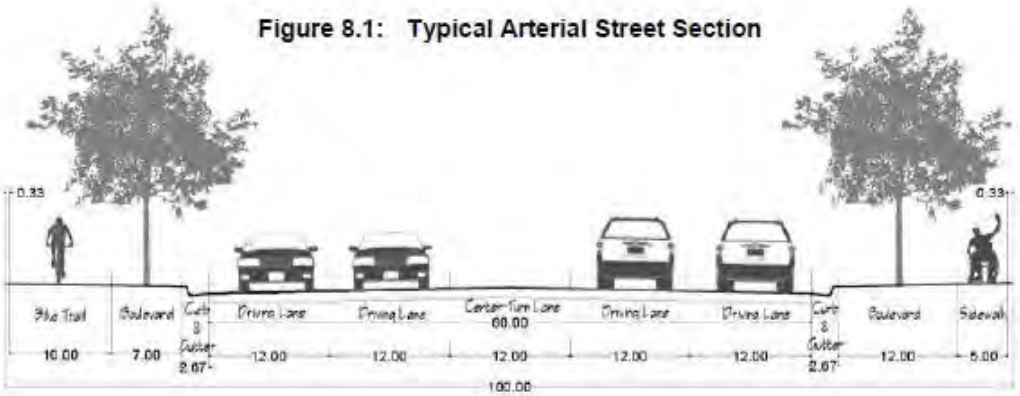


Figure 8.2: Typical Collector Street Section

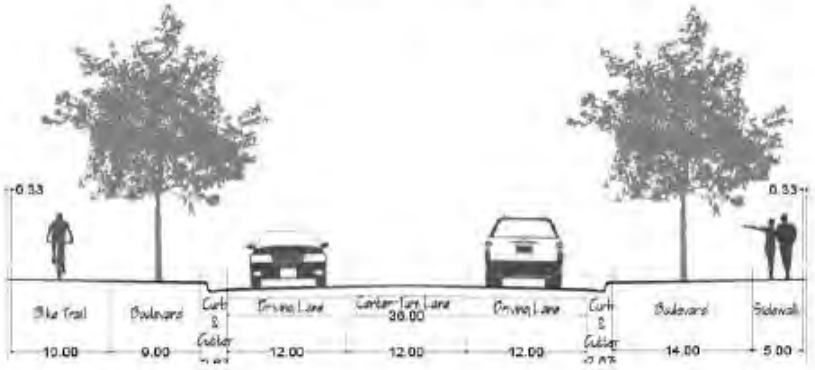


Figure 8.3: Typical Local Residential Street Section

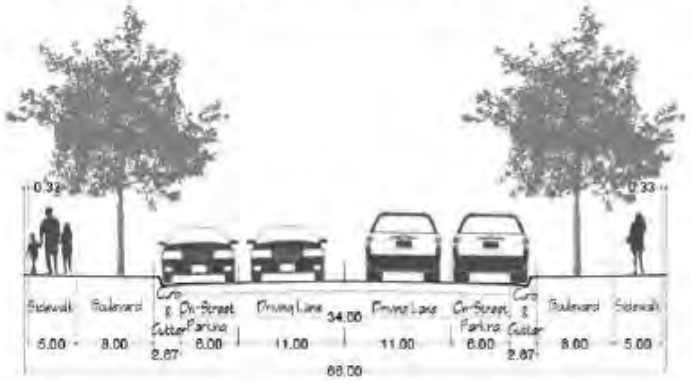


Figure 8: Typical Street Cross-Sections Based on Classification[3]

[3] Engineering Design Standards for Public Improvements (City of Watertown), March 2016.

The design criteria for streets are comprehensive, thorough, and reference appropriate industry standard documents for roadway design. After a review of the street design standards sections the following are recommendations for consideration for future updates:

- Section 8.2.3.6 (H) – update right-of-way requirement for Local Streets to 66' to correspond with typical section and Table 8.1
- Section 8.3.2.3 – Figure 8.4 for Design of Left-Turn Storage Length appears to be applicable only to At Grade Signalized Intersections and not for unsignalized intersections
    - Section 8.11 – Speed Change Lanes appears to address left and right turn lane design/warrants for all intersections
    - Recommend adding a figure similar to the example in **Figure 9** below to Section 8.11 to depict the Speed Change Lane/Turn Lane design components and possibly rename Section 8.11 to Turn Lanes for clarity

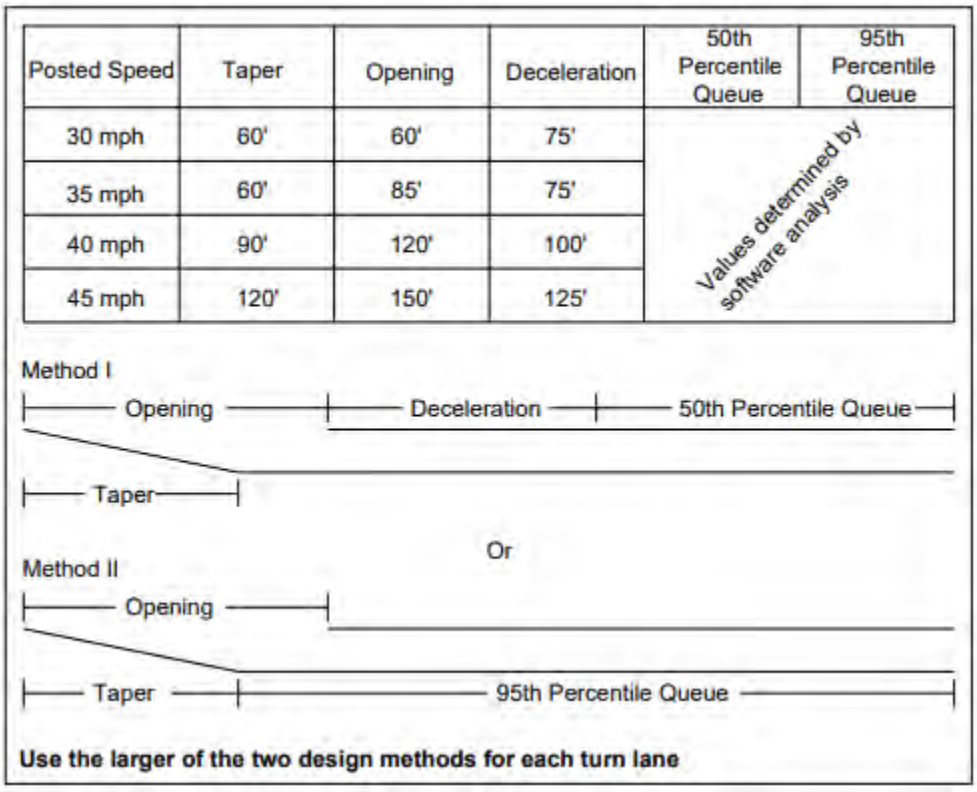


Figure 9: Turn Lane Lengths Design Standards Example (City of Sioux Falls)[4]

[4] Design Standards – Table 8.5: Turn Lane Lengths (City of Sioux Falls), January 2019.

Noted Issues and Development Concerns

Missed Opportunities for Subdivision Connectivity

As the City continues to grow, it is important to provide connectivity between adjoining subdivisions as well as establish a network of future arterial and collector streets to provide orderly, adequate, and efficient transportation connections for developing areas. Watertown has adopted an ordinance to facilitate connections between subdivisions and provide continuity for the arterial and collector network as follows:

Section 24.0506 RELATION TO ADJOINING STREET SYSTEMS of the Revised Ordinances – City of Watertown, South Dakota states:

The arrangement of streets in new subdivisions shall make provisions for the continuation of the principal existing streets in adjoining areas (or their proper projection where adjoining land is not subdivided) in so far as they may be deemed necessary by the Plan Commission for public requirements. The width of such streets in new subdivisions shall not be less than the minimum width established in the Engineering Design Standards. The street and alley arrangement shall be such as not to cause a hardship to owners of the adjoining properties. In general, provisions should be made for through streets at intervals not exceeding one-half mile, and for street connections to future subdivisions at intervals not less than one quarter mile. Offset streets should be avoided. (Ord. 11-18; Add 11-4-11)

The City has also developed and adopted a Major Street Plan as part of the City of Watertown – 2020 Comprehensive Land Use Plan to identify the approximate locations of the future arterial and collector street network. It is especially important to review development applications with regard to their role in providing continuity for the future arterial and collector network. If a development spans the area for which a future arterial or collector has been identified, accommodations for routing the corridor through the development should be made to provide continuity for the extension of the route, including dedicating the necessary right-of-way width as identified in the City's Design Standards for the corresponding street classification. In some cases due to topographical or environmental constraints, considerations may need to be given to a curvilinear route, but the overall goal of providing the most direct route through the development for an arterial or collector street should be a priority. Connections for streets with a classification lower than arterial or collector can be more flexible, but should still be pursued in the development process in order to promote a higher level of mobility, not only for vehicular traffic, but also for bicycle and pedestrian traffic.

The City developed a Check List for Preliminary Plan Approval, which contains items associated with the Street Plan for the proposed development, including:

- Compliance with Major Street Plan
- Compliance with Access Plan for Highways
- Proposed Street & Right-of-Way Widths
- Typical Sections
- Conformance with Engineering Design Standards

This check list should continue to be reviewed for each subdivision development application for conformity with the Major Street Plan as well as applicable street design standards. If a proposed preliminary subdivision plan has an arterial or collector street as identified on the Major Street Plan within its boundary, it is recommended accommodations for the street should be provided as part of the subdivision process.

Half Streets

There are two instances in Watertown where a “Half Street” exists:

- 14th Ave. NE
- 16th Ave. N

Figure 10: 16th Avenue N Half Street Example[5]

This is a “temporary” condition where half of a street section has been dedicated and constructed (example shown above). In both current cases the “Half Street” provides curb and gutter on the south side of the street and asphalt pavement to the centerline of the street. There is limited to no shoulder, no pavement markings or signage to define the edge of the temporary surface or change in condition to the motorist as the street section transitions from a Full Street to a Half Street . This condition is likely due to the fact that the proposed street was at the edge of the City Limits and in both cases, there were no immediate development plans for the agricultural land abutting the north side of the street to require participation in dedicating and constructing a “Full Street”.

The City of Watertown has addressed “Half Streets” in Section 24.0509 HALF STREETS of the Revised Ordinances – City of Watertown, South Dakota as follows:

[5] Google Maps Streetview.

1. Whenever and existing half street is adjacent to a tract being subdivided, the other half of the street shall be platted with said subdivision.
2. A preliminary plan of a subdivision may show half of a street adjoining property, which has not been subdivided, but no lot abutting on such half street shall have a building permit issued for it until such time as the other half street is dedicated. (Ord. 11-18; Add 11-4-11)

While the construction of Half Streets addresses the immediate responsibility/funding issue associated with adjacent separate ownership parcels developing under different schedules, it has the potential to create issues with street functionality. The "temporary" duration of the Half Street configuration could last many years should the undeveloped parcel remain in an undeveloped condition. In both existing cases, the rural edge of the street has not been delineated and a temporary shoulder has not been provided, it also does not appear the road subgrade and base course was extended much beyond the edge of pavement. In the case of 16th Ave. N, it does not appear there is width for two vehicles to pass without driving off of the asphalt surface. It is not known if proper drainage has been provided on the rural side of the street, which could result in premature damage to the paved street subgrade. Further, as a result of the indefinite time period until the second half of the street is constructed and not having a uniform subgrade and base course material, there could also be longevity/durability concerns with the overall street section once the second half is constructed.

There are multiple options which could address the issue of "Half Streets" which include:

1. Continue with current practice of Half Streets with additional minimum design considerations to include:
    a. Provide adequate width for 2 vehicles to pass head-to-head.
    b. Provide a shoulder on the rural edge of pavement with pavement markings until an urban is constructed
    c. Extend the subgrade preparation and base material to a specified width beyond the street centerline in accordance with the depth of the overall pavement section
    d. Provide adequate rural ditch section
2. Require all new developments to be "stand-alone" or self-supporting and construct all necessary infrastructure to support the development (first developer builds the entire street)
    a. A development funding "re-capture" or assessment policy could be developed in tandem with this policy to allow the initial developer an opportunity to recover some costs
    b. Work with the developer to provide an alternative layout for their development which would not require Half Street construction
3. For streets which are designated Arterial or Collector streets consider City participation to fully develop the street section at time of initial construction
    a. This scenario could also allow for an assessment onto the adjacent property and allow the City to recover any upfront costs

Based upon the two existing examples of Half Streets in Watertown it is recommended that options be further considered and vetted to find a best fit for Watertown to address Half Streets due to the unknown duration for which a Half Street could exist as well as the operational and safety drawbacks associated with a Half Street.

Rural Cross-Section Local Streets

The City of Watertown Design Standards allows the design and construction of a rural subdivision road cross-section for developments outside of the City Limits where extraterritorial platting jurisdiction applies and within the City Limits where a proposed subdivision adjoins an existing rural subdivision and lot densities are less than one house per acre. Section 8.13 and 8.14 of the City Design Standards address the design of these rural streets. It is not uncommon for communities to have a rural street design criteria for very low density (1 dwelling per acre max.) residential developments on the urban fringe. If the density of homes per acre increases beyond one unit per acre, operational issues associated with rural subdivision streets start to become apparent, including but not limited to:

- Inadequate surfacing width for higher traffic volumes
- Lack of Maintenance and continuity of drainage and ditches
- Lack of pedestrian facilities

Watertown does not currently have zoning for rural residential subdivisions within the City Limits, therefore it is recommended that careful consideration be given to rural subdivision streets for developments within the City limits. While the one dwelling per acre requirement would typically satisfy a “low density” requirement, consideration should be given to increasing the minimum front yard setbacks to ensure adequate space is provided to provide ample off street parking and continuity of the required drainage ditches and conveyance for any development within the City which propose to provide a rural street cross section.

Additionally, when areas containing existing development are being considered for annexation or the City is being requested to take over maintenance of township or county roads, an inspection of the road infrastructure should be conducted and design plans/as-built drawings for the facility should be reviewed to determine compliance with the City’s rural road standards. This process will assist in identifying road facilities that may need upgrades or rehabilitation prior to the City entertaining ownership/maintenance and not placing a financial burden on the City to make upgrades/repairs.

When to Pave Gravel Roads

As Watertown continues to grow into the urban fringe areas, the City will undoubtedly encounter and annex areas that contain gravel roads. Typically, the levels of traffic using a road will dictate from a maintenance/cost of maintenance perspective when a road should be paved. Once the level and type of traffic reach a tipping point, maintaining a gravel road will ultimately become more costly than that of a paved road. Additionally, the types of traffic and function of the road should also be reviewed as they both place different demands on the roadway. Is the route subject to loads heavier than passenger vehicles? Or is the road an arterial or collector road

and likely subject to through traffic. These questions may also dictate the need for a paved section. In general, average daily traffic volumes (ADT) from a low of 50 vehicles per day to 400 or 500 ADT would warrant the paving of a street/road section.

Ultimately, the City of Watertown Engineering Design Standards require a paved surface of Asphaltic Concrete or Portland Cement Concrete for all classifications of streets. However, should an "island" or "peninsula" of County road be contained in a segment of corridor within the City, the volume thresholds as well as guidance from the USDOT/FHWA manual "Gravel Roads Construction & Maintenance Guide", Appendix D "When to Pave a Gravel Road" could be used in the decision making process to require paving of the roadway section under review.

At link to the USDOT/FHWA guide is provided at:
https://www.fhwa.dot.gov/construction/pubs/ots15002.pdf

Existing Wide Right-of-Way (ROW) Streets

In the municipality of Watertown the streets and most public utilities are contained within a street ROW which extends beyond the street section proper and contains additional space for utilities, drainage, and sidewalk. There are several areas within Watertown that have ROW widths in excess of the current standard for their corresponding street classification. In many instances in the core area of Watertown, local streets have an 80' wide ROW. The current standard for a local street is to provide a 66' wide ROW. This means in several areas there is additional area beyond the necessary width required which is under the ownership of the municipality. City staff requested as part of the Standards Development Process to review the possibility of vacating a portion of the ROW above and beyond what is currently required for local streets with "wide" ROWs.

For review purposes, **Figure 11** and **Figure 12** were developed, one for a street (2nd St SW) and one for an Avenue (4th Ave. SW) to depict how different street widths and configurations fit within the ROW. For most local streets, the actual street width varies from 39' to 44' wide from the back of the curb to back of curb, leaving approximately 13' behind the curb for a boulevard and 5' wide sidewalk for a standard 66' ROW. For areas with 80' wide ROWs, there is an additional 7' +/- of additional ROW which would not ordinarily be necessary. Based upon the varying street, sidewalk, and utility infrastructure configurations provided within the core area of town where the wider ROWs are present, there is not a one-size-fits-all approach to address. Case-by-Case considerations for each corridor include:

- Location of existing sidewalk
    - if sidewalk is located at edge of existing ROW, all sidewalk for the street segment would require relocation in order to narrow ROW
    - if no sidewalk exists, a possible candidate for ROW narrowing
- Location of existing utilities
    - are public utilities located within area of "excess" ROW
    - Utility locates/locations were not provided as part of this concept level review
- Is street section in need of replacement?

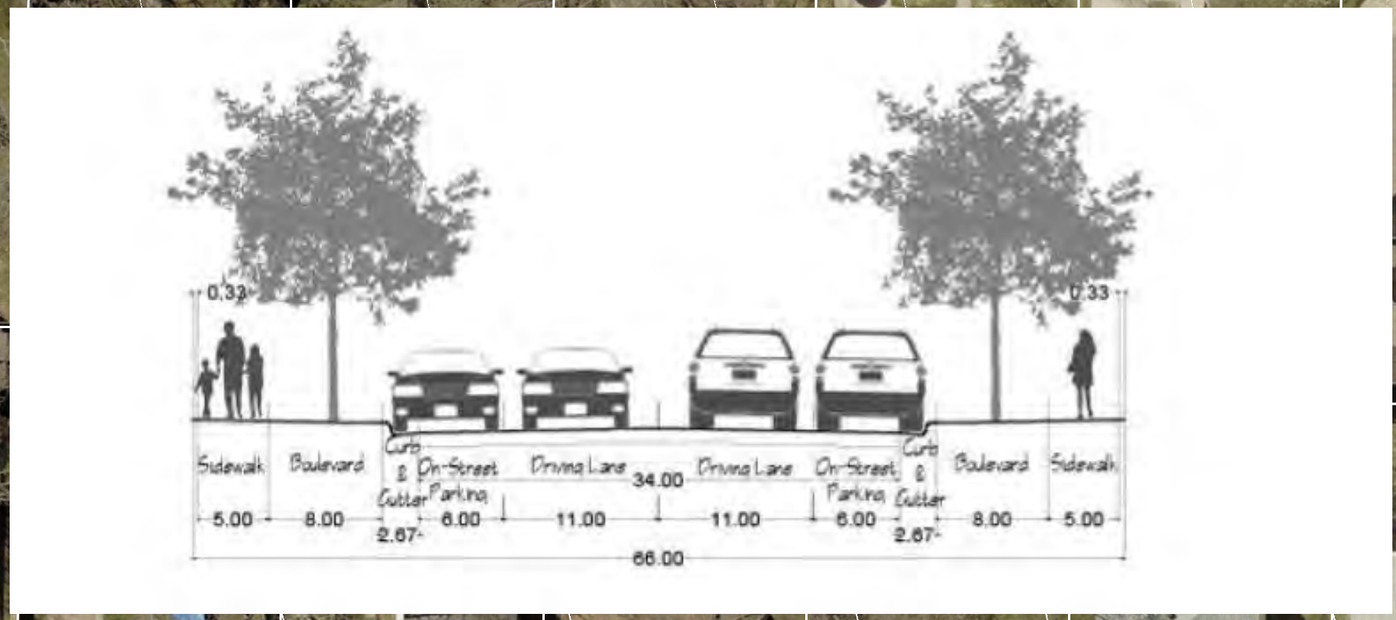
    - If the street section needs reconstruction there may be opportunity to provide new street section, sidewalk, and utilities within narrower ROW
- Is there public buy-in to reduce ROW width and incorporate excess area into adjacent lots?
    - Adjacent lot owners would need to accept the property being vacated by the City for formal ownership
    - All lot owner participation per block would be required in order to avoid a staggered ROW within a single block

If the City is interested in pursing the vacation of excess ROW width for local streets, it is recommended it is pursued in conjunction with pavement management or utility projects where the project area is surveyed, utility locations are thoroughly investigated, the street may be redesigned/reconstructed, and the public is typically involved in the process to evaluate whether they are accepting of receiving the additional property. An additional step in the design process for street and utility projects could review the ROW considerations for each street and review the criteria noted above to determine if a specific corridor would be subject to re-establishment of the ROW width.

Existing 80' ROW
Typical 66' ROW
7' ROW Difference
Existing Profile Lengths
Back of Curb
Boulevard
Sidewalk

5'
14'
40'
14'
5'
80'
66'

2 ST SW
5 AVE SW
4 AVE SW



0 20 Feet

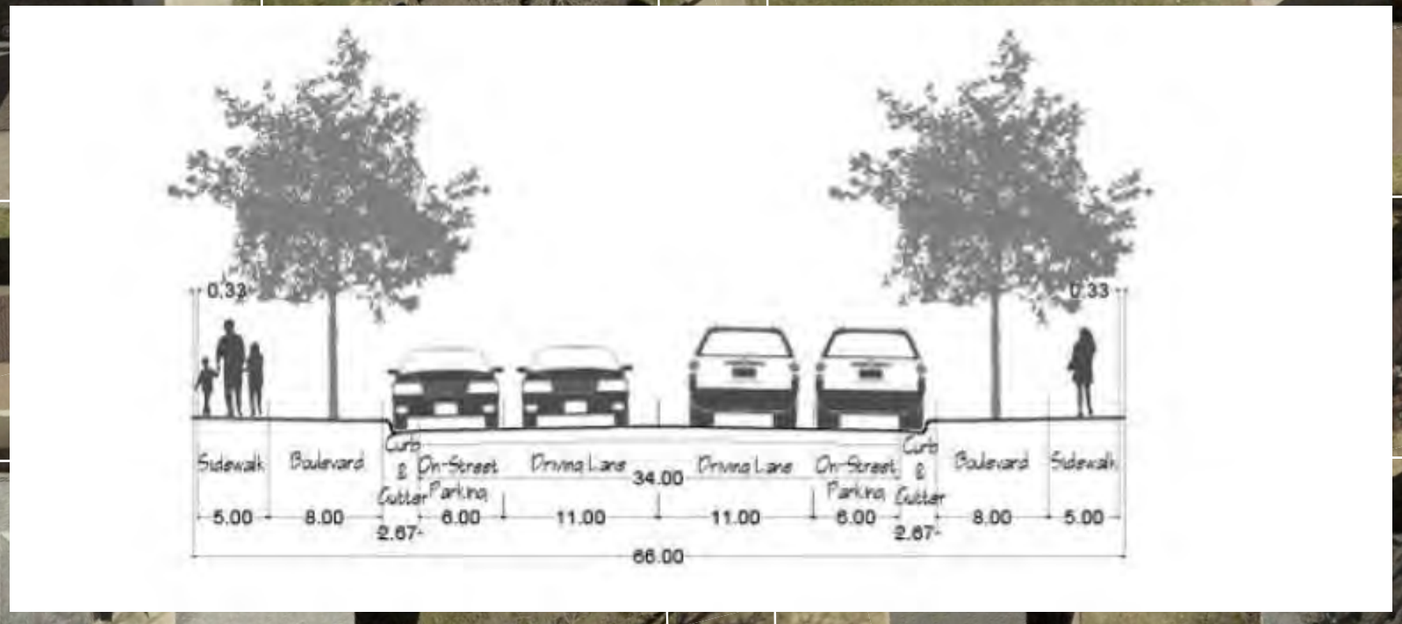
TYPICAL BLOCK ROW COMPARISON - 2ND STREET W

FIGURE 11

Existing 80' ROW
Typical 66' ROW
7' ROW Difference
Existing Profile Lengths
Back of Curb
Boulevard
Sidewalk

5'
12'
44'
80'
66'
12'
5'

4 AVE SW
2 ST SW
1 ST SW



0 20 Feet

TYPICAL BLOCK ROW COMPARISON - 4TH AVENUE SW

FIGURE 12

Traffic Level of Service

Operational performance of streets/highway and intersections is evaluated in terms of the quality of service, which describes how well a transportation facility operates from the traveler's perspective. Quality of service is usually measured with "Level of Service" (LOS), a letter grade like those used in school. LOS categories range from LOS "A" (best) to "F" (worst) as shown in below.

Table 2: Level of Service Definitions[6]

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)	All-Way Stop, Two-Way Stop, and Roundabout Intersection Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80; volume exceeds capacity	> 50; volume exceeds capacity

Section 5.1.2.8 of the Watertown Design Standards establishes a LOS C for the peak hour as the design objective for the City of Watertown. The establishment of a LOS C for intersections is a common threshold for acceptable delay for small/medium sized urban communities. For larger communities in heavily urbanized areas, an intersection LOS D with individual movements of LOS E may be acceptable for peak hours where the costs or impacts to provide LOS C may be prohibitive.

As part of the traffic operations analysis for this study the following LOS goals were established:

- Signalized Intersections:
  - Rural area minimum allowable LOS – LOS B
  - Urban area minimum allowable LOS – LOS C
    - Individual movements allowed to operate at LOS E or better.

- Roundabouts:
  - Minimum allowable LOS – LOS C

- Two-Way Stop-Controlled Intersections:
  - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
  - Urban area minimum allowable LOS – LOS C (weighted average intersection approach)

As such, for the urbanized areas within the Watertown City Limits, the established threshold of LOS C for peak hour intersection delay would seem appropriate.

[6] Highway Capacity Manual 6th Edition (Transportation Research Board), 2016.

Introduction

This memo provides a set of recommendations to improve walking and bicycling conditions in the City of Watertown, South Dakota. Recommendations were developed based upon public input, the Existing Conditions Memo developed earlier in the Master Transportation Plan process, and the 2012 Watertown Trail Master Plan. Recommendations for bicycle and pedestrian improvements were grouped into the following categories:

- Key Pedestrian Intersections and Crossings
- Key Mid-Block Crossings
- Off-Street Trails
- On-Street Bicycle Facilities
- Sidewalk Network Gaps

The following national state-of-the-practice guidance documents were used to inform recommendations:

- FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- City of Boulder Pedestrian Crossing Treatment Installation Guidelines
- FHWA Manual on Uniform Traffic Control Devices (MUTCD)
- NACTO Designing for All Ages and Abilities

The City of Boulder Pedestrian Crossing Treatment Installation Guidelines were used in conjunction with national best-practices. These guidelines are regarded as high-quality policy standards across the region and include some more detailed information about pedestrian crossings than the FHWA guide provides.

Recommendations for bicycle and pedestrian improvements are provided in the following sections. In summary, the recommendations include:

- **50** street intersection improvements
- **3** key mid-block crossing improvements
- **60** trail crossing enhancements
- **32 miles** of new trails
- **13 miles** of new on-street bicycle facilities
- **140 miles** of new sidewalks

Table 1 shows the breakdown estimated cost of each improvement type. Costs for key crossings, sidewalks, trails, and bicycle facilities. were calculated using high-level planning cost estimates that include contingencies. Actual project costs may be different from these preliminary estimates.

Table 1: Total Estimate Cost of Recommended Bicycle and Pedestrian Improvements

Quantities	
DESCRIPTION	**COST**
Intersections and Key Crossings Along Sidewalk Feeder Network Total	$610,000
Key Mid-block Crossings	$250,000
Install Tier 1 Sidewalks Total*	$9,780,000
New Trails Total	$17,260,000
Trail Crossings Total	$1,220,000
On-Street Bicycle Facilities Total	$2,270,000
PROJECT TOTAL	**$31,390,000**

***Tier I sidewalks only encompass a portion of missing sidewalks which are the highest priority to construct. More information is available in the Sidewalk Network Gaps section.**

Multiple funding opportunities are available to the City of Watertown to implement these bicycle and pedestrian improvements. The South Dakota DOT provides funding for alternatives modes of transportation under the federal Transportation Alternatives (TA) program. Eligible projects include pedestrian and bicycle facilities, recreation trails, and safe routes to school projects, with projects ranging from $50,000-$400,000 and include a minimum local match of 18.05%.[1]

Key Pedestrian Intersections and Crossings

The City of Watertown Master Trails Plan (2012) defined a “Sidewalk Feeder Linkage” system that allows for connections to trails and bicycle facilities throughout the City of Watertown. This network includes 3rd Avenue Northwest/Northeast, Kemp Avenue, 4th Avenue South, Broadway, 19th Street East, and 11th Street East. This feeder network was analyzed for pedestrian connectivity, gaps in sidewalks, ADA accessibility, and potential safety improvements. Identified locations for crossing improvements included key intersections of the sidewalk feeder system, areas near schools, parks, and the Uptown Commercial District. These 50 locations were identified as priority crossing locations. Additionally, recommended city-wide policies to upgrade all pedestrian crossings should include continental crosswalks, four-way stops near schools, parks, and other public amenities, detectable warning surfaces (truncated domes) at all crossings, and traffic signals with pedestrian count-down timers where applicable. It is recommended to conduct multiway stop sign engineering studies at all proposed multiway stop locations to determine if pedestrian and vehicle volumes support installation of multiway stops or if adding pedestrian warning signs would be more appropriate to facilitate pedestrian crossings. City-wide policies and spot location improvements were determined using the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations and City of Boulder Pedestrian Crossing Treatment Installation Guidelines. In addition to these sidewalk and intersection improvements, these key routes should be considered for the installation of pedestrian-scale lighting where nighttime lighting is currently lacking. **Figure 1** and **Figure 2** show example improvements.

[1] https://dot.sd.gov/programs-services/programs/transportation-alternatives#listItemLink_1419

Figure 1: Continental Crosswalks with ADA Accessible Curb Cuts and Detectible Warning Surfaces[2]

Figure 2: Pedestrian Countdown Signal[3]

Figure 3 shows the existing feeder linkage system and proposed locations for crossing improvements. **Table 2** describes in detail the existing condition and proposed improvements at each location; a more detailed table can be found at the end of the memo. **Table 3** details the estimated cost information for all proposed crossing locations.

Beyond the Sidewalk Feeder Linkage Network, a more detailed corridor-wide pedestrian study of US-212 is also recommended to identify opportunities for safety improvements including sidewalk infill and pedestrian crossings.

2 https://www.transitchicago.com/assets/1/6/ASAP_Presentation_for_MPAC_-_051017.pdf

3 spokesman.com

Figure 3: "Sidewalk Feeder Linkage" System and Proposed Crossing Improvement Locations

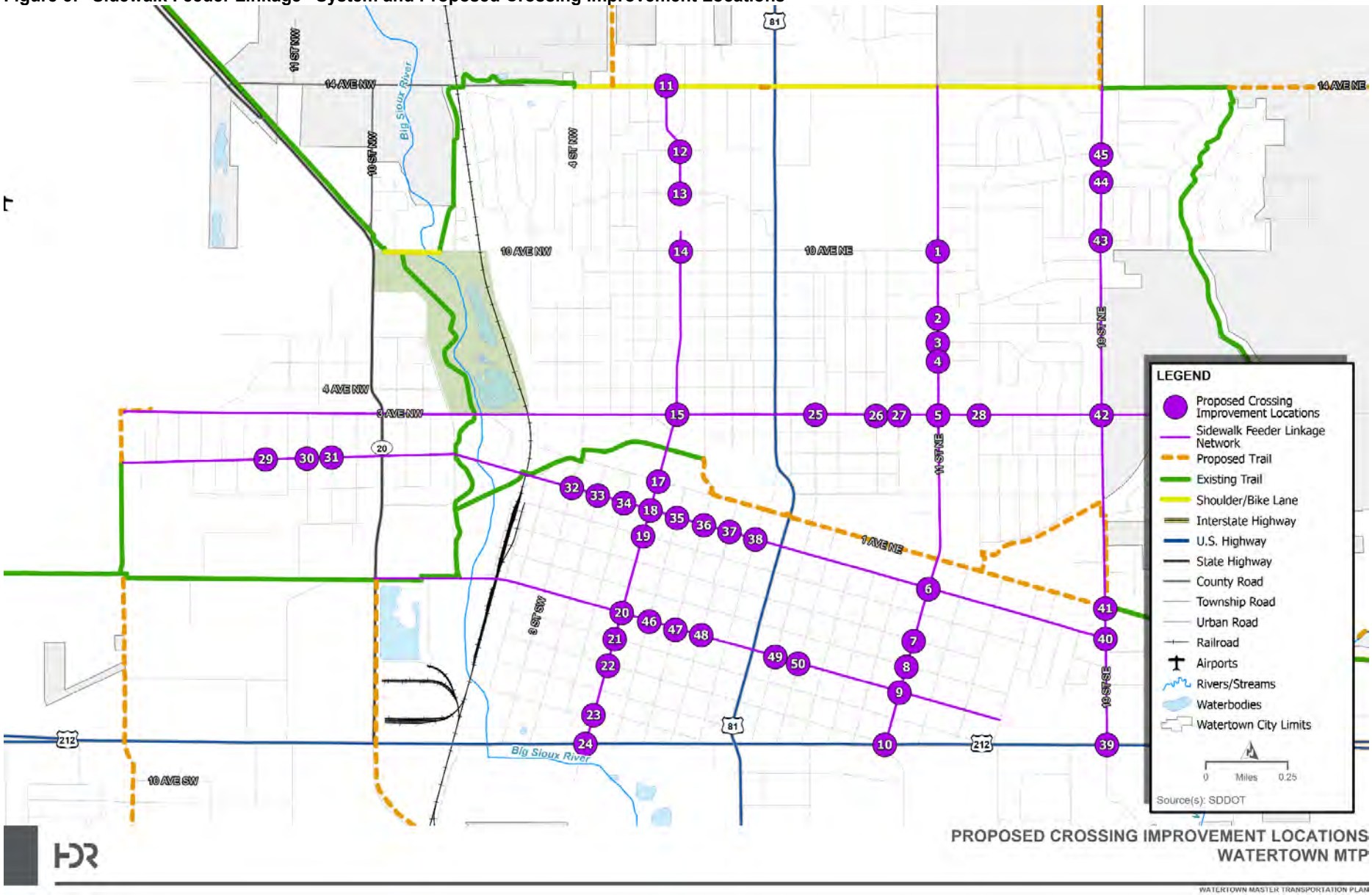


Table 2: Proposed Crossing Improvements

ID	Location	Proposed Improvements
1	11th St NE & 10th Ave NE	Continental Crosswalks
2	11th St NE & 7th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks
3	11th St NE & 6th Ave NE	Conduct multiway stop sign engineering study; square up intersection; continental crosswalks; continue crosswalks through parking lot
4	11th St NE & 5th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks
5	11th St NE & 3rd Ave NE	Upgrade signal to have pedestrian count-down; make ADA accessible on west side
6	11th St NE & E Kemp Ave	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps
7	11st St NE & 2nd Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps
8	11st St NE & 3rd Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps
9	11st St NE & 4th Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps
10	11st St NE & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps
11	N Broadway & 14th Ave NW	Continental Crosswalks; make south side ADA Accessible, infill sidewalk gaps
12	N Broadway & 12th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps
13	N Broadway & N Highland Blvd	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps
14	N Broadway & 10th Ave NW	Conduct multiway stop sign engineering study; make north side ADA Accessible; continental crosswalks; infill sidewalk gaps
15	N Broadway & 3rd Ave NW	Conduct multiway stop sign engineering study; continental crosswalks
16	N Broadway & Carpenter Pl	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on east sidewalks
17	N Broadway & 1st Ave NW	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts
18	N Broadway & E Kemp Ave	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts
19	N Broadway & 1st Ave SW	Continental crosswalks; Add Detectable Warning Surface on all curb cuts
20	N Broadway & 4th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on all curb cuts
21	N Broadway & 5th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on SW curb cuts
22	N Broadway & 6th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on NW curb cuts
23	N Broadway & 8th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts
24	N Broadway & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps
25	3rd Ave NE & 6th St NE	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts
26	3rd Ave NE & 8th St NE	Conduct multiway stop sign engineering study; continental crosswalks
27	3rd Ave NE & 9th St NE	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps
28	3rd Ave NE & 13th St NE	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps
29	W Kemp Ave & 15th St NW	Conduct multiway stop sign engineering study; continental crosswalks
30	W Kemp Ave & 13th St NW	Conduct multiway stop sign engineering study; continental crosswalks
31	W Kemp Ave & 12th St NW	Conduct multiway stop sign engineering study; continental crosswalks
32	W Kemp Ave & 3rd St SW	Continental Crosswalks; Detectable Warning Surface

33	W Kemp Ave & 2nd St SW	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
34	W Kemp Ave & 1st St SW	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
35	E Kemp Ave & N Maple	Upgrade signal to have pedestrian count-down; Continental Crosswalks; Detectable Warning Surface
36	E Kemp Ave & 2nd St SE	Upgrade signal to have pedestrian count-down; Continental Crosswalks
37	E Kemp Ave & 3rd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
38	E Kemp Ave & 4th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
39	19th St SE & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps
40	19th St SE & E Kemp Ave	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on west side
41	19th St SE & 1st Ave NE/ Willow Creek Dr	Continental Crosswalks
42	19th St SE & 3rd Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on NW
43	19th St SE & 10th Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks
44	19th St SE & 12th Ave NE	Conduct multiway stop sign engineering study
45	19th St SE & 13th Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks
46	4th Ave SE & S Maple	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
47	4th Ave SE & 2nd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks
48	4th Ave SE & 3rd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks
49	4th Ave SE & 6th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface
50	4th Ave SE & 7th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface

Table 3: Proposed Crossing Improvement Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
Construct ADA Ramp at all four corners	EACH	12	$40,000	$480,000
Add Detectable Warning Surface (Truncated Domes) at all four corners	EACH	20	$2,000	$40,000
Continental Crosswalks (Assume 4 Legs)	EACH	45	$2,000	$90,000
PROJECT TOTAL				**$610,000**

Key Mid-Block Crossings

In addition to identifying key pedestrian crossings at intersections along the "Sidewalk Feeder Linkage" network, mid-block crossings were also identified to provide greater access to schools in Watertown. These mid-block crossings would include continental crosswalks, curb extensions (paint and post), yield to pedestrians and bikes signs (MUTCD signs W11-15 and W11-15P), and in-street pedestrian crossing signs (MUTCD signs R1-6). City-wide policy for all mid-block crossings should follow these recommendations, with prioritization of mid-block crossings along the "Sidewalk Feeder Linkage" routes. City-wide policies and spot location improvements were determined using the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, the City of Boulder Pedestrian Crossing Treatment Installation Guidelines, and NACTO Midblock Crossing guidelines. Error! Reference source not found., **Figure 5**, and

Figure 6 show example of a mid-block crossing with continental crosswalks, curb extensions and signage.

Figure 4: Mid-Block Crossing

[4]

Figure 5: Yield to Pedestrians and Bikes Sign (MUTCD W11-15)

[5]

Figure 6: In-street Pedestrian Crossing Sign (MUTCD R1-6)

[6]

Error! Reference source not found. and **Table 4** show the locations and proposed improvements. The end of the memo has more detail for each proposed crossing location. **Table 5** details the estimated cost information for all proposed mid-block crossing locations.

[4] https://louisville.edu/sustainability/images/IMG_0674.JPG/image_view_fullscreen
[5] https://mutcd.fhwa.dot.gov/htm/2009/part2/fig2c_10_longdesc.htm
[6] https://mutcd.fhwa.dot.gov/htm/2009/part2/fig2b_02_longdesc.htm

Table 4: Proposed Mid-Block Crossing Improvements

ID	Location	Proposed Improvements
1	11th St NE between 3rd Ave NE & Arrow Ave NE	Mid-block crossing connecting Watertown Sr High School and Lake Area Technical College - need further study to determine exact location Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)
2	11th St NE between Arrow Ave NE & 1st Ave NE	Mid-block crossing connecting overflow parking and Lake Area Technical College Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)
3	4th Ave SE between 2nd St SE & 3rd St SE	Mid-block crossing connecting parking lot and Roosevelt Elementary School Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)

Table 5: Proposed Mid-Block Crossing Improvement Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
Crosswalks, Pavement Markings and Warning Signs (Typical)	EACH	3	$3,000	$9,000
Construct ADA Ramp	EACH	6	$10,000	$60,000
Concrete Curb Extension (Typical)	EACH	3	$60,000	$180,000
PROJECT TOTAL				**$249,000**

Off-Street Trails

There is currently a strong network of existing off-street trails in the City of Watertown. The City currently includes the following trails:

- Highway 20 Trail
- North Lake Kampeska Trail
- South Lake Kampeska Trail
- Golf Course Trail
- 4th Avenue Trail
- Big Sioux River Trail
- Uptown Trail
- Willow Creek Trail
- 14th Avenue Trail
- 1st Avenue Trail

The project team reviewed the 2012 Watertown Trails Master Plan and provided additional detail and cost estimates to build out the recommended improvements included in that plan. Where new trails were recommended, a 10’ wide concrete off-street trail was assumed as the typical design. Recommended improvements include upgrading crosswalks and warning signs, High-Intensity Activated Crosswalks, (HAWK), Rectangular Rapid Flashing Beacons (RRFB), and concrete median islands with refuge. There is one example of a HAWK in Watertown, located on US-81 between 12th Avenue NE and 11th Avenue NE. **Figure 7** through **Figure 10** show examples of these improvements.

Figure 7: Uncontrolled Crossing with Crosswalks, Pavement Markings and Warning Signs[7]

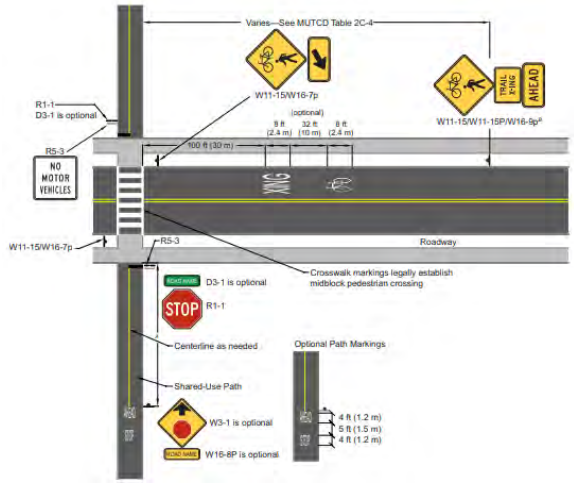


Figure 8: High-Intensity Activated Crosswalk Beacon (HAWK)[8]

Figure 9: 8' x 20' Concrete Median Island with Refuge[9]

Figure 10: Rectangular Rapid-Flashing Beacon (RRFB)[10]

Figure 11 and **Table 6** show the locations of proposed improvements. The end of the memo has more detail for each proposed crossing location. **Table 7** and **Table 8** detail the estimated cost information for all proposed new trails and trail crossing improvement locations.

[7] https://njdotlocalaidrc.com/perch/resources/aashto-gbf-4-2012-bicycle.pdf
[8] http://loudoun.granicus.com/MetaViewer.php?view_id=69&clip_id=4991&meta_id=123851
[9] https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/midblock-crosswalks/
[10] https://redwoodcounty-mn.us/departments/highway-department/attachment/rapid-flashing-beacon/

Figure 11: Proposed New Trail and Trail Crossing Improvement Locations

Table 6: Proposed Trail Crossing Improvements

ID	Name	Location	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
1	Uncontrolled Crossing	N Broadway & S Kempeska Blvd					2		
2	Uncontrolled Crossing	3rd Ave NW near 1st Ave NW						1	
3	Uncontrolled Crossing	3rd Ave NE near 22nd St E	1				2		
4	Uncontrolled Crossing	33rd St SE near US-212							
5	Controlled Crossing	14th Ave & 22nd St E	1			2			
6	Controlled Crossing	14th Ave NE & 20th St NE	1			2			
7	Controlled Crossing	14th Ave NE & 19th St E	1						
8	Uncontrolled Crossing	14th Ave NW & 4th St NW	1			2			Change to All-way Stop
9	Uncontrolled Crossing	14th Ave NW & 6th St	1				1		
10	Uncontrolled Crossing	7th St NW south of 14th Ave NW							
11	Uncontrolled Crossing	10th Ave NW near 7th St NW						1	
12	Uncontrolled Crossing	10th Ave NW east of 9th St NW						1	Move crossing to the east to cross where trail meets the road coming from the south
13	Uncontrolled Crossing	SD-20 Slip Ramp south of 10th St NW	1				1		Close slip ramp
14	Uncontrolled Crossing	10th St NW & SD-20	1						
15	Controlled Crossing	14th Ave NW & SD-20	1						
16	Controlled Crossing	26th Ave NW & SD-20	1						
17	Controlled Crossing	Sioux Conifer Rd & SD-20	1						
18	Controlled Crossing	Airport Dr & SD-20	1				2		
19	Uncontrolled Crossing	SD-20 & S Lake Dr		1		2			
20	Controlled Crossing	Forsberg Park & SD-20	1				2		
21	Uncontrolled Crossing	SD-20 & N Lake Dr/451st Ave		1			2		
22	Controlled Crossing	SD-139 east of SD-20 connection	1				2		
23	Uncontrolled Crossing	SD-139 & N Lake Dr	1				1		

ID	Name	Location	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
24	Controlled Crossing	SD-139 & 458th Ave	1						
25	Controlled Crossing	SD-139 & County Rd 8 2/10	1						
26	Controlled Crossing	SD-139 & 449th Ave	1						
27	Controlled Crossing	SD-139 & 169th Ave	1						
28	Uncontrolled Crossing	SD-139 east of Sunset Dr	1						
29	Uncontrolled Crossing	Codington Memorial Park & Campground	1						
30	Uncontrolled Crossing	Pompeska Dr & S Lake Dr	1						
31	Uncontrolled Crossing	S Lake Dr & Prairie Hills Dr	1						
32	Uncontrolled Crossing	S Lake Dr north of Prairie Hills Dr			2				Drop speed limit to 35MPH
33	Controlled Crossing	Co Rd 17 5/10 & 54th St W	1						
34	Controlled Crossing	Co Rd 17 5/10 & Prairie Winds Golf Club	1				2		
35	Controlled Crossing	CO Rd 12 3/10 & 43rd St NW							
36	Uncontrolled Crossing	CO Rd 12 3/10 west of 43rd St NW	1						
37	Controlled Crossing	42nd St NW & County Rd 12 3/10	1						
38	Uncontrolled Crossing	42nd St NW Slip Ramp	1						
39	Uncontrolled Crossing	S Lake Dr & Jackson Park (south entrance)	1						
40	Uncontrolled Crossing	Jackson Park (south)	1				2		
41	Uncontrolled Crossing	S Lake Dr & Jackson Park (north entrance)	1				2		
42	Controlled Crossing	Jackson Park (north)	1				2		
43	Uncontrolled Crossing	S Lake Drive west of Casino Speedway	1				2		
44	Uncontrolled Crossing	Stokes-Thomas Lake City Park & S Lake Dr					2		
45	Uncontrolled Crossing	Co Rd 12 3/10 & 33rd St NW	1				2		

ID	Name	Location	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
46	Uncontrolled Crossing	5th Ave NW & Co Rd 12 3/10	1				2		
47	Controlled Crossing	3rd Ave NW & Co Rd 12 3/10	1				2		
48	Controlled Crossing	Co Rd 12 3/10 & 4th Ave SW	1				2		Change to All-way Stop
49	Controlled Crossing	4th Ave SW & Co Rd 14A	1				4		
50	Uncontrolled Crossing	21st St NW & W Kemp Ave	1				2		
51	Controlled Crossing	4th Ave SW & 19th St SW	1				2		
52	Controlled Crossing	4th Ave SW & 14th Ave SW	1				2		
53	Uncontrolled Crossing	4th Ave SW west of S Kampeska Blvd	1				2		
54	Controlled Crossing	4th Ave SW & S Kampeska Blvd	1				1		
55	Uncontrolled Crossing	W Kemp Ave & Kampeska Blvd	1						
56	Uncontrolled Crossing	Kampeska Blvd north of W Kemp Ave	1						
57	Uncontrolled Crossing	W Kemp Ave east of 6th St NW	1				2		
58	Uncontrolled Crossing	1st Ave NW & 3rd St NW	1				4		
59	Controlled Crossing	Codington County Hwy Shop & SD-20	1				2		
60	Controlled Crossing	Fireside Camper & SD-20	1				2		

Table 7: Proposed New Trail Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
Install 10' concrete trail	LF	172,510	$100	$17,251,007
PROJECT TOTAL				**$17,251,007**

Table 8: Proposed Trail Crossing Improvement Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
Crosswalks, Pavement Markings and Warning Signs (Typical)	EACH	49	$3,000	$147,000
RRFB	EACH	2	$30,000	$60,000

HAWK	EACH	2	$300,000	$600,000
Construct ADA Ramp	EACH	8	$10,000	$80,000
Add Detectable Warning Surface (Truncated Domes)	EACH	58	$500	$29,000
8' x 20' Concrete Median Island with Refuge (Typical)	EACH	3	$100,000	$300,000
PROJECT TOTAL				**$1,216,000**

On-Street Bicycle Facilities

There are currently existing shoulder bicycle routes on the following street segments:

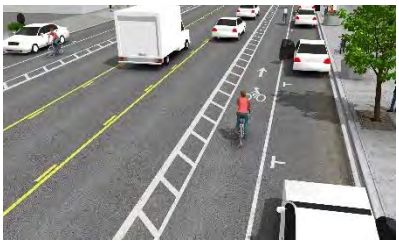
- 14th Ave NE (1.5 mi shoulder bikeway/bike lane)
- 10th Ave NW – trail connection (0.1 mi shoulder bikeway/bike lane)
- North Lake Kampeska Trail (1.4 mi shoulder bikeway/bike lane)
- South Lake Kampeska Trail (0.6 mi shoulder bikeway/bike lane)

On-street bicycle facilities have been proposed in addition to these existing shoulder bicycle routes and the trail network improvements discussed above. On-street bicycle facilities were proposed for all routes identified as "Sidewalk Feeder Linkage" routes in the 2012 City of Watertown Master Trail Plan. Proposed facilities were determined using the NACTO Contextual Guidance for Selecting All Ages & Abilities Bikeways document. Recommended facilities were tailored to the Watertown street network evaluating existing street and right-of-way width, traffic speeds and volumes and land use context. **Figure 12**, **Figure 13**, and **Figure 14** show example recommended bicycle facilities.

Figure 12: Bicycle Boulevard[11]

Figure 13: Conventional Bike Lane[12]

Figure 14: Buffered Bike Lane[13]



Broadway

- ADT:
  - 2,080 north of 3rd Ave NE
  - 3,070 south of 3rd Ave NE
- Recommendations:
  - Bicycle Boulevard from 10th Ave NE to 3rd Ave NE (0.5 miles)

[11] https://twitter.com/NYCMayor/status/1355207355739365388/photo/1
[12] https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/conventional-bike-lanes/
[13] https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/buffered-bike-lanes/

- Sharrows from 3rd Ave NE to 3rd Ave SE (0.55 miles)
- Buffered Bike Lane from 3rd Ave SE to 9th Ave SE/US-212 (0.5 miles)

11th Street East

- ADT:
  - 1,810 between 14th Ave NE and 7th Ave NE
  - 2,500 between 7th Ave NE and 3rd Ave NE
  - 2,800 south of 3rd Ave NE
- Recommendation:
  - Conventional Bike Lane from 14th Ave NE to 9th Ave SE/US-212 (2 miles)

19th Street Southeast

- ADT:
  - 3,760 between 14th Ave NE and 10th Ave NE
  - 7,280 between 10th Ave NE and 3rd Ave NE
  - 6,460 between 3rd Ave NE and Arrow Ave NE
  - 9,540 between Arrow Ave NE and 1st Ave NE
  - 6,470 between 1st Ave NE and 9th Ave SE/US-212
- Recommendations:
  - Remove two-way left turn lane (TWLTL) and add buffered bike lanes between 14th St NE and 9th Ave SE/US-212 (2 Miles)

East Kemp Avenue

- ADT:
  - 1,490 between 3rd St NW and 5th St NE/US-81
- Recommendation
  - Bike Boulevard between 21st St NW and 19th St SE (3 Miles)

4th Avenue Southeast/Southwest

- ADT:
  - 5,900 between 21st St NW and 10th St NW/SD-20
  - 4,930 between 10th St NW/SD-20 and 3rd St SW
  - 3,190 between 3rd St SW and Broadway
  - 2,510 between Broadway and 5th St NE/US-81
  - 1,590 between 5th St NE/US-81 and 14th St SE
- Recommendations:
  - Conventional Bike Lanes between 4th St SW and 14th St SE (1.5 Miles)

3rd Avenue Northwest/Northeast

- ADT:
  - 1,860 between 21st St NW and 17th St NW
  - 2,830 between 17th St NW and 10th St NW/SD-20
  - 5,700 between 10th St NW/SD-20 and Broadway
  - 4,350 between Broadway and 4th St NE/US-81
  - 3,580 between 4th St NE/US-81 and 7th St NE

  - 3,670 between 7th St NE and 11th St NE
  - 2,200 between 11th St NE and 19th St NE
  - 660 between 19th St NE and 31st St NE (dirt road in this segment)
- Recommendations:
  - Conventional or Buffered Bike Lanes (depending on pavement width) from 21st St NW and to 19th St NE

Figure 15 shows the locations of proposed improvements and **Table 9**: Proposed On-Street Bike Facility Estimated Costs detail the estimated cost information.

Figure 15: Proposed On-Street Bike Facility Locations

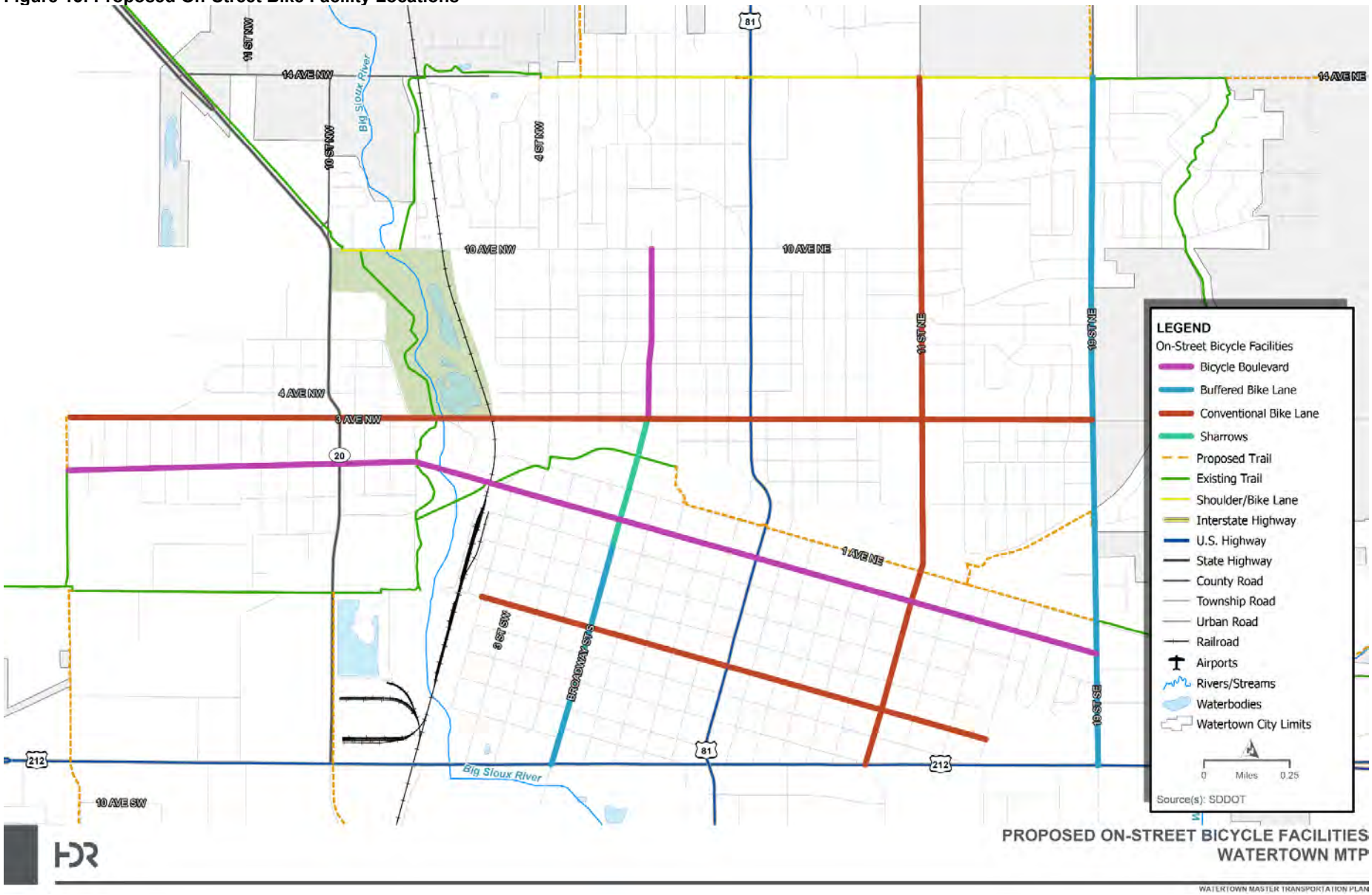


Table 9: Proposed On-Street Bike Facility Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
Bike Lanes	MILES	4.55	$135,000	$1,019,250
Buffered Bike Lanes	MILES	2.00	$185,000	$370,000
Bicycle Boulevard (Includes Traffic Calming, Signing and Striping	MILES	3.50	$250,000	$875,000
PROJECT TOTAL				**$2,264,250**

Sidewalk Network Gaps

Existing and missing sidewalk data were collected in a previous City of Watertown project. Building off this data, the project team developed a two-tier priority system for building the remaining missing sidewalks in the city. The first tier includes sidewalks along the Sidewalk Feeder Linkage routes identified in the 2012 Watertown Trails Master Plan and any sidewalks within the surrounding blocks of public schools in the City of Watertown. The second tier includes all other missing sidewalks in the City of Watertown.

Figure 16 on the following page shows the locations of existing sidewalks, Tier 1 missing sidewalks, Tier 2 missing sidewalks, and the existing and proposed trail network for reference. **Table 10** on the subsequent page shows the estimated cost to install sidewalks in these locations.

Figure 16: Missing Sidewalk Infill Locations and Tiers

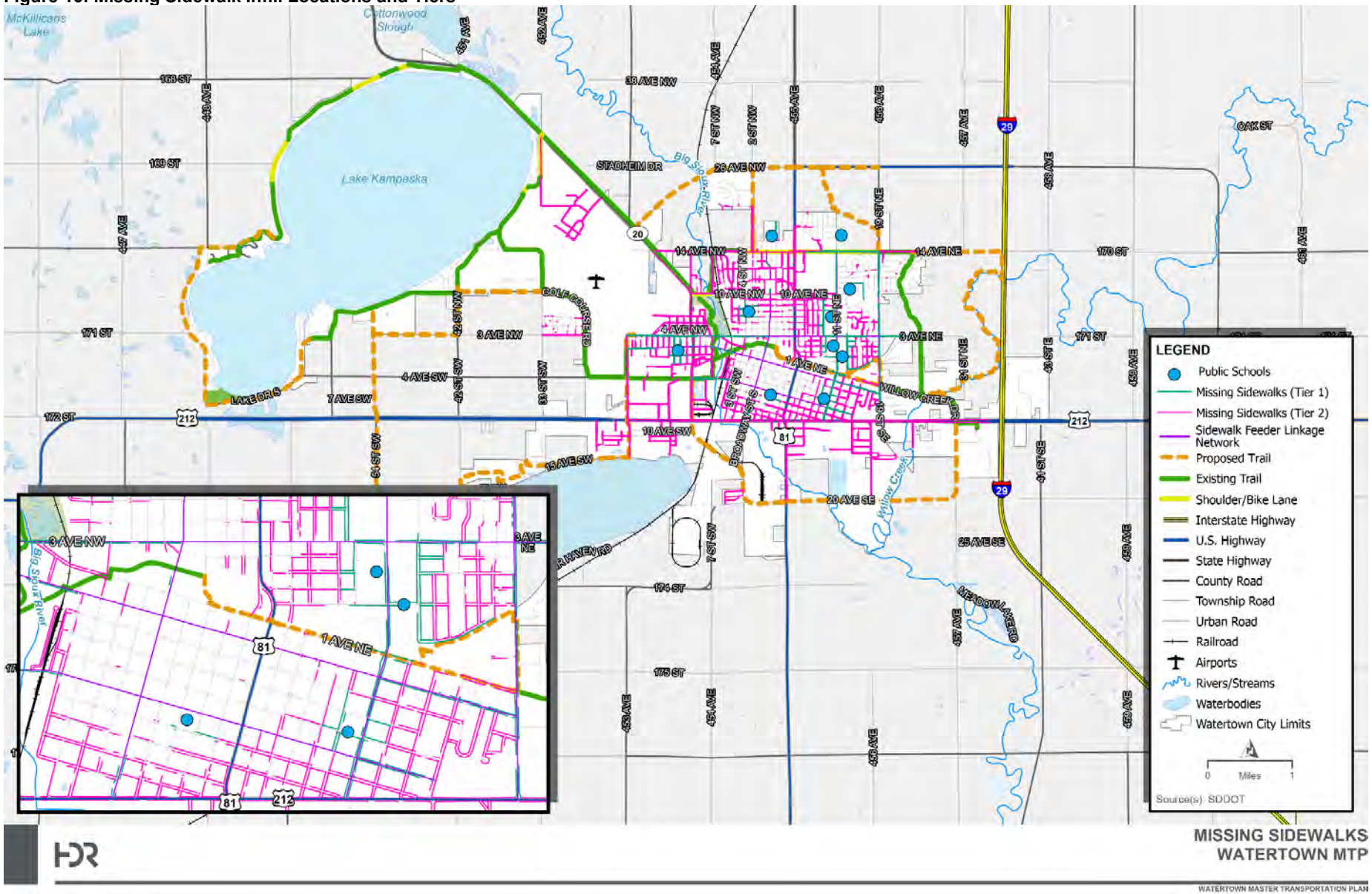


Table 10: Tier 1 Missing Sidewalk Infill Estimated Costs

Quantities				
DESCRIPTION	**UNIT**	**QUANTITY**	**UNIT PRICE**	**COST**
(TIER 1) Install 5' concrete sidewalk and curb and gutter	LF	114,958	$85	$9,771,390
PROJECT TOTAL				**$9,771,390**

One strategy to address sidewalk gaps for the City of Watertown is to incorporate sidewalk improvements into other neighborhood improvement and road resurfacing projects. Additionally, looking at sidewalk infill on a case by case basis as other projects come up may be more manageable than looking at the City as a whole. Other cities have allocated annual budget dollars to a sidewalk fund so that they can continually infill sidewalks each year.

Advisory sidewalks or pedestrian lanes within the existing ROW are another interim solution to sidewalk infill. Pedestrian lanes may include signing, striping, and/or bollards. More information can be found on FHWA Small Town and Rural Design Guide. As seen in **Figure 17** and **Figure 18** below, these types of facilities include striping or otherwise separating a portion of the existing roadway for pedestrians rather than building new concrete sidewalk above the curb.

Figure 17: Pedestrian Lane with Bollards[14]

Figure 18: Pedestrian Lane with Signing and Striping[15]

[14] https://www.cbc.ca/news/canada/calgary/adaptive-sidewalks-calgary-1.5125310
[15] https://ruraldesignguide.com/visually-separated/pedestrian-lane

Table of Proposed Pedestrian Crossing Improvements

Table 11: Proposed Crossing Improvements

ID	Location	Existing Condition	Speed (mph)	Daily Traffic Volume	Proposed Improvements	Notes
1	11th St NE & 10th Ave NE	4-way stop; 2 lane no centerline; transverse Line Crosswalk	25	2,500	Continental Crosswalks	Near school
2	11th St NE & 7th Ave NE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	15	2,500	Conduct multiway stop sign engineering study; continental crosswalks	Near school
3	11th St NE & 6th Ave NE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	15	2,500	3-way stop; square up intersection; continental crosswalks; continue crosswalks through parking lot	Near school
4	11th St NE & 5th Ave NE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	15	2,500	Conduct multiway stop sign engineering study; continental crosswalks	Near school
5	11th St NE & 3rd Ave NE	Traffic signal; 2 lanes with centerline; turn lanes each direction; transverse line crosswalk	25	3,670	Upgrade signal to have pedestrian count-down; make ADA accessible on west side	Near school
6	11th St NE & E Kemp Ave	2-way stop; 2 lane no centerline; no crosswalks; existing sidewalk on west side	25	2,820	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Key sidewalk network crossing
7	11st St NE & 2nd Ave SE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	15	2,820	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Near school
8	11st St NE & 3rd Ave SE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	35	2,820	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Near school
9	11st St NE & 4th Ave SE	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	25	2,790	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Key sidewalk network crossing
10	11st St NE & US-212	Traffic signal; 3-way intersection: 11st St NE - 2 lanes no centerline, US-212 - 4 lanes with turn lanes; continental crosswalk	35	2,500 - 8,000 - 11th St; 18,570 - US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	
11	N Broadway & 14th Ave NW	4-way stop; 2 lane no centerline (N Broadway); 2 lanes with centerline (14th Ave NW); transverse line crosswalk	35	6,220	Continental Crosswalks; make south side ADA Accessible, infill sidewalk gaps	
12	N Broadway & 12th Ave NE	No stop signs; 2 lane no centerline; no crosswalks	25	-	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps	Near school
13	N Broadway & N Highland Blvd	2-way stop; 2 lane no centerline; no crosswalks	15	-	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps	Near park

ID	Location	Existing Condition	Speed (mph)	Daily Traffic Volume	Proposed Improvements	Notes
14	N Broadway & 10th Ave NW	2-way stop; 2 lane no centerline; no crosswalks	25	4,780	Conduct multiway stop sign engineering study; make north side ADA Accessible; continental crosswalks; infill sidewalk gaps	Near park & daycare
15	N Broadway & 3rd Ave NW	4-way stop; 2 lane no centerline; no crosswalks	25	4,350	Conduct multiway stop sign engineering study; continental crosswalks	
16	N Broadway & Carpenter Pl	2-way stop (1-way?); 2 lane no centerline; no crosswalks	25	3,070	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on east sidewalks	
17	N Broadway & 1st Ave NW	Traffic signal; 4-way intersection; 1st Ave has centerline and turn lanes; Broadway 2 lane no centerline; transverse line crosswalk	25	3,070	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts	Downtown
18	N Broadway & E Kemp Ave	Traffic signal; 4-way intersection; 2 lane no centerline; transverse line crosswalk	25	3,070	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts	Downtown; near daycare; Key sidewalk network crossing
19	N Broadway & 1st Ave SW	Traffic Signal; 1st Ave SW 2 lane with centerline; Broadway 2 lane no centerline; transverse Line Crosswalk	25	3,070	Continental crosswalks; Add Detectable Warning Surface on all curb cuts	Downtown; near daycare
20	N Broadway & 4th Ave SW	2-way stop; 2 lane no centerline; 1 ladder crosswalk	25	3,070	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on all curb cuts	Key sidewalk network crossing
21	N Broadway & 5th Ave SW	2-way stop; 2 lane no centerline; no crosswalks	25	3,070	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on SW curb cuts	Near park
22	N Broadway & 6th Ave SW	2-way stop; 2 lane no centerline; no crosswalks	25	3,070	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on NW curb cuts	Near park
23	N Broadway & 8th Ave SW	2-way stop; 2 lane no centerline; no crosswalks	25	3,070	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts	Near daycare; disjointed intersection
24	N Broadway & US-212	Traffic signal; 4-way intersection: N Broadway - 2 lanes no centerline, US-212 - 4 lanes with turn lanes; continental crosswalk	35	2,500 - 8,000 - N Broadway; 18,410 - US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	
25	3rd Ave NE & 6th St NE	2-way stop; 2 lane no centerline; no crosswalks or curb cuts	25	3,670	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts	Near preschool

ID	Location	Existing Condition	Speed (mph)	Daily Traffic Volume	Proposed Improvements	Notes
26	3rd Ave NE & 8th St NE	2-way stop; 2 lane no centerline; no crosswalks	25	3,670	Conduct multiway stop sign engineering study; continental crosswalks	Near park & school; too close to 27?
27	3rd Ave NE & 9th St NE	2-way stop; 2 lane no centerline; one transverse line crosswalk	25	3,670	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps	Near park & school
28	3rd Ave NE & 13th St NE	2-way stop; 2 lane no centerline; no crosswalks	25	3,670	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps	Near school
29	W Kemp Ave & 15th St NW	2-way stop; 2 lane no centerline; no crosswalks; curb cuts with ADA tactile warnings	25	-	Conduct multiway stop sign engineering study; continental crosswalks	Near stadium
30	W Kemp Ave & 13th St NW	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	25	-	Conduct multiway stop sign engineering study; continental crosswalks	Near school
31	W Kemp Ave & 12th St NW	2-way stop; 2 lane no centerline; Transverse Line Crosswalk	25	-	Conduct multiway stop sign engineering study; continental crosswalks	Near school
32	W Kemp Ave & 3rd St SW	4-way stop; 2 lane no centerline; transverse Line Crosswalk	25	1,490	Continental Crosswalks; Detectable Warning Surface	Downtown
33	W Kemp Ave & 2nd St SW	2-way stop; 2 lane no centerline; transverse Line Crosswalk	25	1,490	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Downtown
34	W Kemp Ave & 1st St SW	2-way stop; 2 lane no centerline; transverse Line Crosswalk	25	1,490	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Downtown
35	E Kemp Ave & N Maple	Traffic signal; 2 lane no centerline; transverse line crosswalk	25	1,490	Upgrade signal to have pedestrian count-down; Continental Crosswalks; Detectable Warning Surface	Downtown
36	E Kemp Ave & 2nd St SE	Traffic signal; 2 lane no centerline; transverse line crosswalk	25	1,490	Upgrade signal to have pedestrian count-down; Continental Crosswalks	Downtown
37	E Kemp Ave & 3rd St SE	2-way stop; 2 lane no centerline; transverse Line Crosswalk	25	1,490	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Downtown
38	E Kemp Ave & 4th St SE	2-way stop; 2 lane no centerline; transverse Line Crosswalk	25	1,490	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Downtown
39	19th St SE & US-212	Traffic signal: 19th St SE - 2 lanes with center turn lane, US-212 - 4 lanes with turn lanes; continental crosswalk	35	2,500 - 8,000 - 19th St; 18,410 - US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	

ID	Location	Existing Condition	Speed (mph)	Daily Traffic Volume	Proposed Improvements	Notes
40	19th St SE & E Kemp Ave	2-way stop; 2 lanes with center turn lane; no crosswalks	35	6,470	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on west side	Key sidewalk network crossing
41	19th St SE & 1st Ave NE/Willow Creek Dr	Traffic signal: 2 lanes with centerline and turn lanes; transverse line crosswalk	45	6,470	Continental Crosswalks	
42	19th St SE & 3rd Ave NE	2-way stop; 2 lanes with center turn lane; no crosswalks	35	6,460	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on NW	Key sidewalk network crossing
43	19th St SE & 10th Ave NE	2-way stop; 2 lanes with center turn lane; no crosswalks	35	7,280	Conduct multiway stop sign engineering study; Continental Crosswalks	
44	19th St SE & 12th Ave NE	2-way stop; 2 lanes with center turn lane; Continental Crosswalks	35	7,280	Conduct multiway stop sign engineering study	
45	19th St SE & 13th Ave NE	2-way stop; 2 lanes with center turn lane; no crosswalks	35	7,280	Conduct multiway stop sign engineering study; Continental Crosswalks	
46	4th Ave SE & S Maple	2-way stop; 2 lane no centerline; two transverse line crosswalk	25	2,510	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	
47	4th Ave SE & 2nd St SE	2-way stop; 2 lane no centerline; transverse line crosswalks	25	2,510	Conduct multiway stop sign engineering study; Continental Crosswalks	Near school
48	4th Ave SE & 3rd St SE	2-way stop; 2 lane no centerline; transverse line crosswalks	25	2,510	Conduct multiway stop sign engineering study; Continental Crosswalks	Near school
49	4th Ave SE & 6th St SE	2-way stop; 2 lane no centerline; no crosswalks	25	1,590	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Near park
50	4th Ave SE & 7th St SE	2-way stop; 2 lane no centerline; no crosswalks	25	1,590	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Near park

Table of Proposed Mid-Block Crossings

Table 12. Proposed Mid-Block Crossing Improvements

ID	Location	Existing Condition	Speed	Daily Traffic Volumes	Proposed Improvements	Notes
1	11th St NE between 3rd Ave NE & Arrow Ave NE	2 lanes without centerline; on-street parking; existing stairs from street to school parking lot	15	2,820	Mid-block crossing connecting Watertown Sr High School and Lake Area Technical College - need further study to determine exact location Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)	Near school
2	11th St NE between Arrow Ave NE & 1st Ave NE	2 lanes without centerline	25	2,820	Mid-block crossing connecting overflow parking and Lake Area Technical College Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)	Near school
3	4th Ave SE between 2nd St SE & 3rd St SE	2 lanes without centerline; on-street parking; existing curb ramp and transverse line crosswalk from parking lot to school	25	2,510	Mid-block crossing connecting parking lot and Roosevelt Elementary School Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6)	Near school

Table of Proposed Trail Crossing Improvements

Table 13. Proposed Trail Crossing Improvements

ID	Name	Location	Existing Condition	Speed Limit (mph)	Daily Traffic Volumes	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
1	Uncontrolled Crossing	N Broadway & S Kempeska Blvd	Warning signs and transverse lines crosswalk	25	3,070					2		
2	Uncontrolled Crossing	3rd Ave NW near 1st Ave NW	Warning signs and continental crosswalk	25	5,700						1	
3	Uncontrolled Crossing	3rd Ave NE near 22nd St E	Uncontrolled crossing	25	600	1				2		
4	Uncontrolled Crossing	33rd St SE near US-212		25								
5	Controlled Crossing	14th Ave & 22nd St E	Stop sign controlled T-intersection	25	960	1			2			
6	Controlled Crossing	14th Ave NE & 20th St NE	Stop sign controlled T-intersection	25	960	1			2			
7	Controlled Crossing	14th Ave NE & 19th St E	All-way stop with new curb ramps	35	7,280	1						
8	Uncontrolled Crossing	14th Ave NW & 4th St NW	Two-Way Stop	30	4,970	1			2			Change to All-way Stop
9	Uncontrolled Crossing	14th Ave NW & 6th St	Warning signs and continental crosswalk	30	4,970	1				1		
10	Uncontrolled Crossing	7th St NW south of 14th Ave NW	Warning signs and continental crosswalk									
11	Uncontrolled Crossing	10th Ave NW near 7th St NW	Warning signs and continental crosswalk	25	4,180						1	
12	Uncontrolled Crossing	10th Ave NW east of 9th St NW	Warning signs and continental crosswalk	25	4,180						1	Move crossing to the east to cross where trail meets the road coming from the south

ID	Name	Location	Existing Condition	Speed Limit (mph)	Daily Traffic Volumes	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
13	Uncontrolled Crossing	SD-20 Slip Ramp south of 10th St NW	Continental crosswalk	35	7,910	1				1		Close slip ramp
14	Uncontrolled Crossing	10th St NW & SD-20	Warning signs and continental crosswalk	25		1						
15	Controlled Crossing	14th Ave NW & SD-20	Warning signs and continental crosswalk			1						
16	Controlled Crossing	26th Ave NW & SD-20	Detectable warning surfaces			1						
17	Controlled Crossing	Sioux Conifer Rd & SD-20	Warning signs and continental crosswalk			1						
18	Controlled Crossing	Airport Dr & SD-20				1				2		
19	Uncontrolled Crossing	SD-20 & S Lake Dr	Warning signs and continental crosswalk	45	4,180		1		2			
20	Controlled Crossing	Forsberg Park & SD-20		45	4,180	1				2		
21	Uncontrolled Crossing	SD-20 & N Lake Dr/451st Ave	Warning signs and continental crosswalk	45	3,570		1			2		
22	Controlled Crossing	SD-139 east of SD-20 connection	Warning signs and continental crosswalk	40		1				2		
23	Uncontrolled Crossing	SD-139 & N Lake Dr	Warning signs and continental crosswalk	40		1				1		
24	Controlled Crossing	SD-139 & 458th Ave	Continental crosswalk	40	70	1						
25	Controlled Crossing	SD-139 & County Rd 8 2/10	Continental crosswalk	40	70	1						
26	Controlled Crossing	SD-139 & 449th Ave	Detectable warning surfaces	40		1						
27	Controlled Crossing	SD-139 & 169th Ave	Detectable warning surfaces	40		1						
28	Uncontrolled Crossing	SD-139 east of Sunset Dr	Detectable warning surfaces	40		1						

ID	Name	Location	Existing Condition	Speed Limit (mph)	Daily Traffic Volumes	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
29	Uncontrolled Crossing	Codington Memorial Park & Campground	Detectable warning surfaces	40		1						
30	Uncontrolled Crossing	Pompeska Dr & S Lake Dr	Warning signs and detectable warning surfaces			1						
31	Uncontrolled Crossing	S Lake Dr & Prairie Hills Dr	Detectable warning surfaces	45		1						
32	Uncontrolled Crossing	S Lake Dr north of Prairie Hills Dr	Warning signs and continental crosswalk	45				2				Drop speed limit to 35MPH
33	Controlled Crossing	Co Rd 17 5/10 & 54th St W	Detectable warning surfaces	25		1						
34	Controlled Crossing	Co Rd 17 5/10 & Prairie Winds Golf Club		25		1				2		
35	Controlled Crossing	CO Rd 12 3/10 & 43rd St NW	Two-Way Stop	30								
36	Uncontrolled Crossing	CO Rd 12 3/10 west of 43rd St NW	Continental crosswalk	30		1						
37	Controlled Crossing	42nd St NW & County Rd 12 3/10	Two-Way Stop	25		1						
38	Uncontrolled Crossing	42nd St NW Slip Ramp	Continental crosswalk	25		1						
39	Uncontrolled Crossing	S Lake Dr & Jackson Park (south entrance)	Warning signs and continental crosswalk	25		1						
40	Uncontrolled Crossing	Jackson Park (south)	Continental crosswalk	15		1				2		
41	Uncontrolled Crossing	S Lake Dr & Jackson Park (north entrance)	Warning signs and continental crosswalk	25		1				2		
42	Controlled Crossing	Jackson Park (north)	Transverse line crosswalk	15		1				2		

ID	Name	Location	Existing Condition	Speed Limit (mph)	Daily Traffic Volumes	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
43	Uncontrolled Crossing	S Lake Drive west of Casino Speedway	Warning signs and continental crosswalk	25		1				2		
44	Uncontrolled Crossing	Stokes-Thomas Lake City Park & S Lake Dr	Warning signs and continental crosswalk	25						2		
45	Uncontrolled Crossing	Co Rd 12 3/10 & 33rd St NW	Warning signs and continental crosswalk	45		1				2		
46	Uncontrolled Crossing	5th Ave NW & Co Rd 12 3/10	Warning signs and continental crosswalk	45		1				2		
47	Controlled Crossing	3rd Ave NW & Co Rd 12 3/10	Warning signs and continental crosswalk	45		1				2		
48	Controlled Crossing	Co Rd 12 3/10 & 4th Ave SW	Two-Way Stop	45	4,060	1				2		Change to All-way Stop
49	Controlled Crossing	4th Ave SW & Co Rd 14A	All-Way Stop with transverse line crosswalks	45	5,900	1				4		
50	Uncontrolled Crossing	21st St NW & W Kemp Ave	Warning signs and transverse lines crosswalk	35	2,930	1				2		
51	Controlled Crossing	4th Ave SW & 19th St SW	Two-Way Stop	35	5,900	1				2		
52	Controlled Crossing	4th Ave SW & 14th Ave SW	Two-Way Stop	35	5,900	1				2		
53	Uncontrolled Crossing	4th Ave SW west of S Kampeska Blvd	Warning signs and continental crosswalk	25	4,930	1				2		
54	Controlled Crossing	4th Ave SW & S Kampeska Blvd	Two-Way Stop	25	4,930	1				1		
55	Uncontrolled Crossing	W Kemp Ave & Kampeska Blvd	Warning signs and transverse lines crosswalk	25	5,700	1						
56	Uncontrolled Crossing	Kampeska Blvd north of W Kemp Ave	Curb cut with detectable warning surfaces	25	5,700	1						

ID	Name	Location	Existing Condition	Speed Limit (mph)	Daily Traffic Volumes	Crosswalks, Pavement Markings and Warning Signs (Typical)	HAWK Signal	RRFB	Construct ADA Ramp	Add Detectable Warning Surface (Truncated Domes)	8' x 20' Concrete Median Island With Refuge (Typical)	Other Proposed Improvement
57	Uncontrolled Crossing	W Kemp Ave east of 6th St NW	Warning signs and continental crosswalk	25	5,700	1				2		
58	Uncontrolled Crossing	1st Ave NW & 3rd St NW	Two-Way Stop	25	5,700	1				4		
59	Controlled Crossing	Codington County Hwy Shop & SD-20		50	7,768	1				2		
60	Controlled Crossing	Fireside Camper & SD-20		55	7,768	1				2		

Appendix C

FHWA Policy on Access to the Interstate System

Policy on Access to the Interstate System

May 22, 2017

Policy

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, the Federal Highway Administration's (FHWA) decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements:

Considerations and Requirements

1. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access should include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

2. The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

Application

This policy is applicable to new or revised access points to existing Interstate facilities regardless of the funding of the original construction or regardless of the funding for the new access points. This applicability includes routes incorporated into the Interstate System under the provisions of 23 U.S.C. 103(c)(4)(A) or other legislation.

Routes approved as a future part of the Interstate System under 23 U.S.C. 103(c)(4)(B) represent a special case because they are not yet a part of the Interstate System. Because the intention to add the route to the Interstate System has been formalized by agreement, any proposed new or significant changes in access beyond those covered in the agreement, regardless of funding, must be approved by FHWA.

This policy is not applicable to toll roads incorporated into the Interstate System, except for segments where Federal funds have been expended or these funds will be used for roadway improvements, or where the toll road section has been added to the Interstate System under the provisions of 23 U.S.C. 103(c)(4)(A). The term "segment" is defined as the project limits described in the Federal-aid project agreement.

Each break in the control of access to the Interstate System right-of-way is considered to be an access point. For the purpose of applying this policy, each entrance or exit point, including "locked gate" access, is considered to be an access point. For example, a diamond interchange configuration has four access points.

Ramps providing access to rest areas, information centers, and weigh stations within the Interstate controlled access are not considered access points for the purpose of applying this policy. These facilities must be accessible to vehicles only to and from the Interstate System. Access to or from these facilities and local roads and adjoining property is prohibited. The only allowed exception is for access to adjacent publicly owned conservation and recreation areas, if access to these areas is available only through the rest area, as allowed under 23 CFR 752.5(d).

Generally, any change in the design of an existing access point is considered a change to the interchange configuration, even though the number of actual points of access may not change. For example, replacing one of the direct ramps of a diamond interchange with a loop, or changing a cloverleaf interchange into a fully directional interchange would be considered revised access for the purpose of applying this policy.

All requests for new or revised access points on completed Interstate highways must closely adhere to the planning and environmental review processes as required in 23 CFR 450 and 771.

The FHWA approval constitutes a Federal action and, as such, requires that the transportation planning, conformity, congestion management process, and the National Environmental Policy Act procedures be followed and their requirements satisfied. The final FHWA approval of requests for new or revised access cannot precede the completion of these processes or necessary actions.[1]

[1] State DOTs may assume FHWA environmental review responsibilities under 23 U.S.C. 326 (Categorical Exclusion assignment program) or 23 U.S.C. 327 (Surface Transportation Project Delivery Program). The FHWA retains final approval authority of the Interstate System access change request once the project receives safety, operational, and engineering acceptability and environmental review.

To offer maximum flexibility, however, any proposed change in access can be submitted by a State department of transportation (State DOT) to the FHWA division office for a determination of safety, operational, and engineering acceptability.[2] This flexibility allows agencies the option of obtaining this acceptability determination prior to making the required modifications to the transportation plan, performing any required conformity analysis, and completing the environmental review and approval process. In this manner, State DOTs can determine if a proposal is acceptable for inclusion as an alternative in the environmental process. This policy in no way alters the planning, conformity, or environmental review and approval procedures as contained in 23 CFR 450 and 771, and 40 CFR 51 and 93.

An affirmative determination by FHWA of safety, operational, and engineering acceptability for proposals for new or revised access points to the Interstate System should be reevaluated whenever a significant change in conditions occurs (e.g., land use, traffic volumes, roadway configuration or design, or environmental commitments). Proposals may be reevaluated if the project has not progressed to construction within 3 years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a); see also 23 CFR 771.129). If the project is not constructed within this time period, FHWA may evaluate whether an updated justification report based on current and projected future conditions is needed to receive either an affirmative determination of safety, operational, and engineering acceptability, or final approval if all other requirements have been satisfied (23 U.S.C. 111, 23 CFR 625.2(a), and 23 CFR 771.129).

Implementation

State DOTs must submit requests for proposed changes in access to their FHWA Division Office for review and action under 23 U.S.C. 106 and 111(a), and 23 CFR 625.2(a). The FHWA Division Office will ensure that all requests for changes in access contain sufficient information, as required in this policy, to allow FHWA to independently evaluate and act on the request.

Effective Date

This policy replaces the policy of August 27, 2009 on "Access to the Interstate System," published at 74 *Federal Register* 43743. The changes in this policy are made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

This policy is effective as of May 22, 2017.

[2] The FHWA may delegate approval authority for some Interstate access justification reports to State DOTs pursuant to 23 U.S.C. 111(e). See https://www.fhwa.dot.gov/design/interstate/160426.cfm. The FHWA retains final approval authority of the Interstate System access change request once the project receives safety, operational, and engineering acceptability and environmental review.

Appendix D

Future Conditions Analysis

Technical Memo

Date:	Friday, April 09, 2021
Project:	Watertown Master Transportation Plan
To:	Study Advisory Team
From:	HDR
Subject:	Future Conditions - Traffic Volumes, Operations, & Build Alternatives

Introduction

The purpose of this memorandum is to evaluate the impact of 2030 and 2040 future-year traffic volumes on the existing Watertown transportation system, focusing on corridors and study intersections. The goal of this analysis is to identify intersection and corridor related traffic capacity and operational needs through the 2040 Planning Horizon. Based on these analyses, Build Alternatives were developed to address operational and deficiencies.

Future Conditions Traffic Volume Scenarios

The 2030 Interim Conditions and 2040 Planning Horizon Conditions traffic volumes were developed from 2020 Existing Conditions volumes, documented in the *Existing Conditions* memo, and future land use trip generation derived from the *City of Watertown 2020 Comprehensive Land Use Plan*.

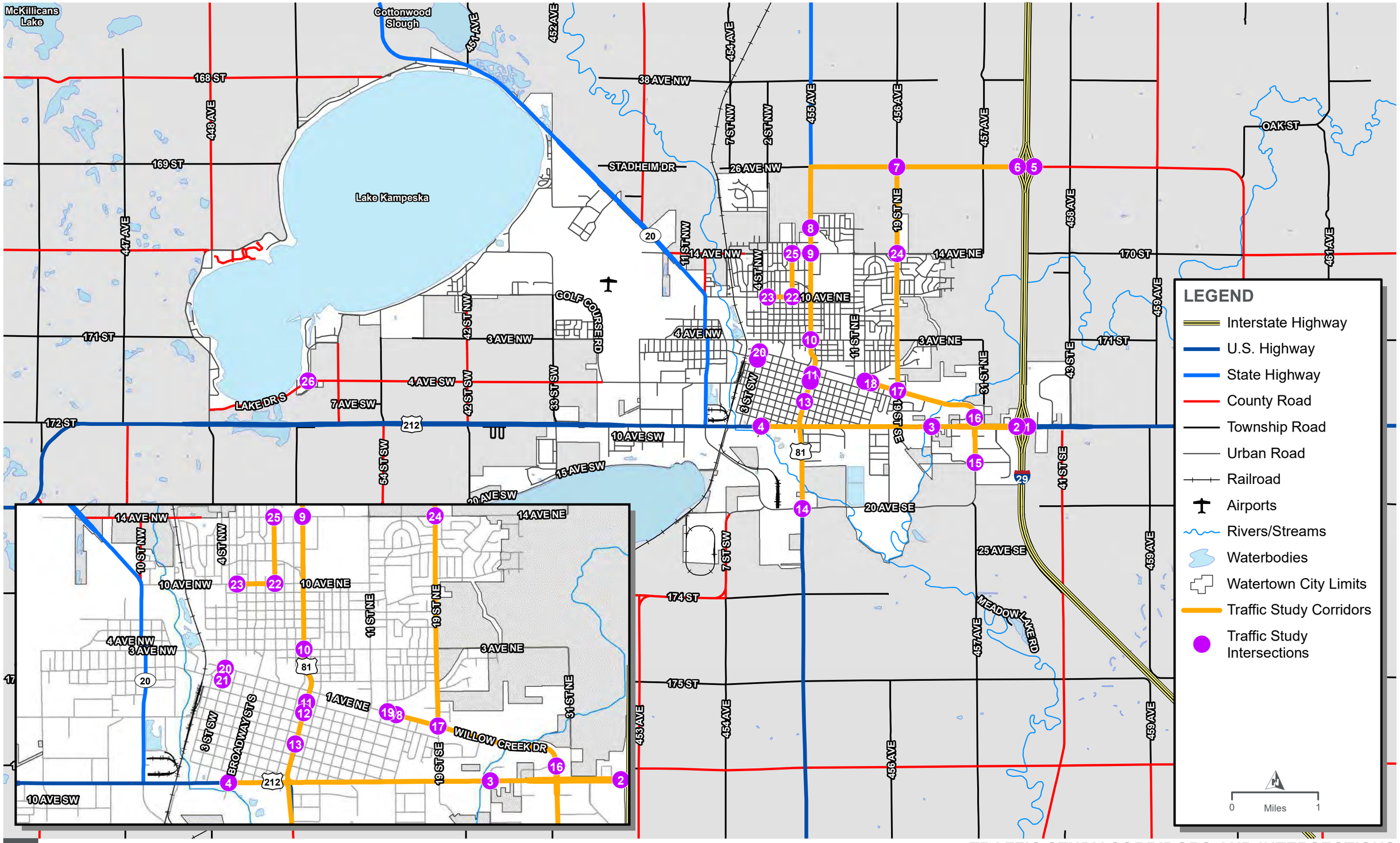
Scenario Development

AM and PM peak hour intersection turning movement volumes were developed for future conditions traffic volume scenarios along the following corridors (shown in **Figure 1**):

- **US 212 (9th Avenue SE)** – from Broadway Street S to I-29 NB Exit 177 RTI
- **US 81(5th Street E/26th Avenue NE)** – from 20th Avenue SE to I-29 NB Exit 180 RTI
- **1st Avenue NE/Willow Creek Drive (29th Street SE)** – from US 212 to 13th Street NE
- **19th Street (456th Avenue)** – from 1st Avenue NE to US 81 (26th Avenue NE)
- **3rd Street NW** – from W Kemp Avenue to 1st Avenue NW
- **10th Avenue NW** – from 2nd Street W to N Maple Street
- **N Maple Street** – from 10th Avenue N to 14th Avenue N

In addition, similar peak hour scenarios were developed for the isolated South Lake Drive and 4th Avenue SW intersection.

2020 Existing Conditions volumes were factored to years 2030 and 2040. In addition, future development volumes were added to the factored volumes for each scenario based on future land uses outlined in the Comprehensive Land Use Plan.



TRAFFIC STUDY CORRIDORS AND INTERSECTIONS

FIGURE 1

WATERTOWN MASTER TRANSPORTATION PLAN - FUTURE CONDITIONS MEMO

Growth Factors

2020 Existing Conditions volumes were factored to years 2030 and 2040 based on SDDOT-provided growth rate factors for Codington County. Interpolation was used to calculate growth factors for 2030 Interim Conditions volumes (10-year growth).

County-wide Growth Factors:

- Urban Arterials/Collectors/Locals (Codington County):
  - 10-year: 1.177
  - 20-year: 1.353
- Rural Arterials/Collectors/Locals (Codington County):
  - 10-year: 1.165
  - 20-year: 1.330

2030 Interim Conditions Traffic Volumes

The future-year 2030 Interim Conditions traffic volumes are presented in the following figures.

CITY-WIDE DAILY SEGMENT VOLUMES

2030 Interim Conditions Daily Traffic Volumes (**Figure 2**)

CORRIDOR SCENARIOS – PEAK HOUR INTERSECTION VOLUMES

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI (**Figure 3**)

US 81 (5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI (**Figure 4** and **Figure 5**)

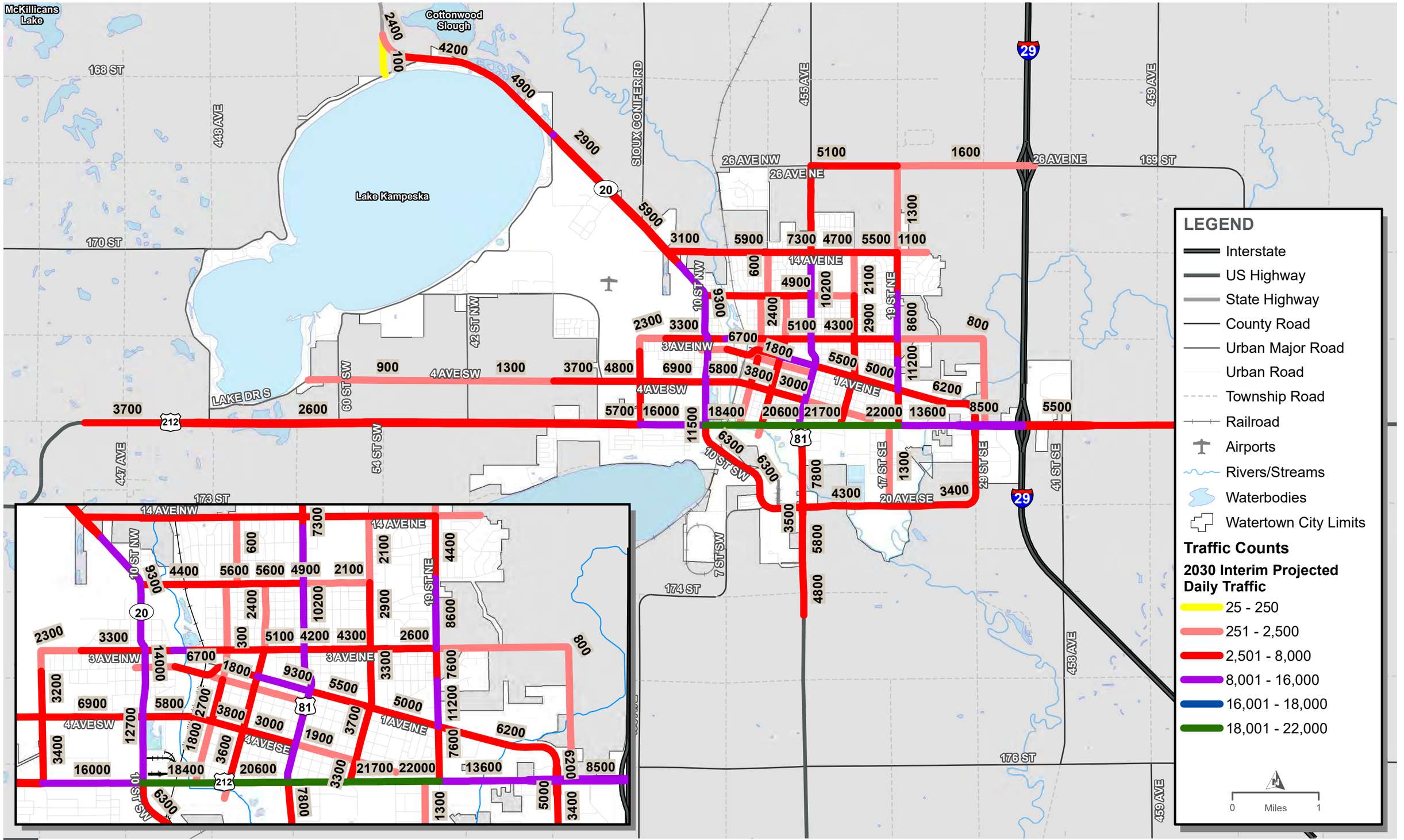
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 6**)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE) (**Figure 7**)

3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 8**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 9**)

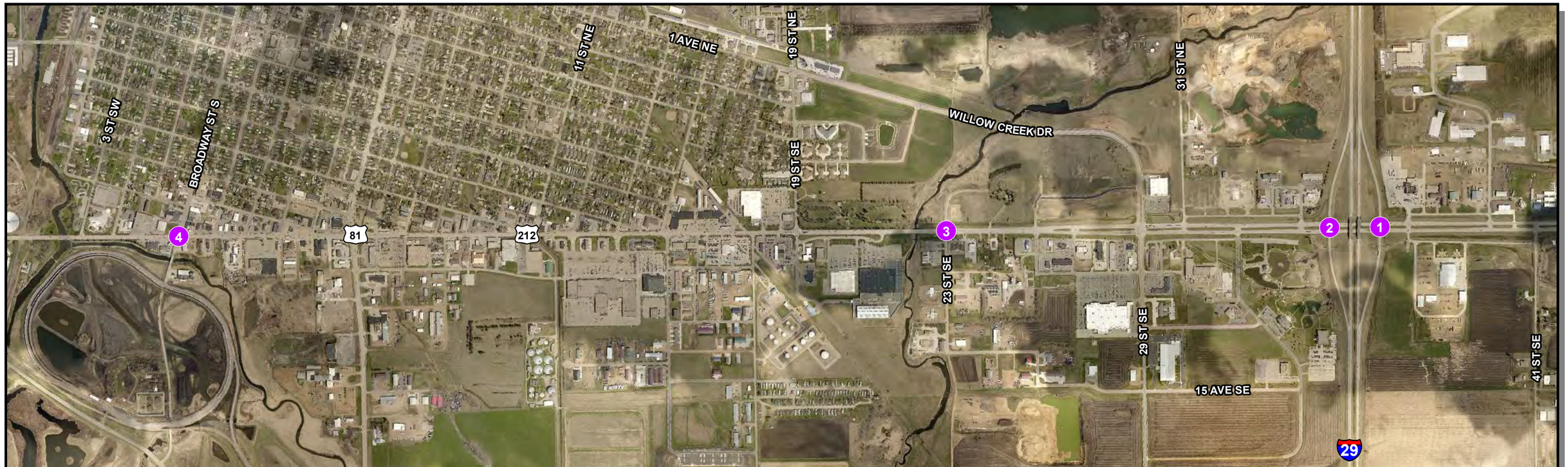
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 10**)



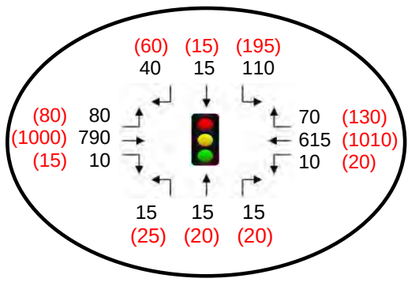
2030 INTERIM PROJECTED DAILY TRAFFIC VOLUMES

FIGURE 2

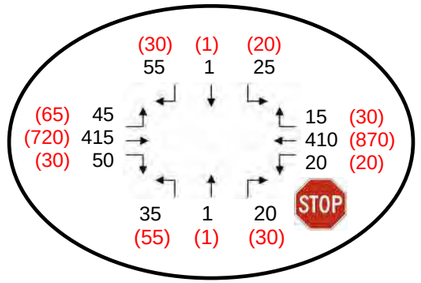
WATERTOWN MASTER TRANSPORTATION PLAN - FUTURE CONDITIONS MEMO



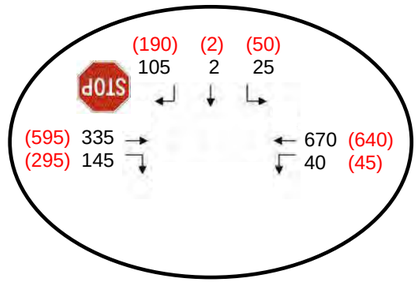
4. US 212 & Broadway Street S



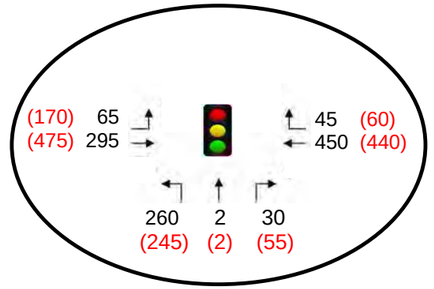
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

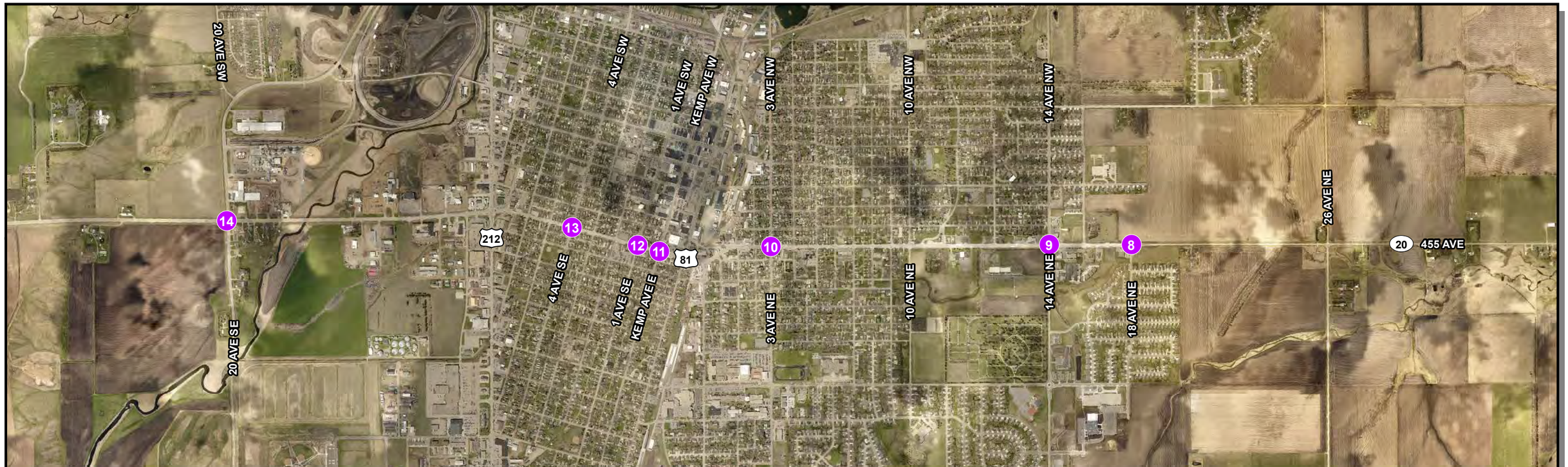
STOP Stop Control

Notes:
* Volumes reflect September design season.

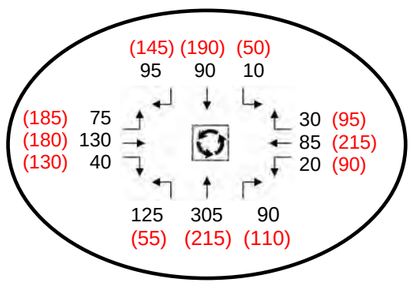
0 Miles 0.2

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

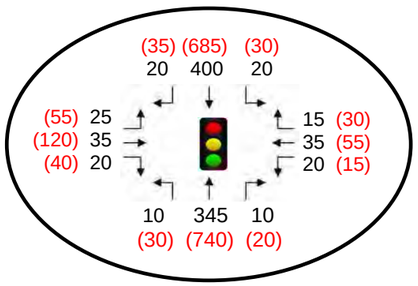
FIGURE 3



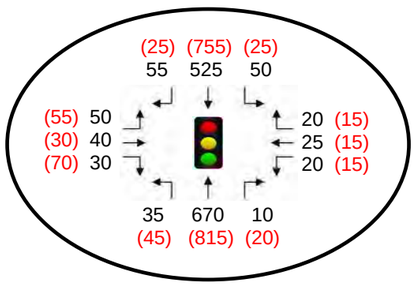
14. US 81 & 20th Ave SE



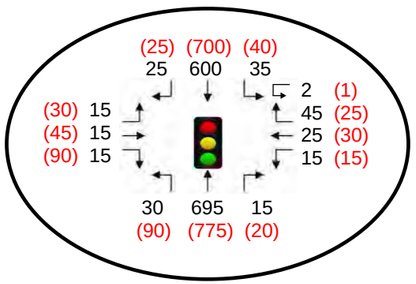
13. US 81 & 4th Avenue SE



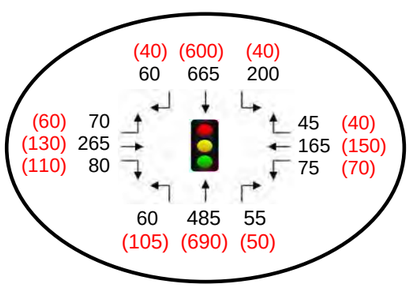
12. US 81 & 1st Avenue SE



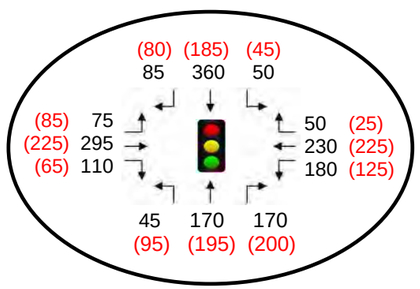
11. US 81 & E Kemp Avenue



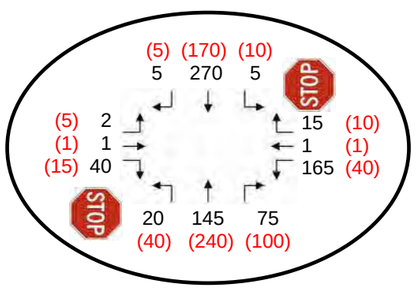
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

Roundabout Control

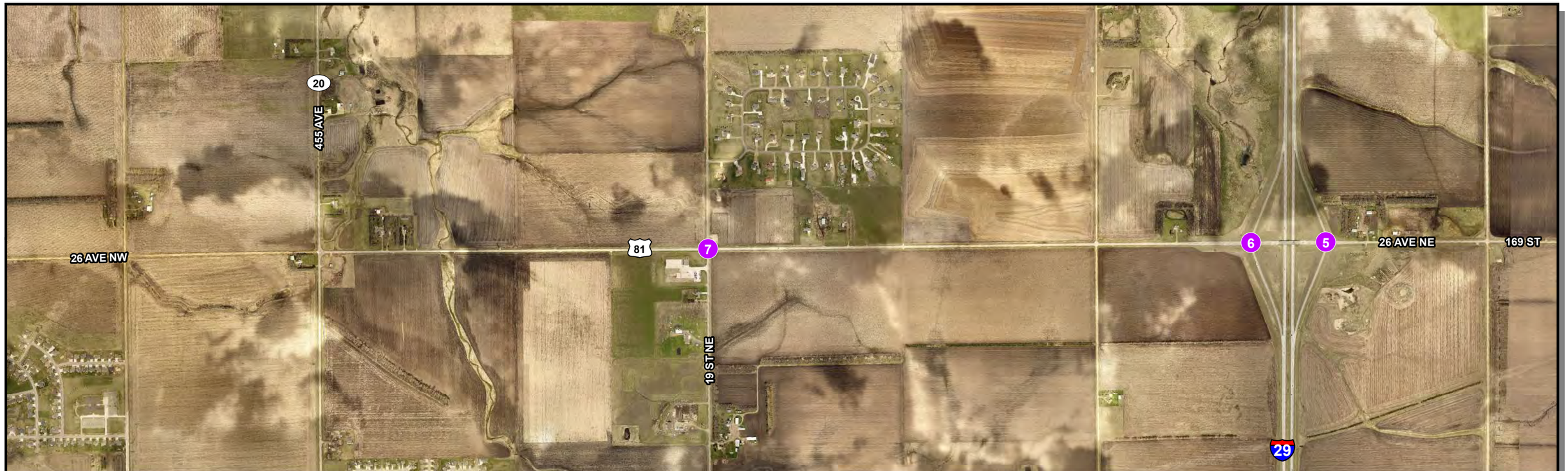
Notes:

* Volumes reflect September design season.
** US 81 (5th Street E) corridor turning movements are shown with the same northbound orientation as previous figures.

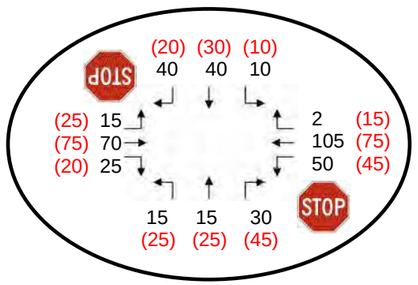
0 Miles 0.35

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS) US 81 (5TH STREET E) CORRIDOR

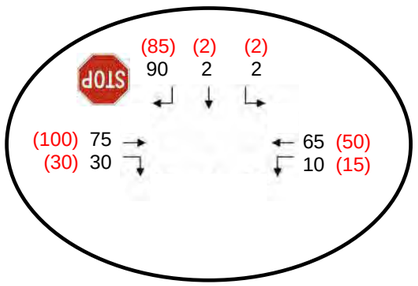
FIGURE 4



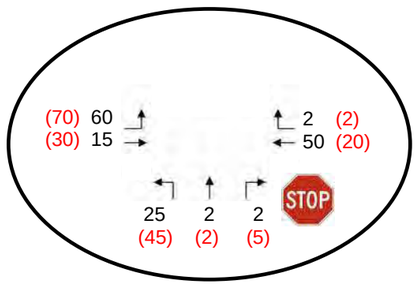
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

STOP Stop Control

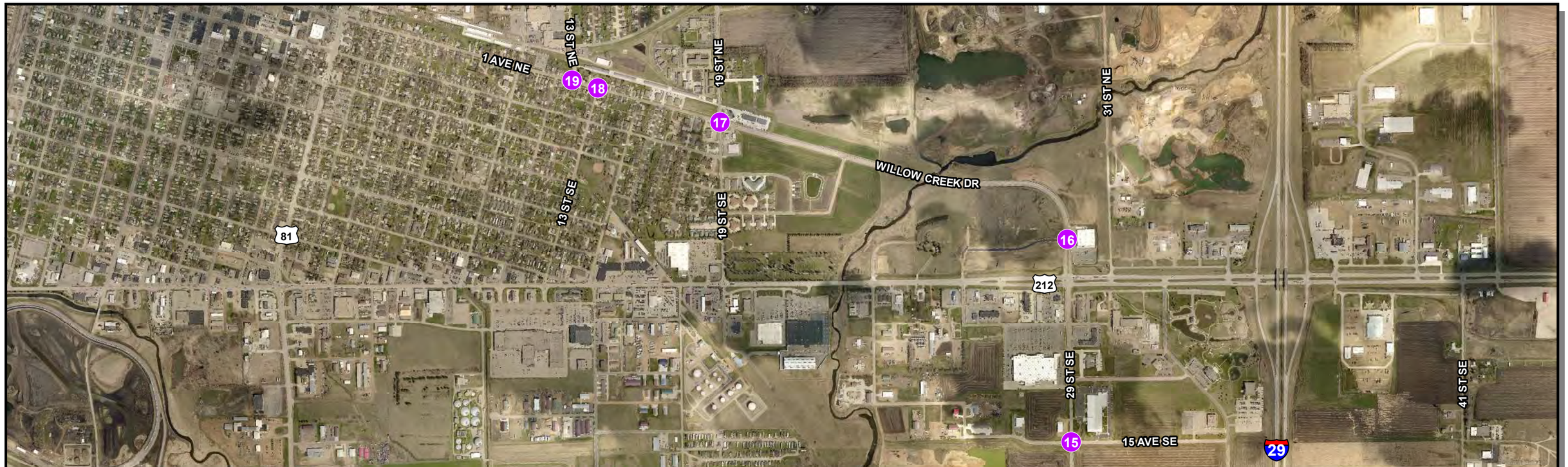
Notes:
* Volumes reflect September design season.

0 Miles 0.25

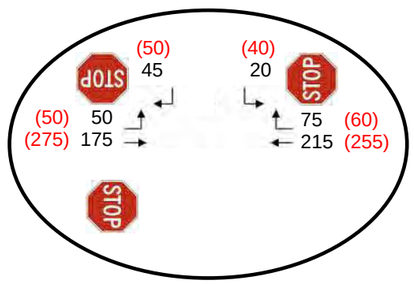
HDR

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 81 (26TH AVENUE NE) CORRIDOR

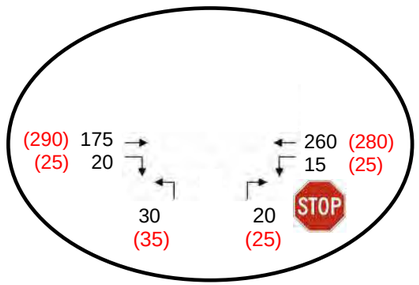
FIGURE 5



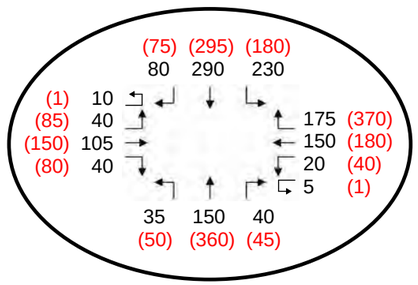
19. 1st Avenue NE & 13th Street NE (NB)



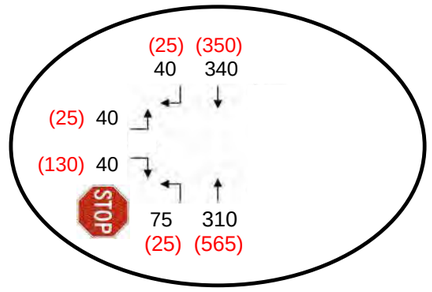
18. 1st Avenue NE & 13th Street NE (SB)



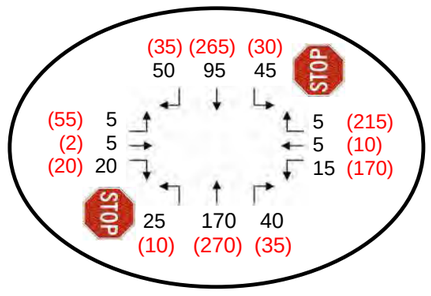
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

STOP Stop Control

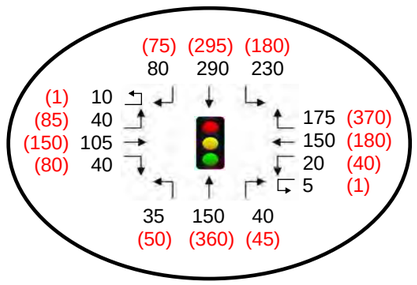
Notes:
* Volumes reflect September design season.

0 Miles 0.2

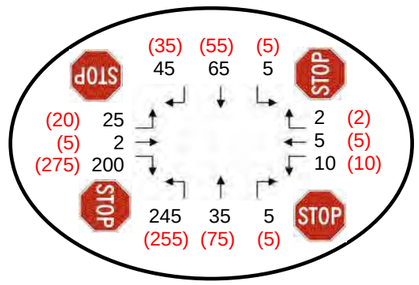
2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

FIGURE 6

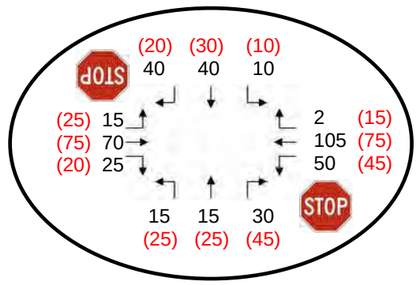
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

Roundabout

Notes:
* Volumes reflect September design season.
** 19th Street NE corridor turning movements are shown with the same northbound orientation as previous figures.

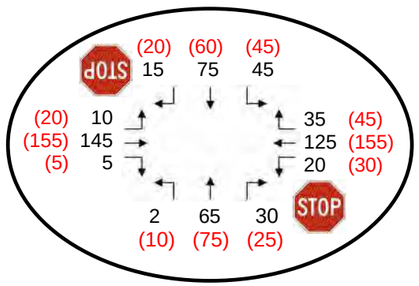
0 Miles 0.3

HDR

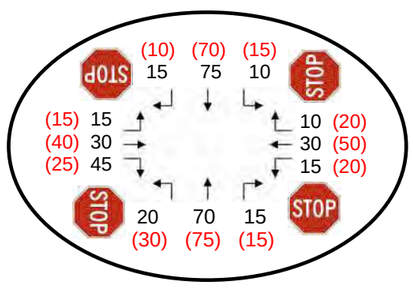
2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 7

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

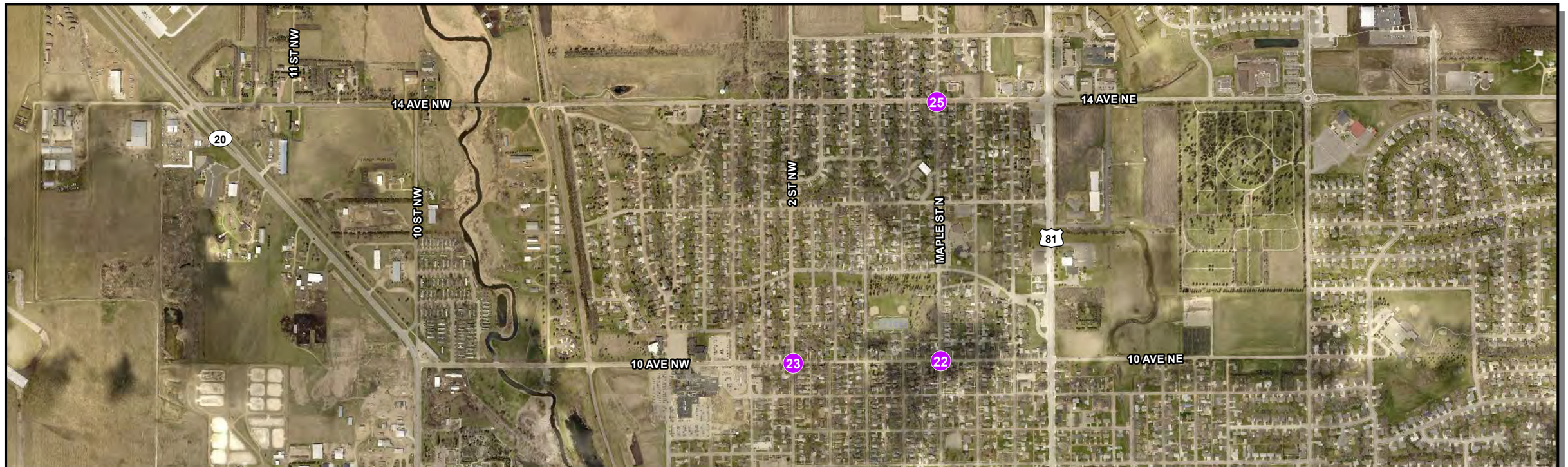
- Signal
- Stop Control
- Roundabout

Notes:
* Volumes reflect September design season.

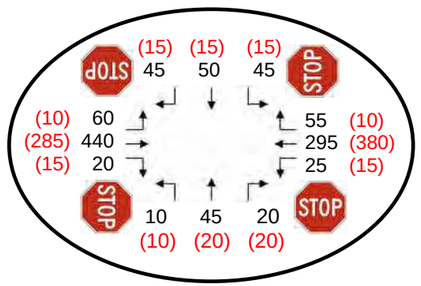
0 Miles 0.05

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS) 3RD STREET NW CORRIDOR

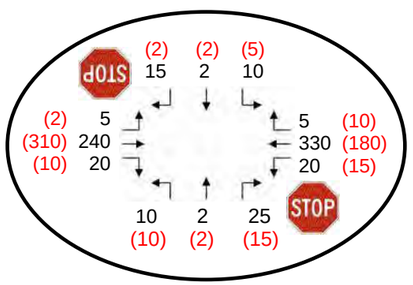
FIGURE 8



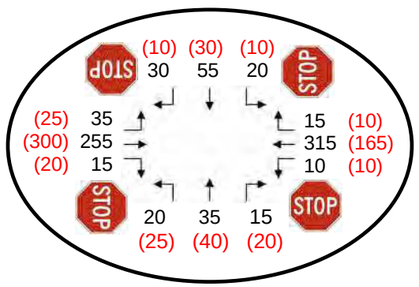
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

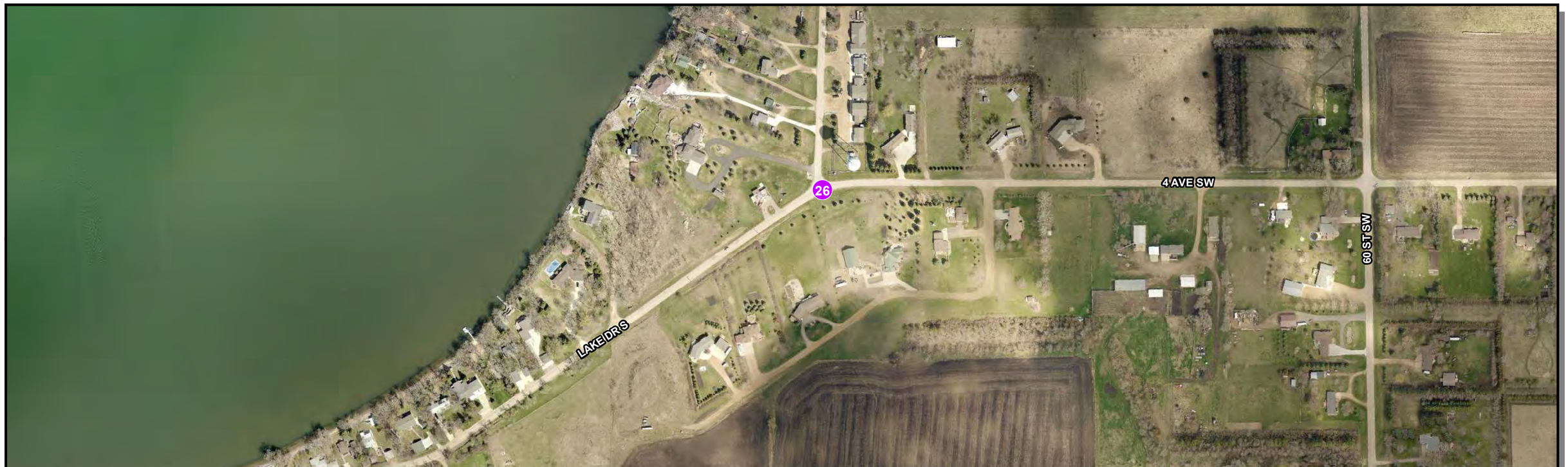
Roundabout

Notes:
* Volumes reflect September design season.

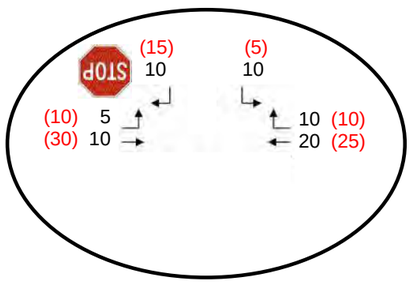
0 Miles 0.15

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 9



26. South Lake Drive & 4th Avenue SW



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

STOP Stop Control

Notes:
* Volumes reflect September design season.

0 Miles 0.05

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
SOUTH LAKE DRIVE & 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 10

2040 Planning Horizon Conditions Traffic Volumes

The future-year 2040 Planning Horizon Conditions traffic volumes are presented in the following figures.

CITY-WIDE DAILY SEGMENT VOLUMES

2040 Planning Horizon Conditions Daily Traffic Volumes (**Figure 11**)

CORRIDOR SCENARIOS – PEAK HOUR INTERSECTION VOLUMES

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI (**Figure 12**)

US 81 (5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI (**Figure 13** and **Figure 14**)

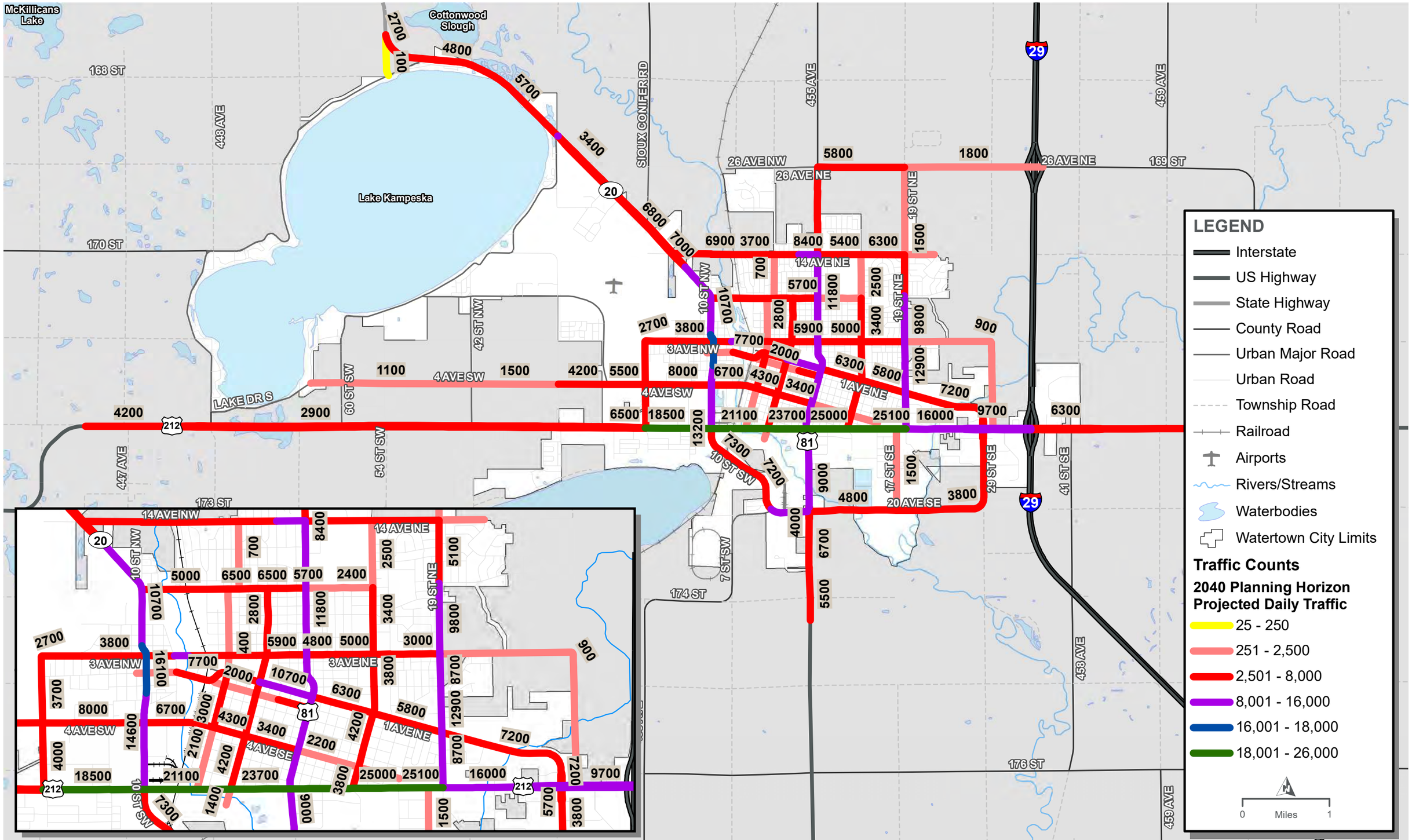
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 15**)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE) (**Figure 16**)

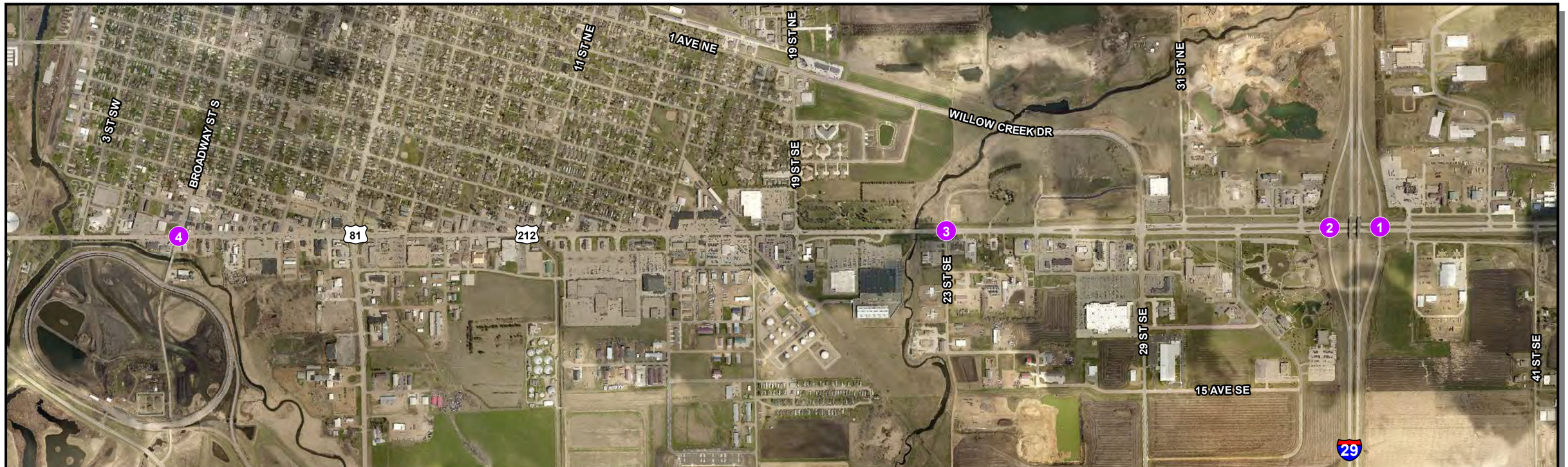
3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 17**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 18**)

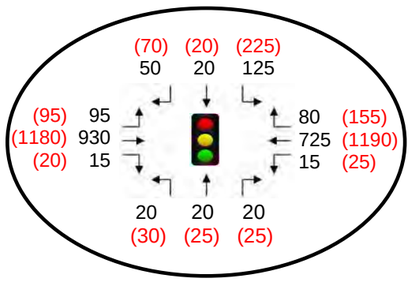
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 19**)



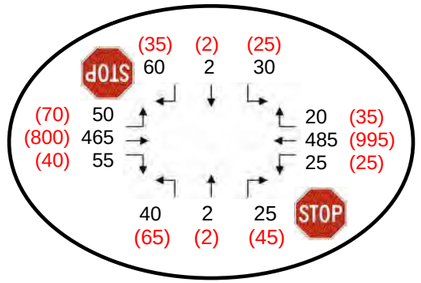
2040 PLANNING HORIZON PROJECTED DAILY TRAFFIC VOLUMES



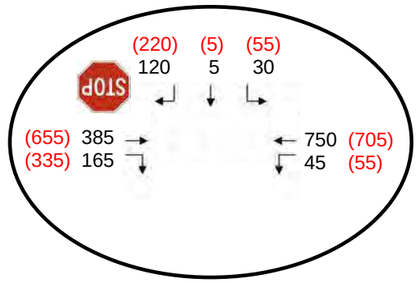
4. US 212 & Broadway Street S



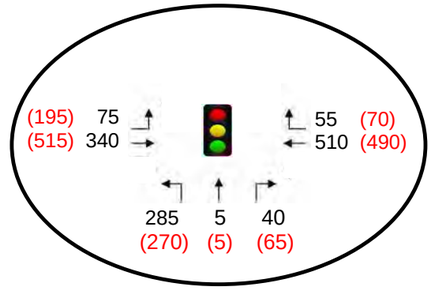
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

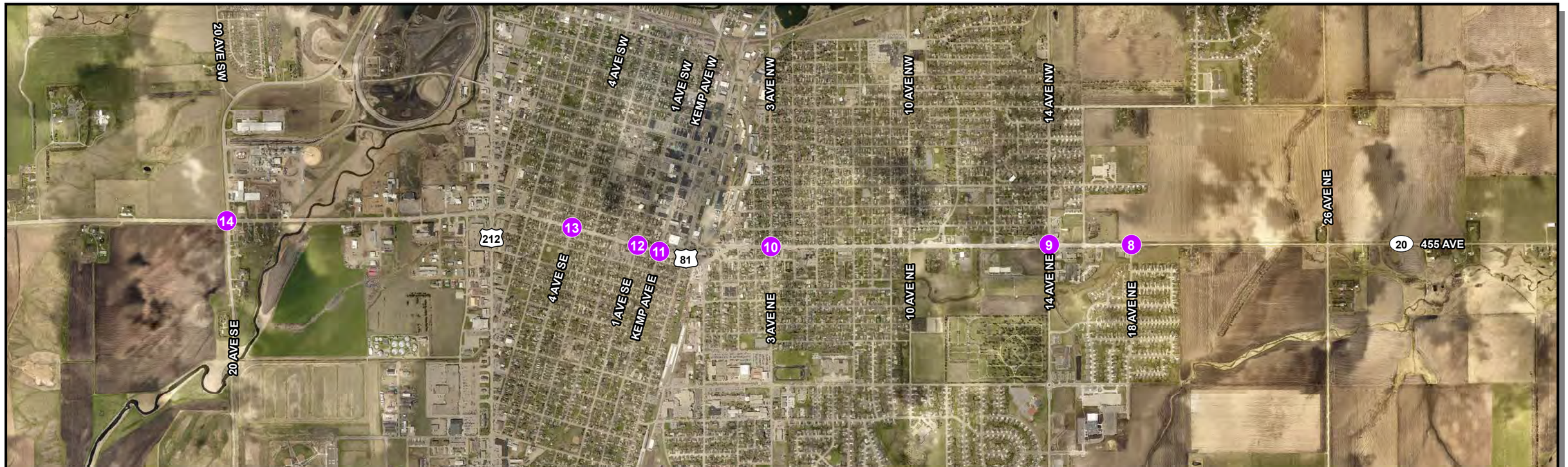
STOP Stop Control

Notes:
* Volumes reflect September design season.

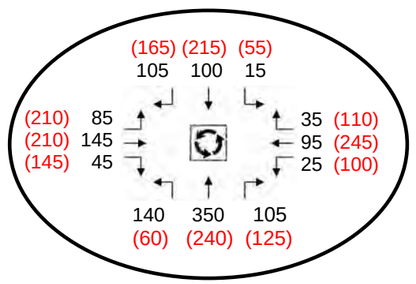
0 Miles 0.2

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

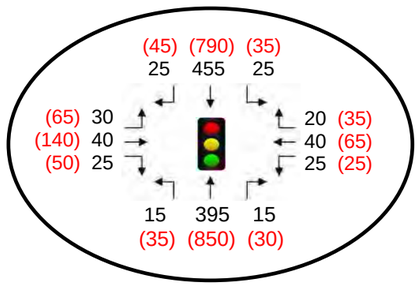
FIGURE 12



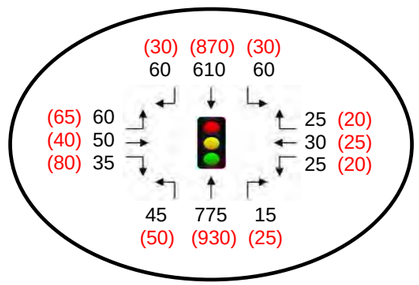
14. US 81 & 20th Ave SE



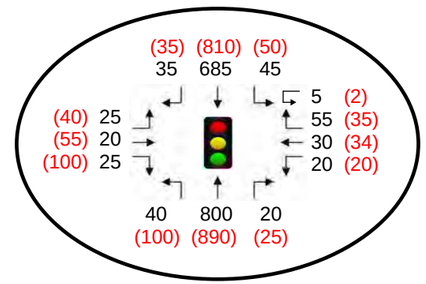
13. US 81 & 4th Avenue SE



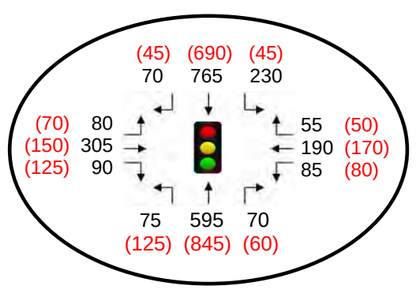
12. US 81 & 1st Avenue SE



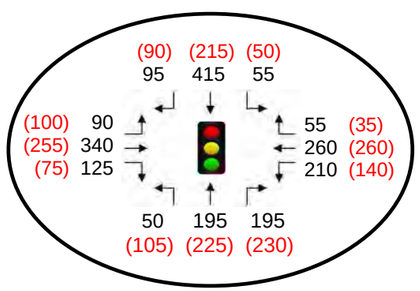
11. US 81 & E Kemp Avenue



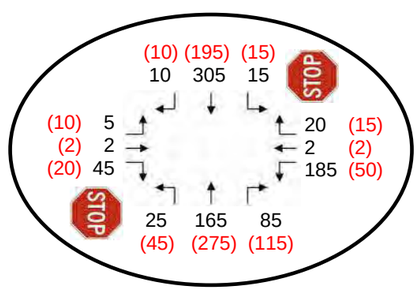
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

Roundabout Control

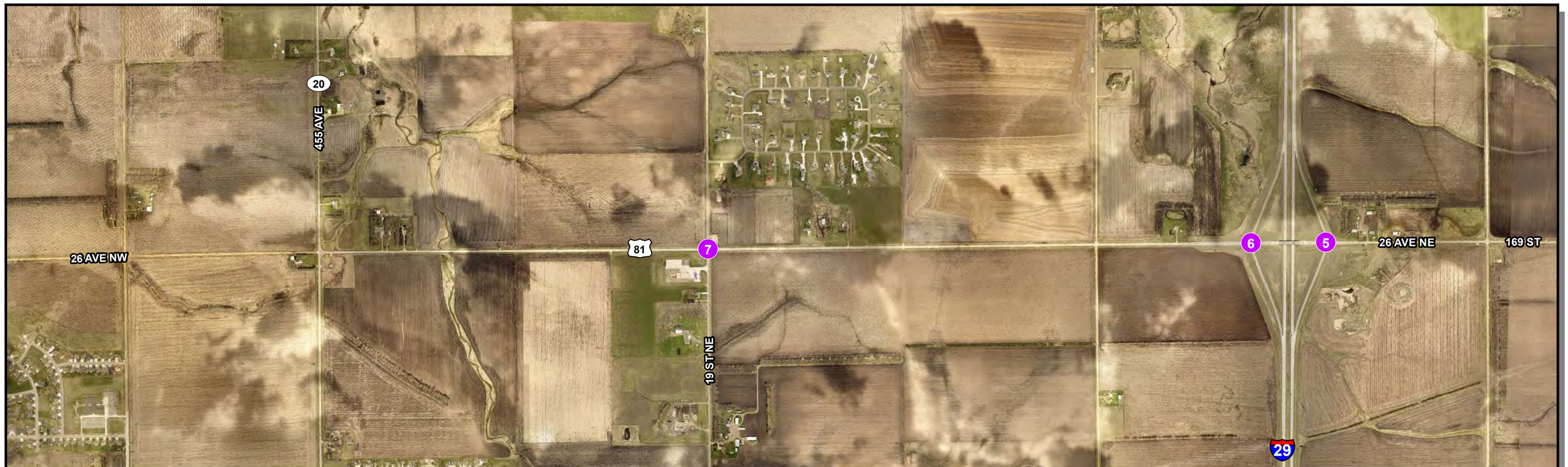
Notes:

* Volumes reflect September design season.
** US 81 (5th Street E) corridor turning movements are shown with the same northbound orientation as previous figures.

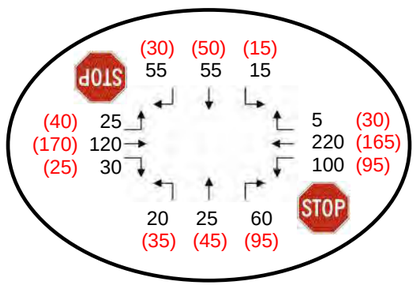
0 Miles 0.35

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

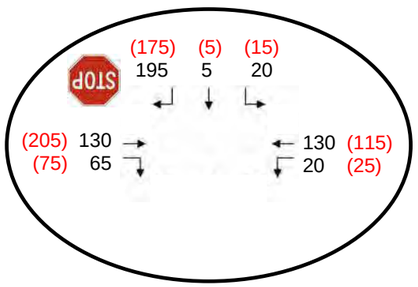
FIGURE 13



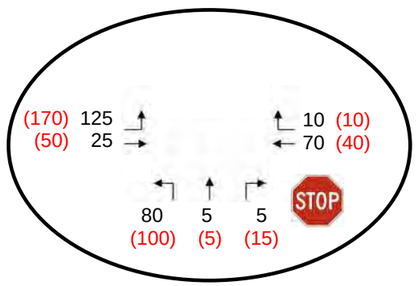
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

STOP Stop Control

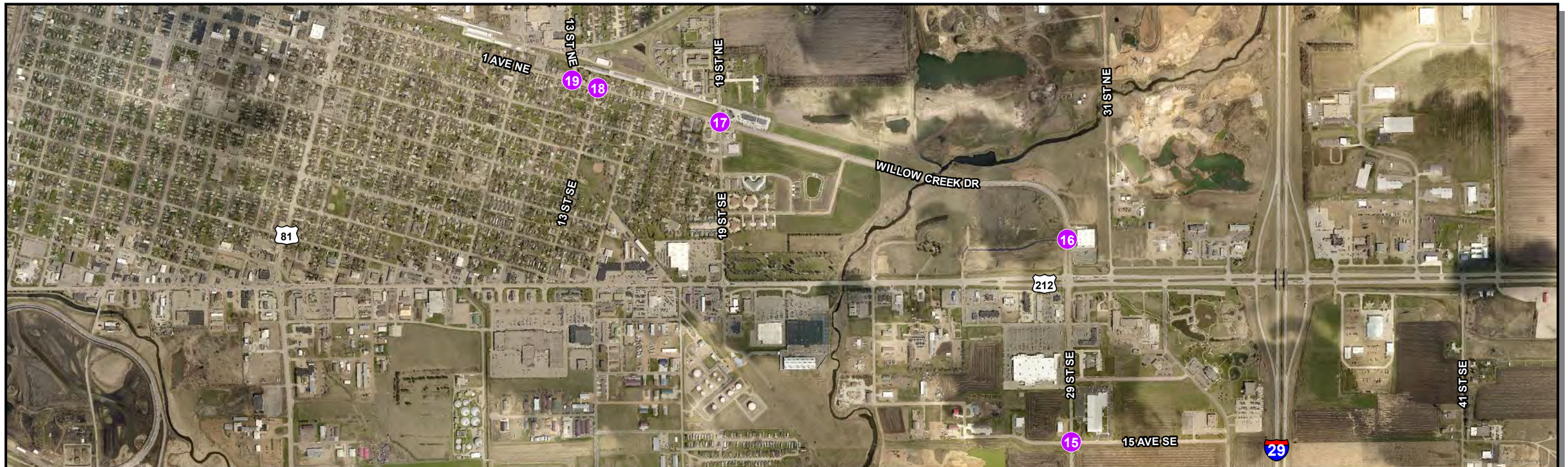
Notes:
* Volumes reflect September design season.

0 Miles 0.25

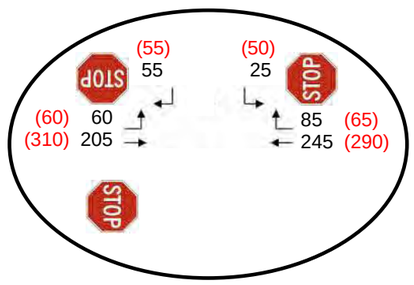
HDR

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 81 (26TH AVENUE NE) CORRIDOR

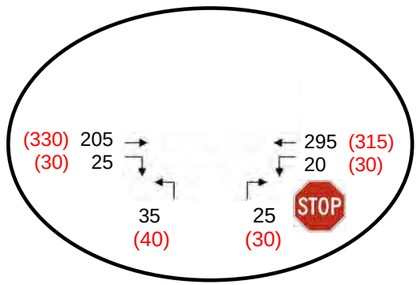
FIGURE 14



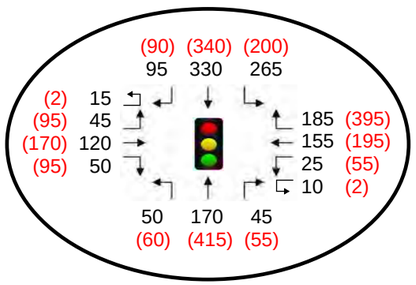
19. 1st Avenue NE & 13th Street NE (NB)



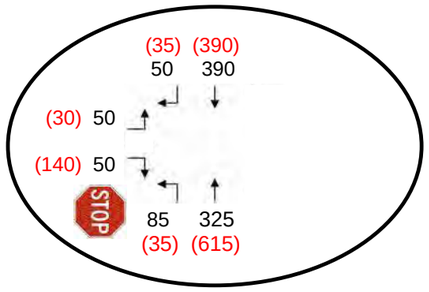
18. 1st Avenue NE & 13th Street NE (SB)



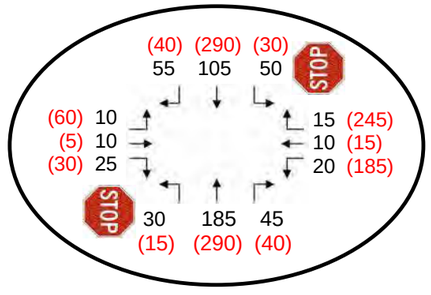
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

STOP Stop Control

Notes:
* Volumes reflect September design season.

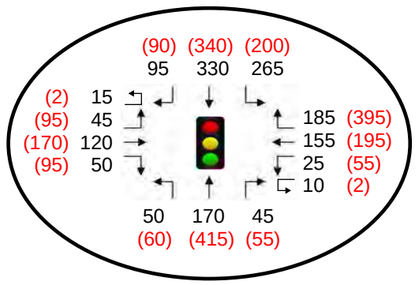
0 Miles 0.2

HDR

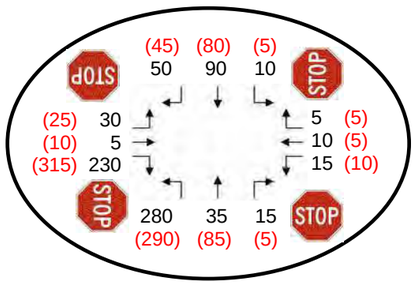
2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

FIGURE 15

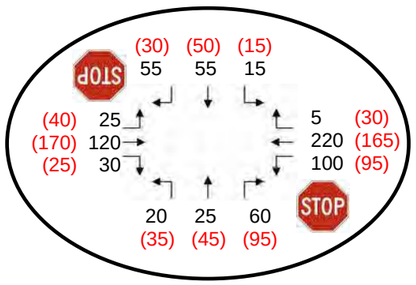
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

Roundabout

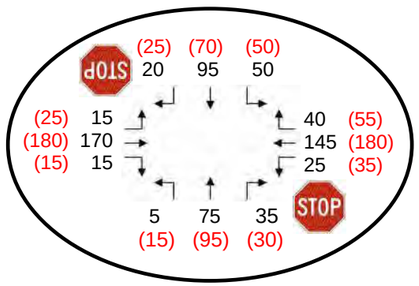
Notes:
* Volumes reflect September design season.
** 19th Street NE corridor turning movements are shown with the same northbound orientation as previous figures.

0 Miles 0.3

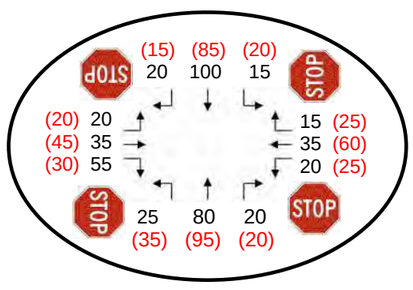
2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 16

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

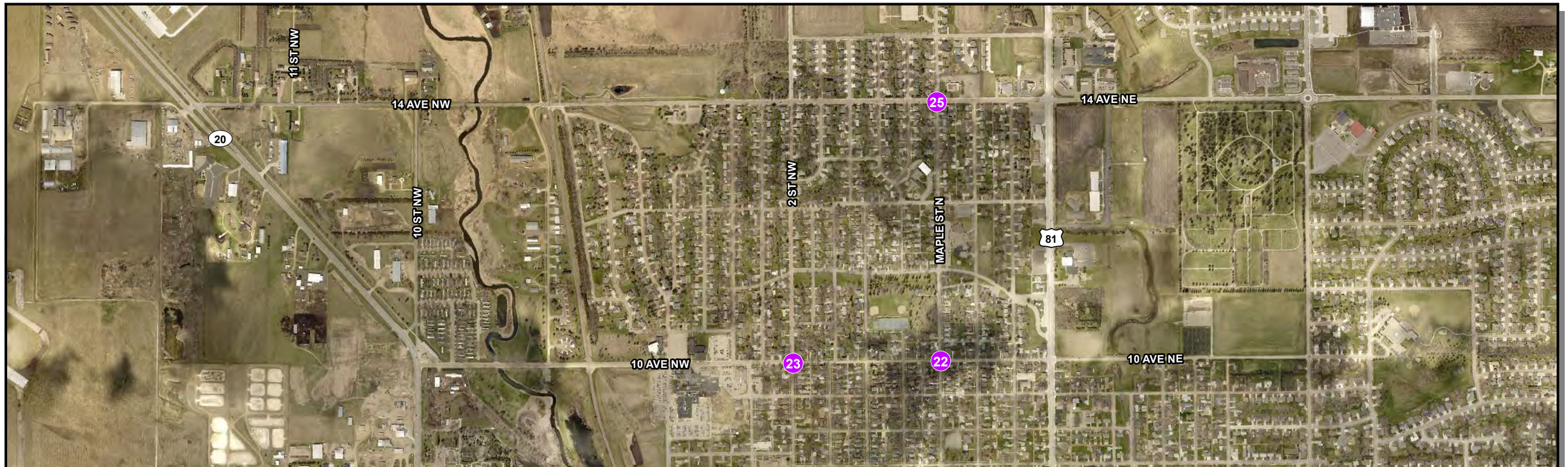
Roundabout

Notes:
* Volumes reflect September design season.

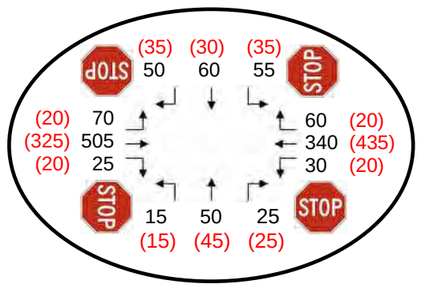
0 Miles 0.05

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
3RD STREET NW CORRIDOR

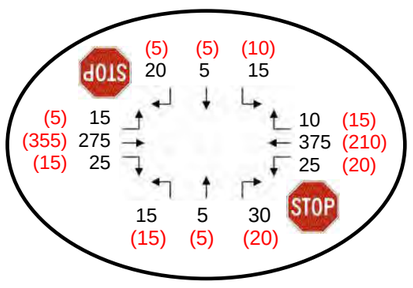
FIGURE 17



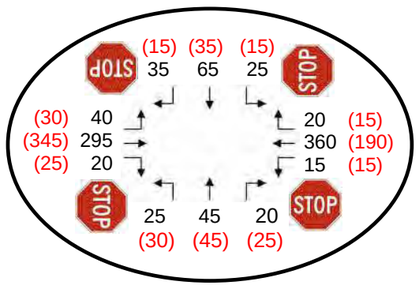
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

Signal

Stop Control

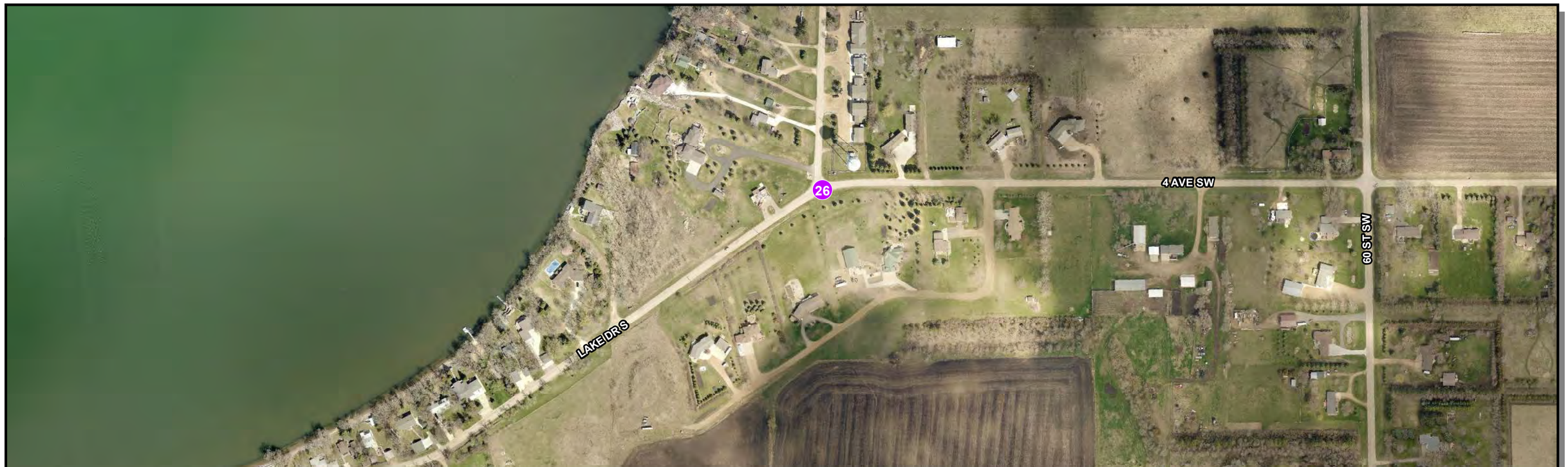
Roundabout

Notes:
* Volumes reflect September design season.

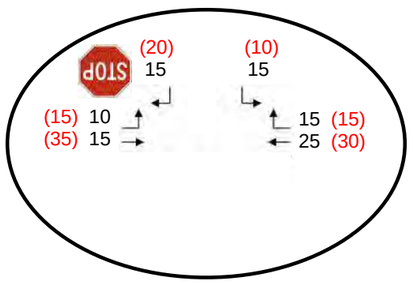
0 Miles 0.15

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 18



26. South Lake Drive & 4th Avenue SW



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Existing Traffic Control

STOP Stop Control

Notes:
* Volumes reflect September design season.

0 Miles 0.05

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
SOUTH LAKE DRIVE & 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 19

Future Conditions Traffic Operations

The following section discusses the results of traffic operations analyses based on future-year volume scenarios 2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) Conditions. This analysis consisted of a planning level number of lanes review, which evaluates segment capacity, and intersection operations analysis for the study intersections. These No-Build scenarios reflect similar roadway features to the 2020 Existing Conditions scenario but apply future-year traffic to the existing roadway network. This helps to identify future needs along study corridors and intersections. For these scenarios, it is assumed that signal timings would be updated as traffic increases and patterns change, so signal timings were optimized in the 2030 Interim and 2040 Planning Horizon Synchro models.

Planning Level Number of Lanes Review

Planning-level number of lanes review is based on LOS-based capacity thresholds for different roadway cross-sections presented in the SDDOT Road Design Manual Chapter 15 (Table 15-10). Color-coding in **Figure 20** and **Figure 21** is based on where the volume falls within **Table 1** thresholds. Traffic patterns, traffic signals or other intersection control, number of access points, and number of major interesting roadways are considerations that typically dictate design needs. Therefore, it is recommended that planning-level number of lanes on either side of the thresholds be considered for segments where volumes are near the cut-off point and specific improvements be analyzed in a more detailed traffic operations analysis

Table 1: Estimated Number of Lanes[1]

Total Number of Lanes	Total Design Year (ADT)[1]	
	Rural Level	Urban
2	< 8,000	< 6,000*
3	[2]	2,500 to 16,000
4	8,000 to 20,000[3]	[3]
5	[2]	16,000 to 30,000
6	> 20,000[4]	> 30,000[4]

* Urban ADT threshold for 2 lanes was modified for this study to approximate LOS C conditions.

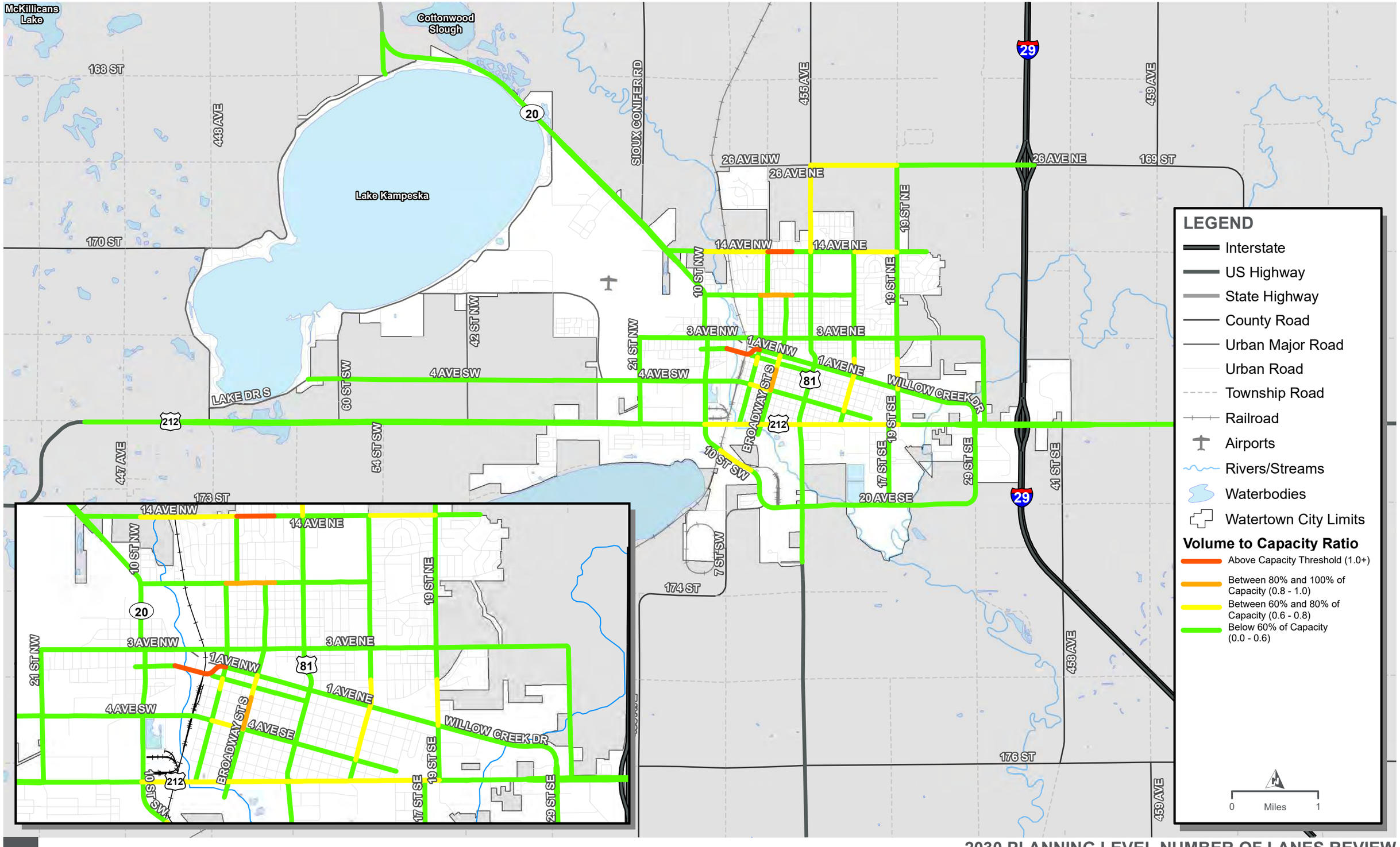
1 Construction/Reconstruction projects are designed based on a typical 20 year ADT project beyond the anticipated year of project construction.

2 Continuous left turn lanes may be considered based on left turn volumes and/or when intersections and/or approaches are closely spaced together.

3 Undivided sections may be used if left turn movements are low and there is no crash history, otherwise consider installing a median or 5 lane section.

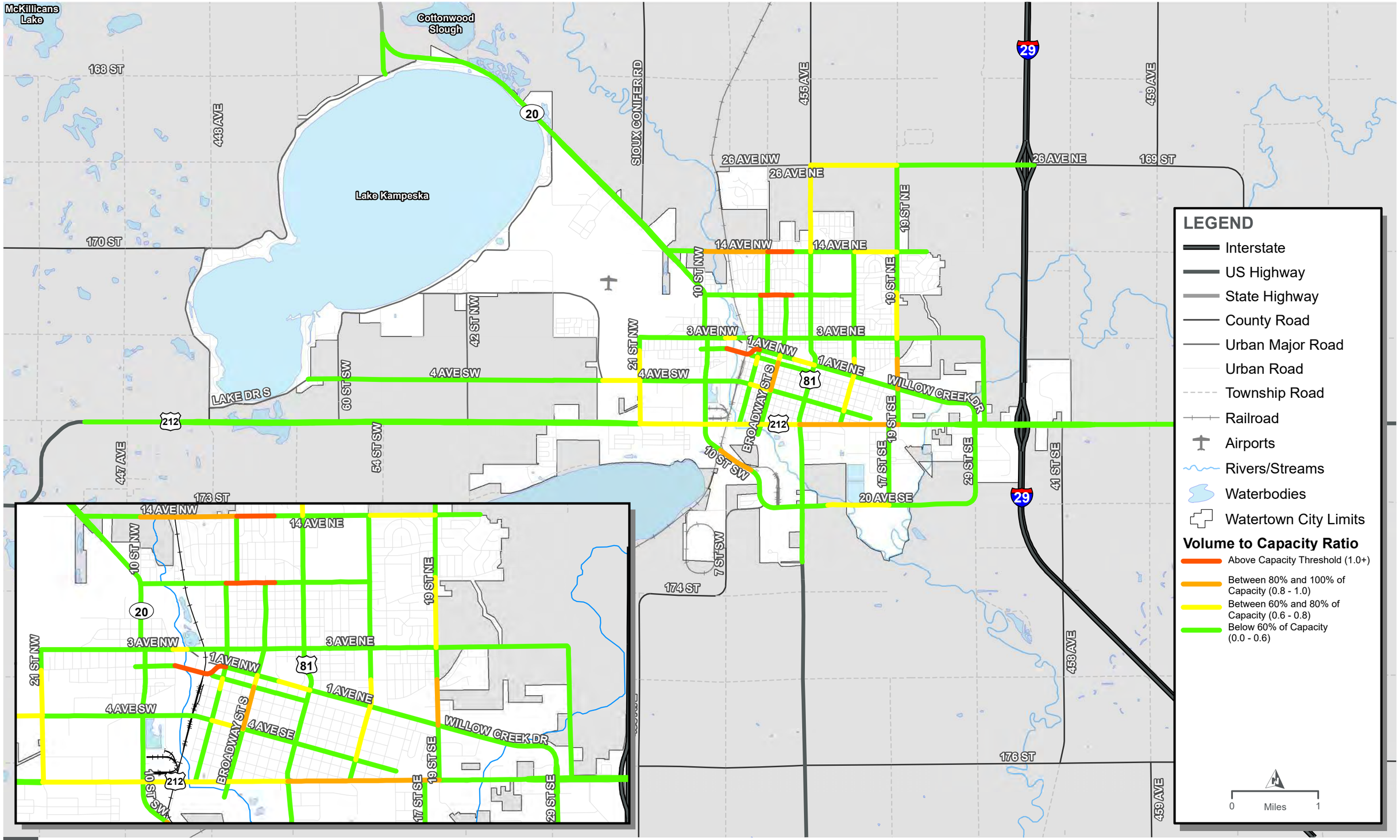
4 Medians should be used.

[1] Road Design Manual – Chapter 15: Table 15-10 (South Dakota Department of Transportation)



2030 PLANNING LEVEL NUMBER OF LANES REVIEW

FIGURE 20



2040 PLANNING LEVEL NUMBER OF LANES REVIEW

FIGURE 21

Intersection Operations

The intersection traffic operations analysis was conducted using Synchro 10 software. Level of Service (LOS) results, which is a measure of average vehicular delay at the intersection, are presented from the Highway Capacity Manual 6th Edition (HCM6) reporting module from Synchro. Thresholds for applicable LOS measures are provide in **Table 2**.

Table 2: Level of Service Definitions[2]

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)	All-Way Stop, Two-Way Stop, and Roundabout Intersection Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80; volume exceeds capacity	> 50; volume exceeds capacity

LOS goals for this study are as follows:

- Signalized Intersections:
  - Rural area minimum allowable LOS – LOS B
  - Urban area minimum allowable LOS – LOS C
    - Individual movements allowed to operate at LOS E or better.
- Roundabouts:
  - Minimum allowable LOS – LOS C
- Two-Way Stop-Controlled Intersections:
  - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
  - Urban area minimum allowable LOS – LOS C (weighted average intersection approach)

Urban area analysis is applicable for facilities within Watertown City limits. Locations where the LOS exceeds (worse) these study goals demonstrates an operation or capacity-related need to be addressed later in the study.

2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) conditions scenario operational measures are presented in the following figures. Synchro reports are included in the **Appendix.**

[2] Highway Capacity Manual – 6th Edition (Transportation Research Board), 2016.

CORRIDOR SCENARIOS – 2030 PEAK HOUR INTERSECTION LEVEL OF SERVICE (LOS) (INTERIM NO-BUILD CONDITIONS)

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI (**Figure 22**)

US 81(5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI (**Figure 23** and **Figure 24**)

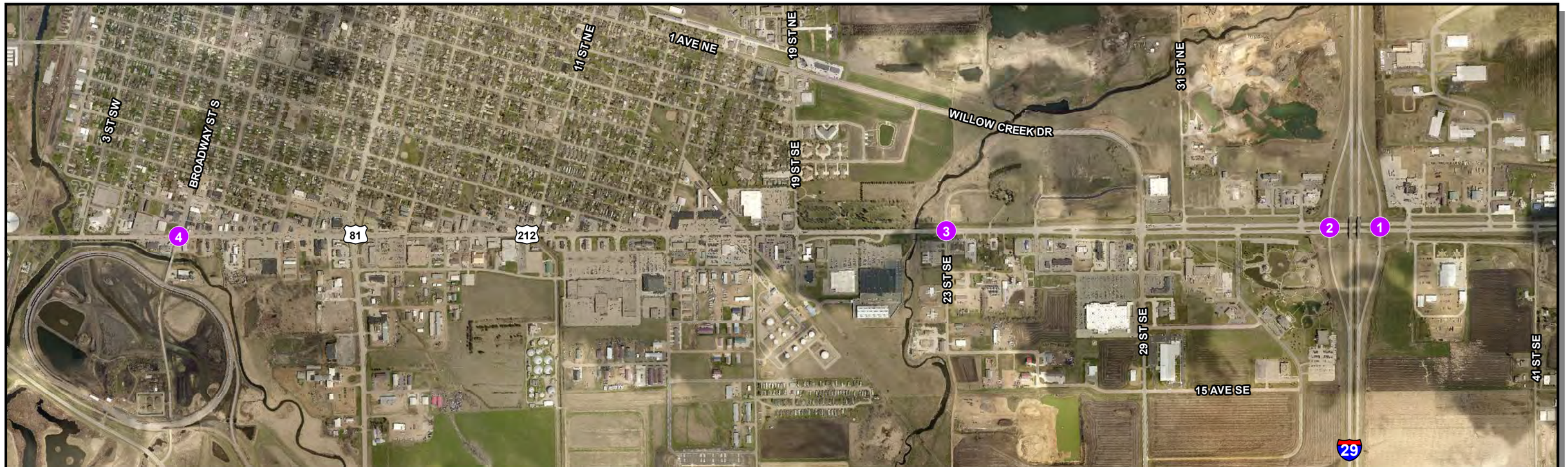
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 25**)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE) (**Figure 26**)

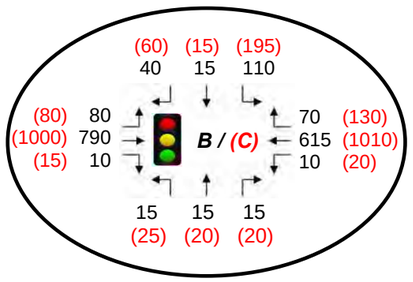
3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 27**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 28**)

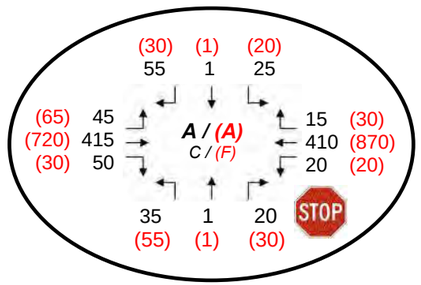
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 29**)



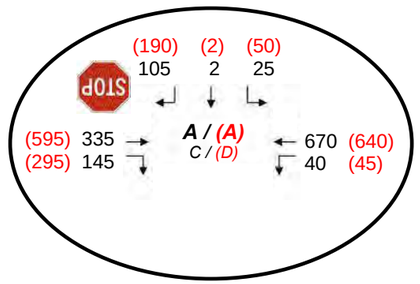
4. US 212 & Broadway Street S



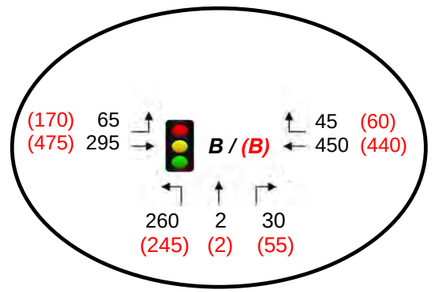
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

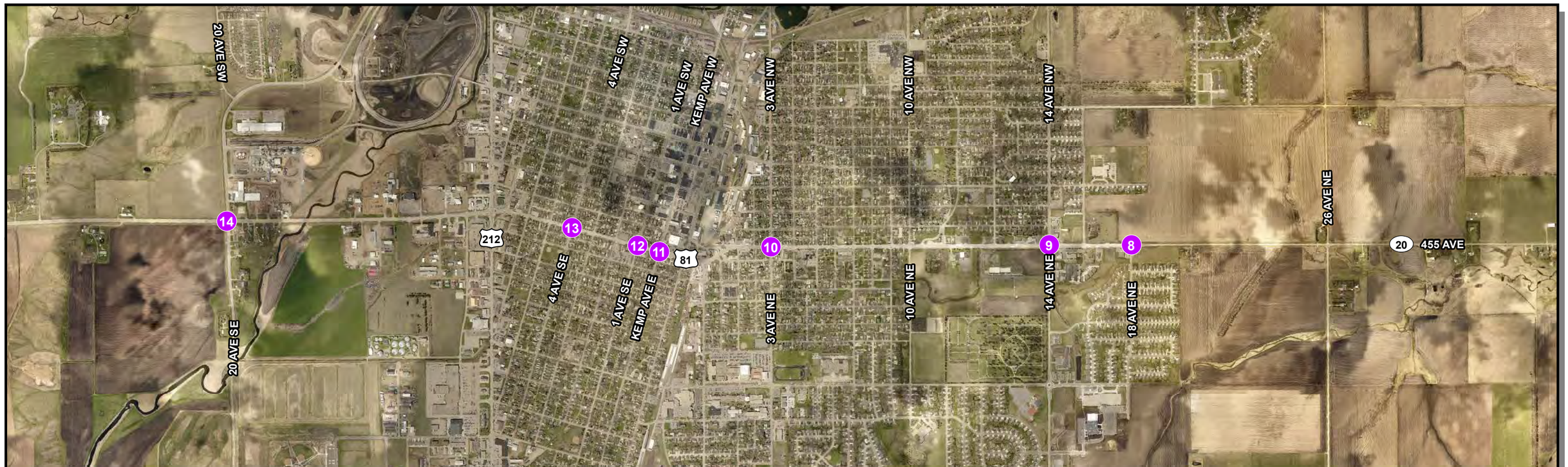
STOP Stop Control

Roundabout

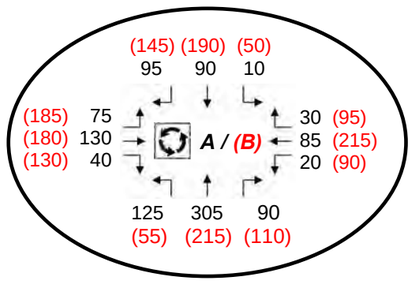
0 Miles 0.2

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

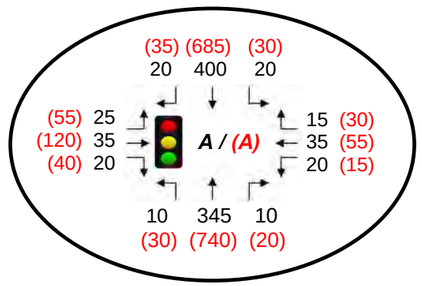
FIGURE 20



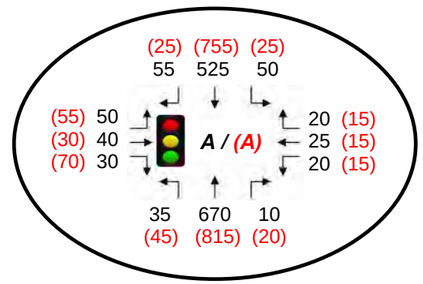
14. US 81 & 20th Ave SE



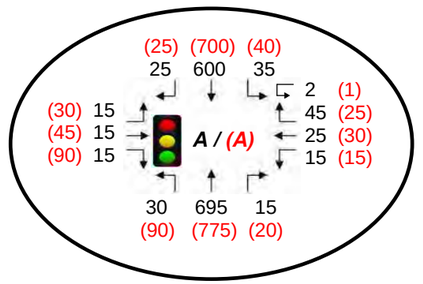
13. US 81 & 4th Avenue SE



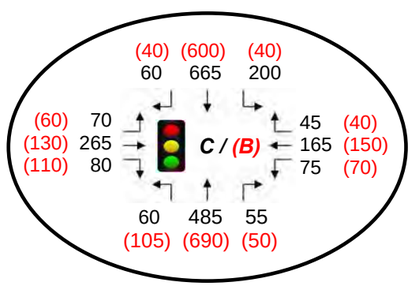
12. US 81 & 1st Avenue SE



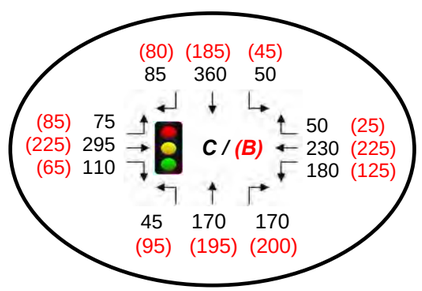
11. US 81 & E Kemp Avenue



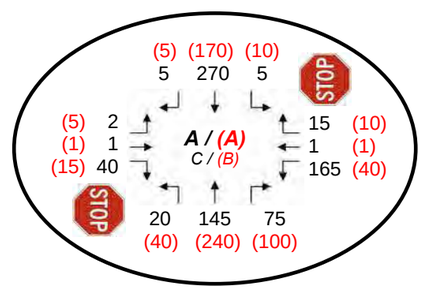
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

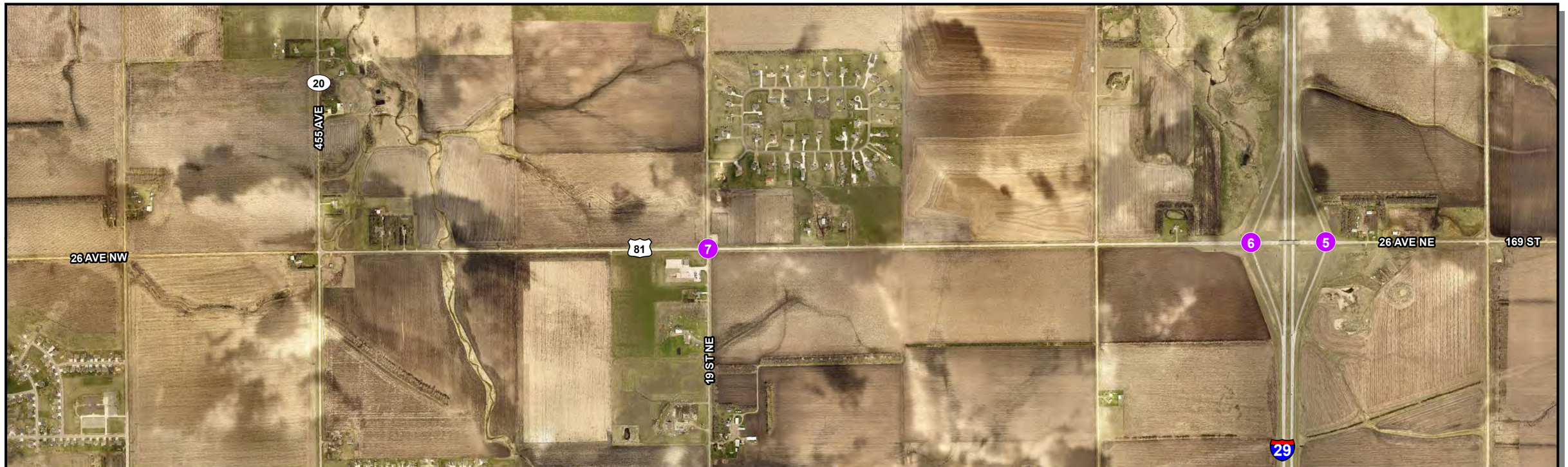
- 1 — Study Intersection
- AM (PM) — 2030 Interim Peak Hour Traffic Volumes (No-Build)
- Intersection LOS
  - A / (B) — Overall Intersection
  - B / (B) — Worst-case Approach LOS (TWSC)
- Intersection Control
  - Signal
  - Stop Control
  - Roundabout Control

0 Miles 0.35

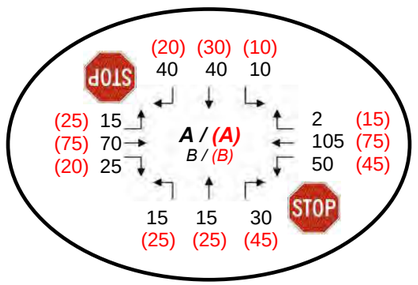
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

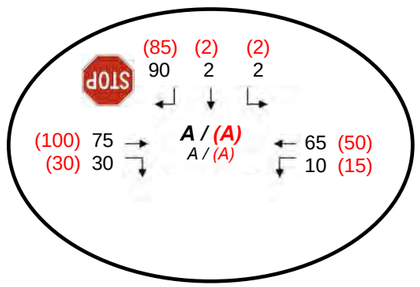
FIGURE 21



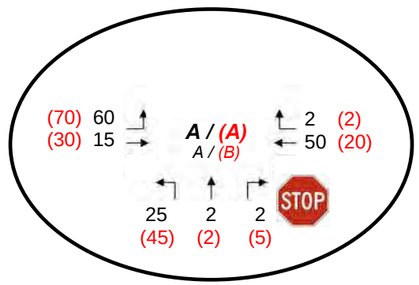
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

STOP Stop Control

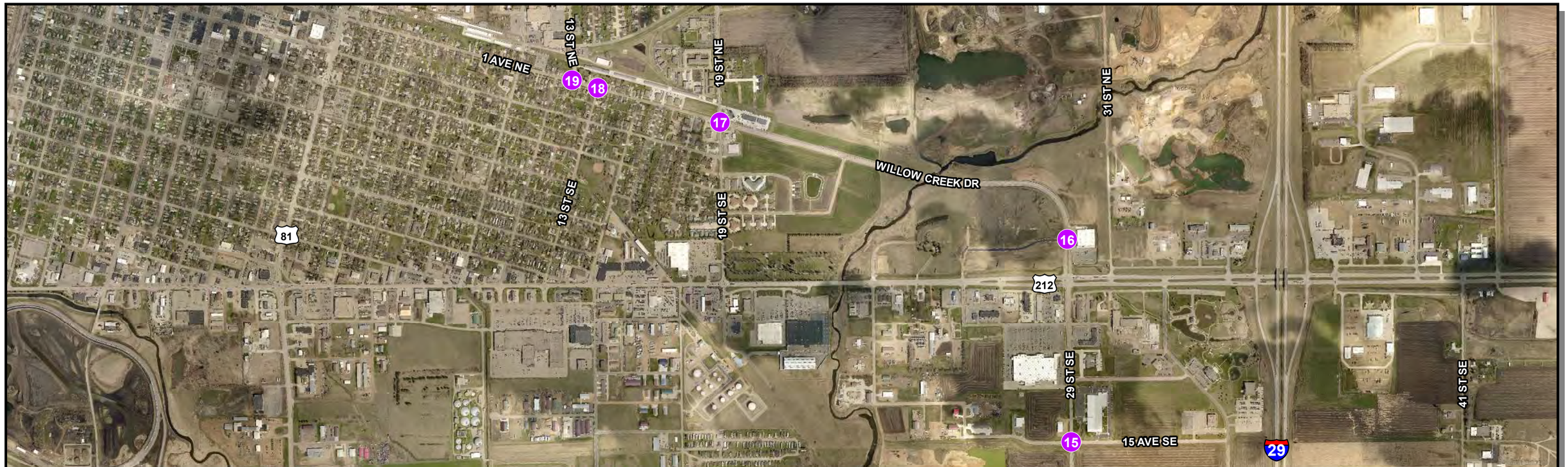
Roundabout Control

0 Miles 0.25

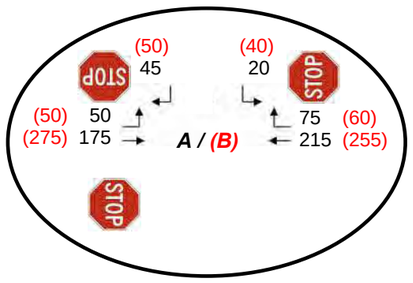
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD)
US 81 (26TH AVENUE NE) CORRIDOR

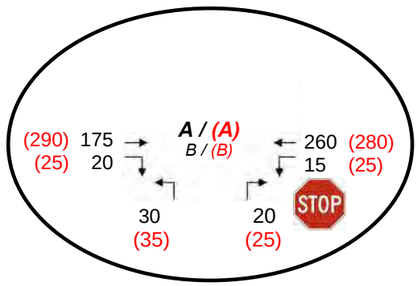
FIGURE 22



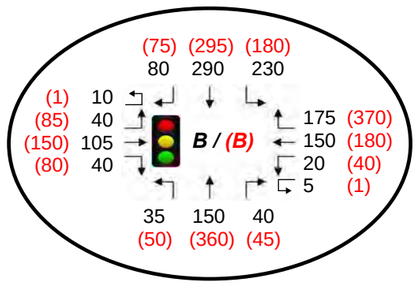
19. 1st Avenue NE & 13th Street NE (NB)



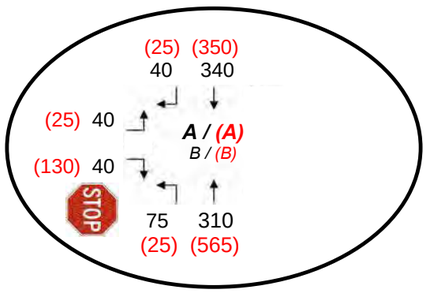
18. 1st Avenue NE & 13th Street NE (SB)



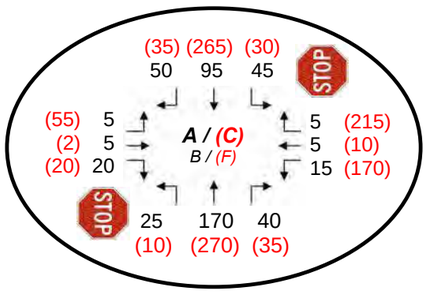
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

STOP Stop Control

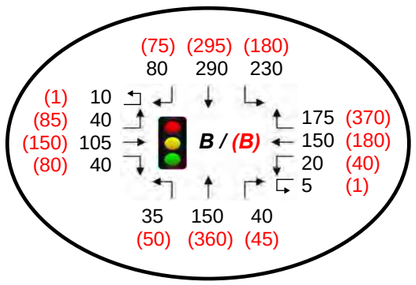
Roundabout Control

0 Miles 0.2

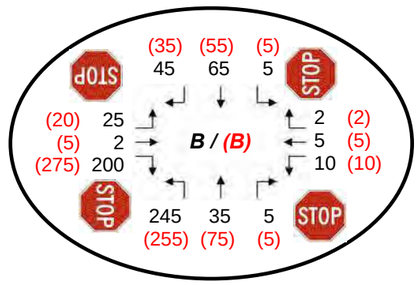
2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

FIGURE 23

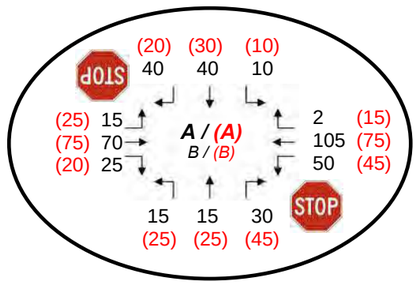
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

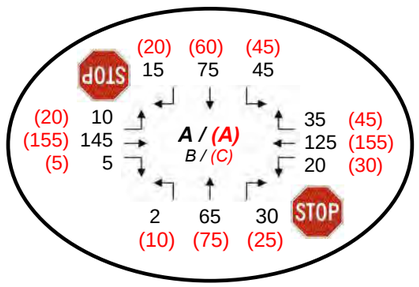
Roundabout

0 Miles 0.3

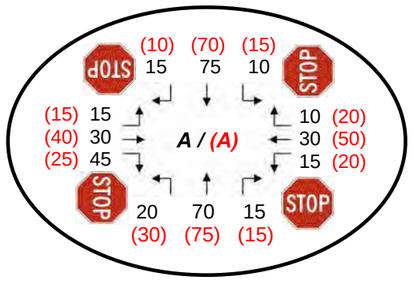
2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 24

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

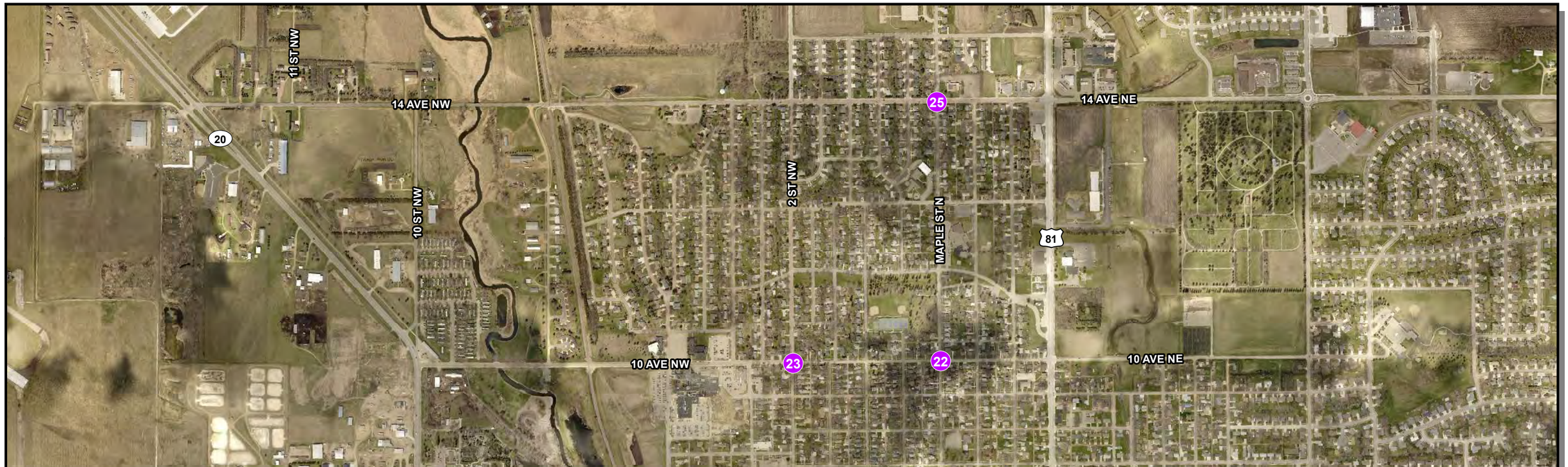
Stop Control

Roundabout

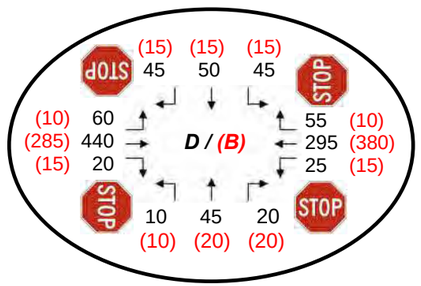
0 Miles 0.05

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS) 3RD STREET NW CORRIDOR

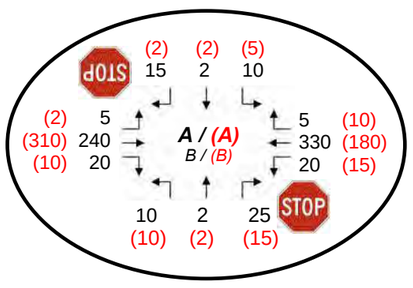
FIGURE 25



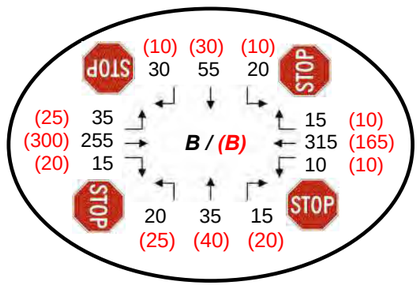
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

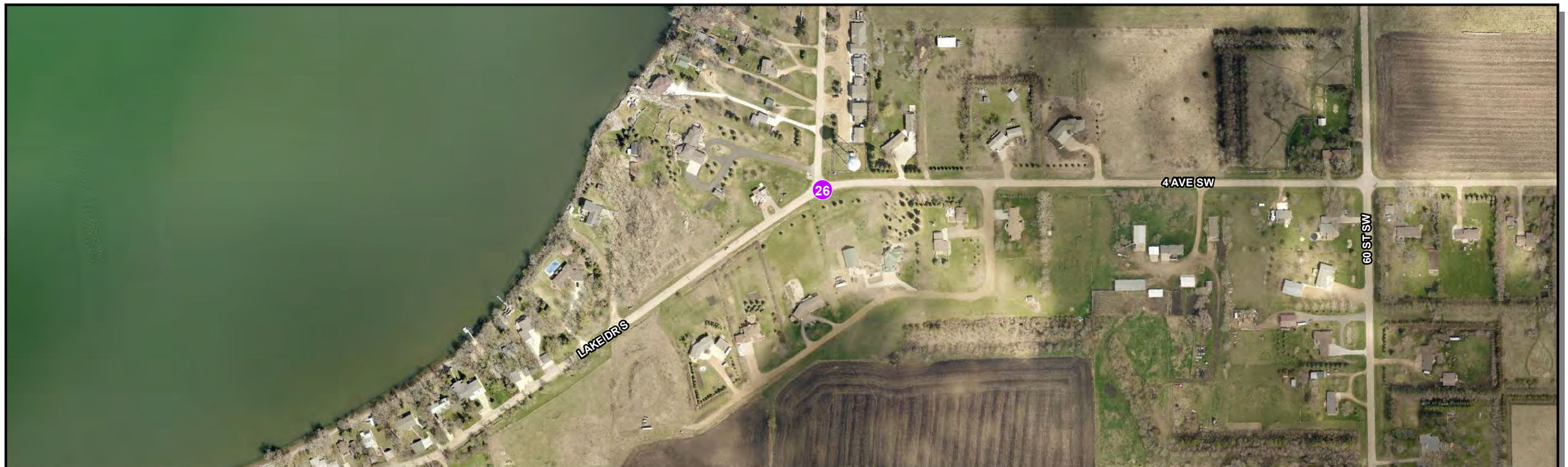
Roundabout

0 Miles 0.15

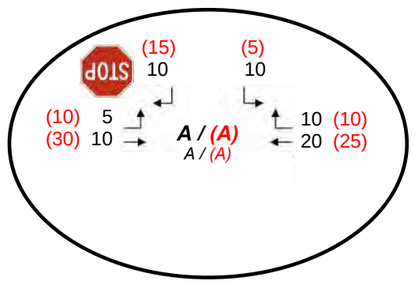
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 26



26. South Lake Drive & 4th Avenue SW



LEGEND

1 Study Intersection

AM (PM) 2030 Interim Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

Roundabout

0 Miles 0.05

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
SOUTH LAKE DRIVE AND 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 27

CORRIDOR SCENARIOS – 2040 PEAK HOUR INTERSECTION LEVEL OF SERVICE (LOS) (PLANNING HORIZON NO-BUILD CONDITIONS)

US 212 (9th Avenue SE) – from Broadway Street S to I-29 NB Exit 177 RTI (**Figure 30**)

US 81(5th Street E/26th Avenue NE) – from 20th Avenue SE to I-29 NB Exit 180 RTI (**Figure 31** and **Figure 32**)

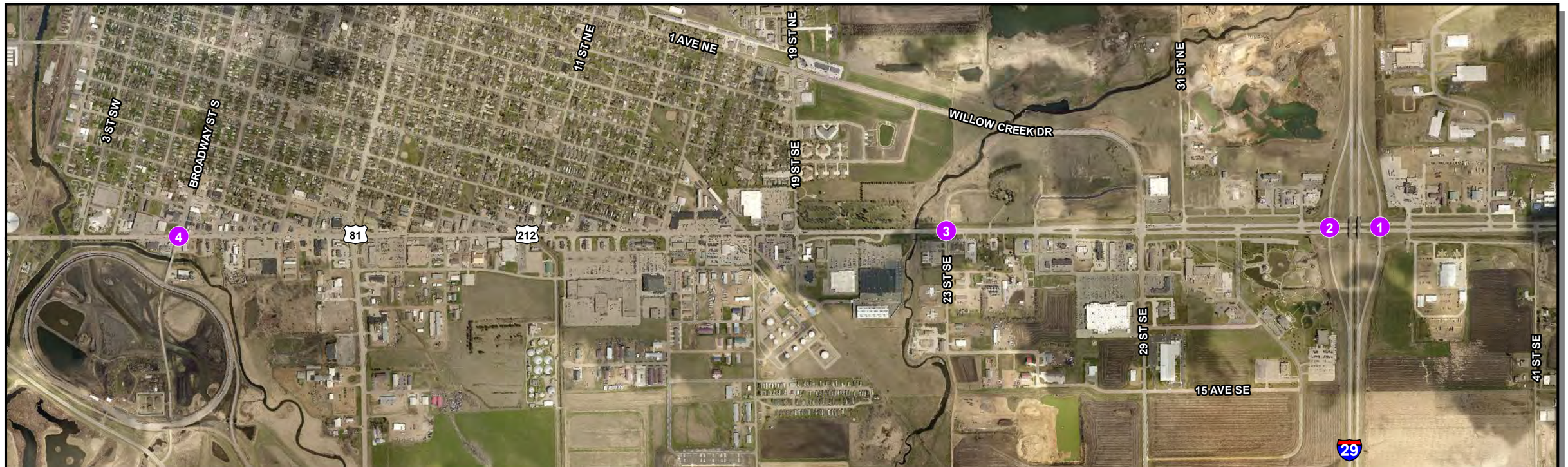
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 33**)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE) (**Figure 34**)

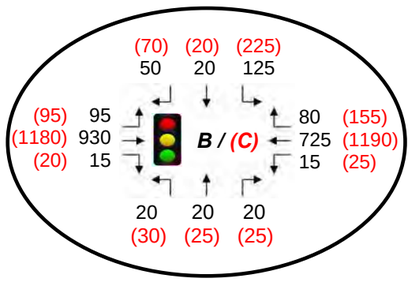
3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 35**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 36**)

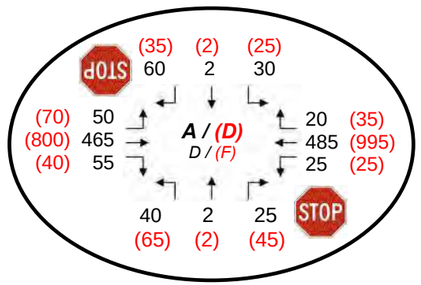
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 37**)



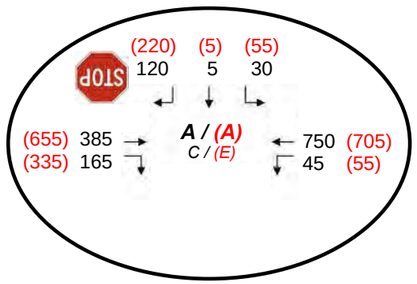
4. US 212 & Broadway Street S



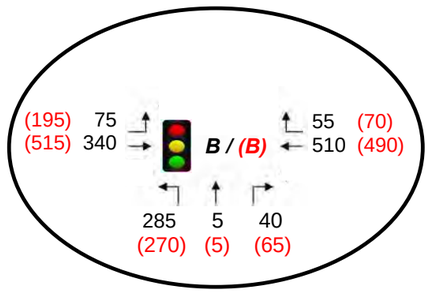
3. US 212 & 23rd Street SE



2. US 212 & I-29 SB Exit 177 RTI



1. US 212 & I-29 NB Exit 177 RTI



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

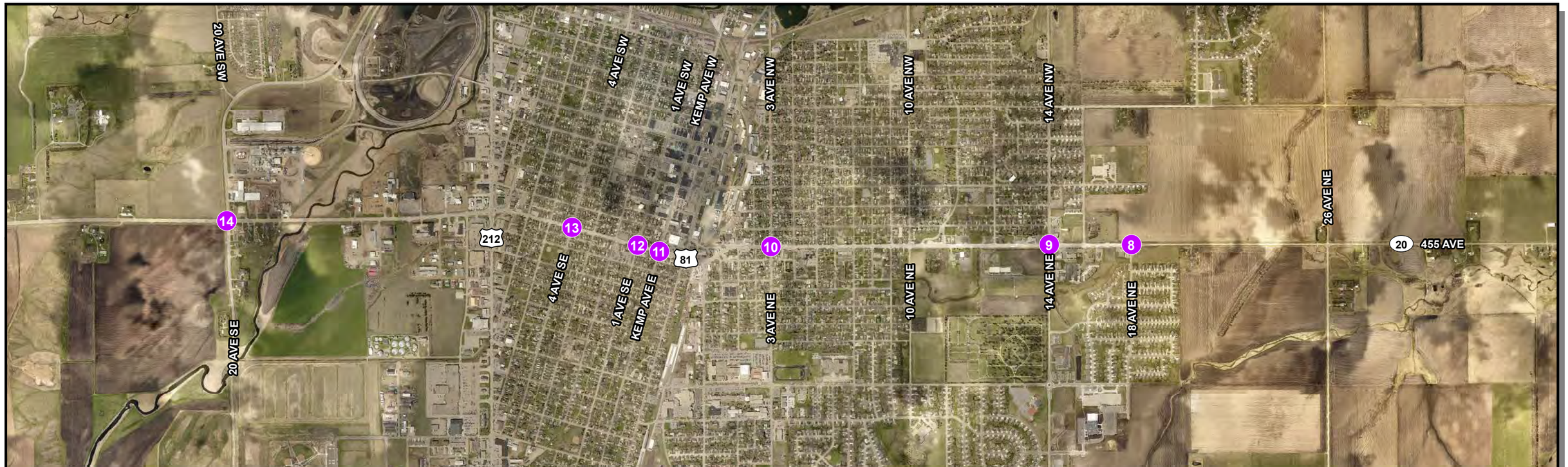
Signal

Stop Control

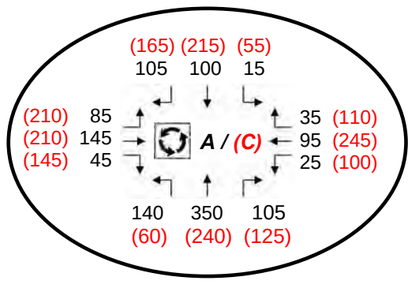
Roundabout

0 Miles 0.2

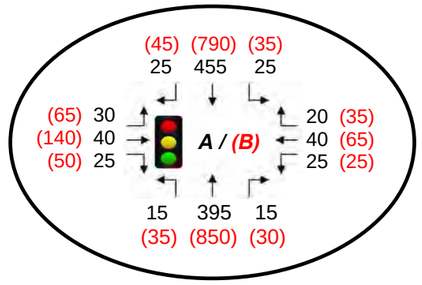
2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR



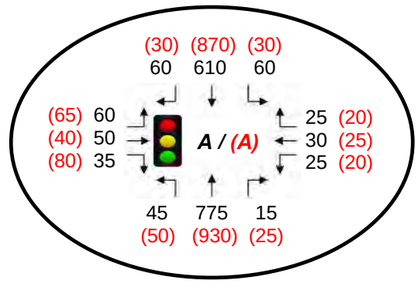
14. US 81 & 20th Ave SE



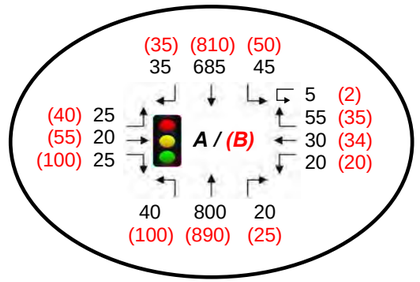
13. US 81 & 4th Avenue SE



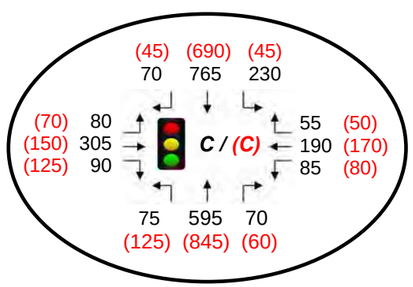
12. US 81 & 1st Avenue SE



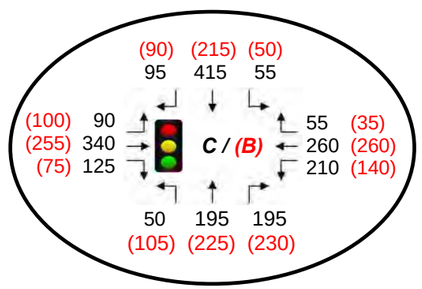
11. US 81 & E Kemp Avenue



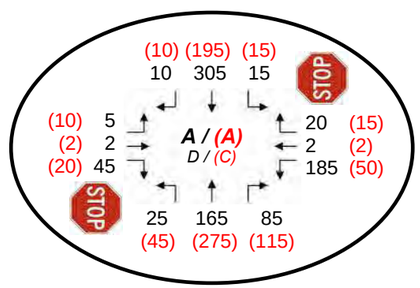
10. US 81 & 3rd Avenue NE



9. US 81 & 14th Avenue NE



12. US 81 & 18th Avenue NE



LEGEND

1 — Study Intersection

AM (PM) — 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

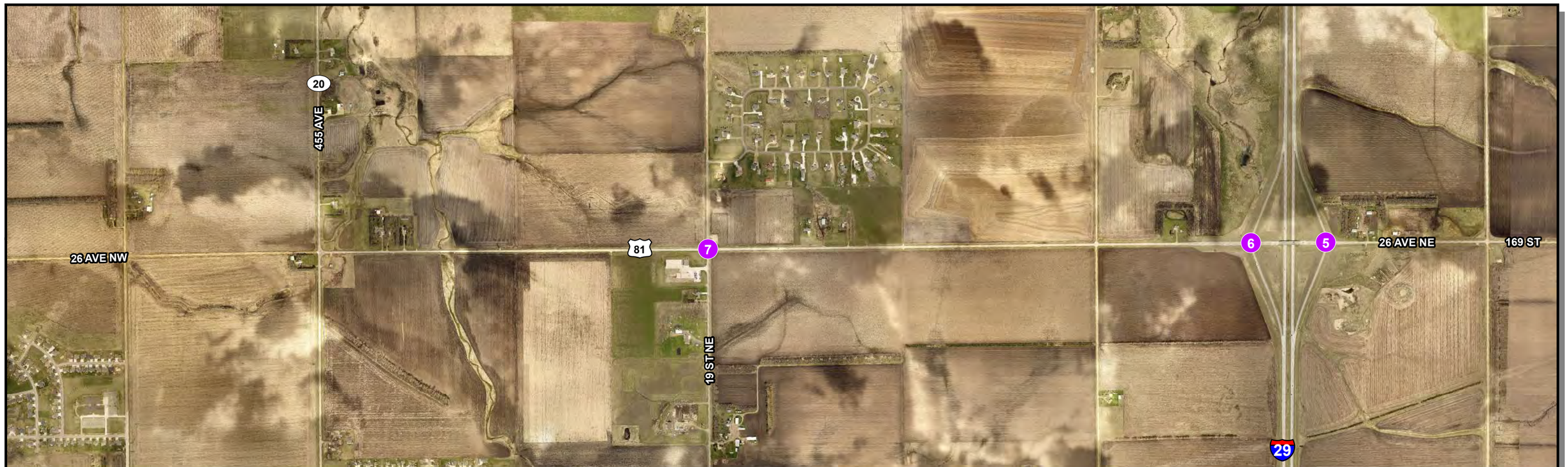
- Signal
- Stop Control
- Roundabout Control

0 Miles 0.35

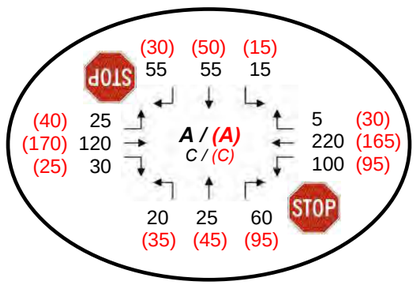
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

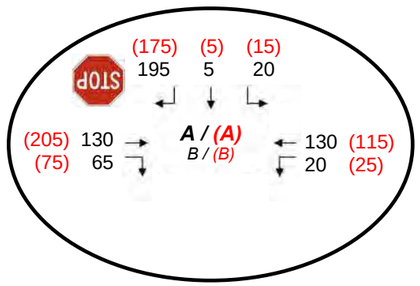
FIGURE 31



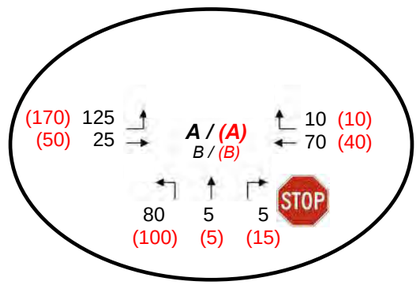
7. US 81 & 19th Street NE (456th Avenue)



6. US 81 & I-29 SB Exit 180 RTI



5. US 81 & I-29 NB Exit 180 RTI



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

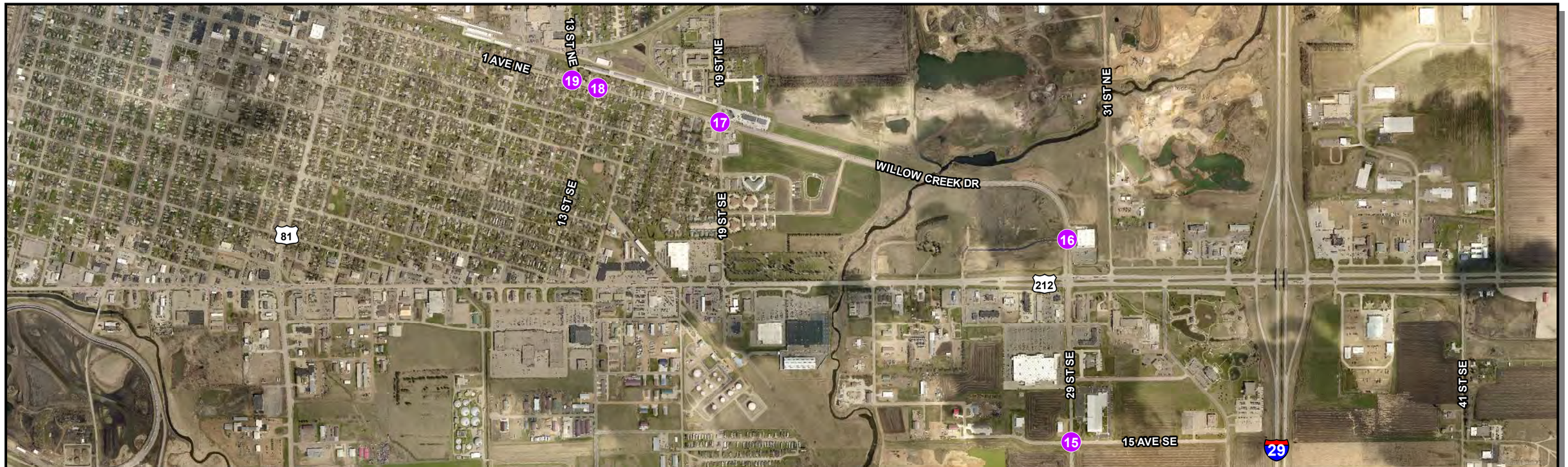
Roundabout Control

0 Miles 0.25

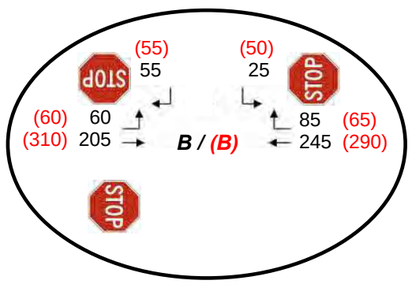
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (26TH AVENUE NE) CORRIDOR

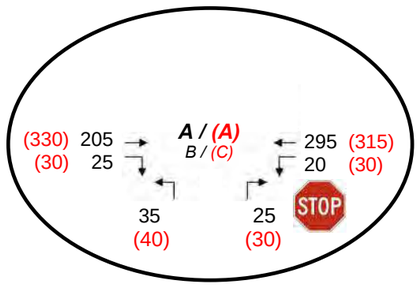
FIGURE 32



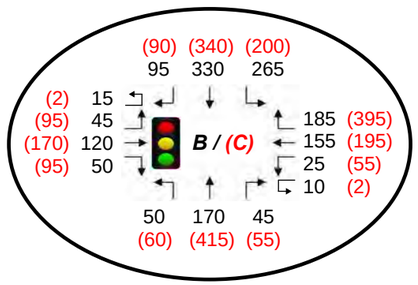
19. 1st Avenue NE & 13th Street NE (NB)



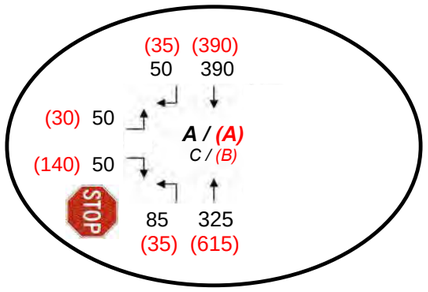
18. 1st Avenue NE & 13th Street NE (SB)



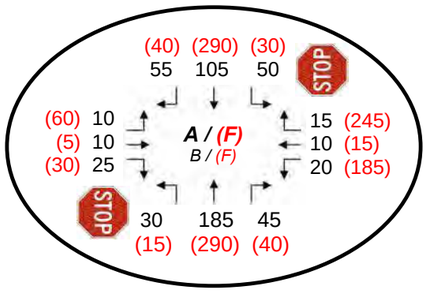
17. 1st Avenue NE & 19th Street NE



16. Willow Creek Drive & 8th Avenue SE



15. 29th Street SE & 15th Avenue SE



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection
B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

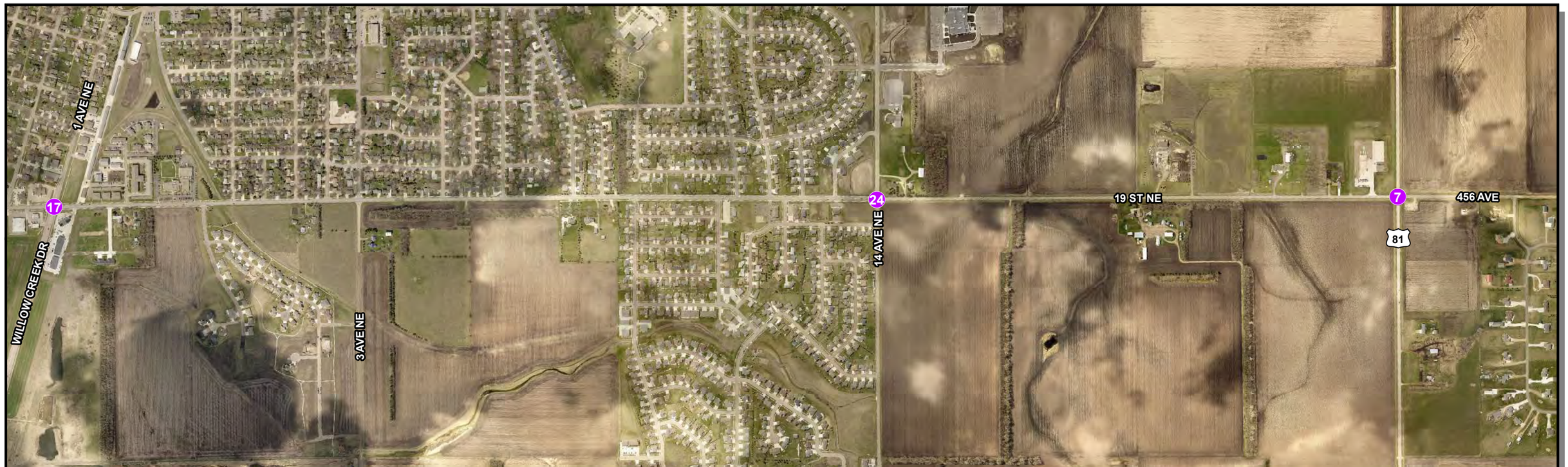
Stop Control

Roundabout Control

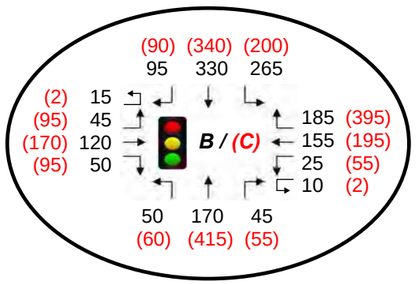
0 Miles 0.2

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

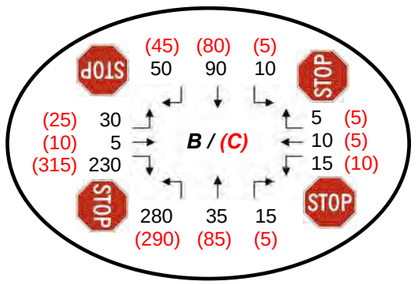
FIGURE 33



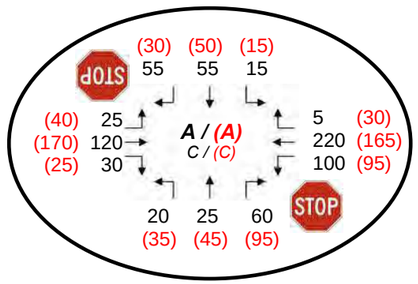
17. 1st Avenue NE & 19th Street NE



24. 19th Street NE & 14th Avenue NE



7. US 81 & 19th Street NE (456th Avenue)



LEGEND

1 — Study Intersection

AM (PM) — 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

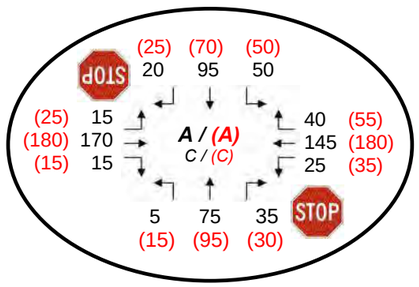
- Signal
- Stop Control
- Roundabout

0 Miles 0.3

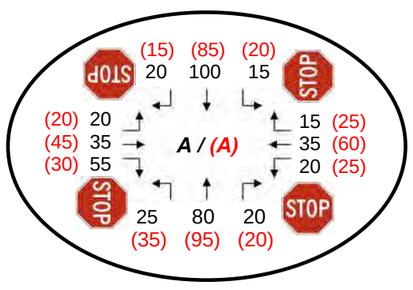
2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

FIGURE 34

20. 3rd Street NW & 1st Avenue NW



21. 3rd Street NW & W Kemp Avenue



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

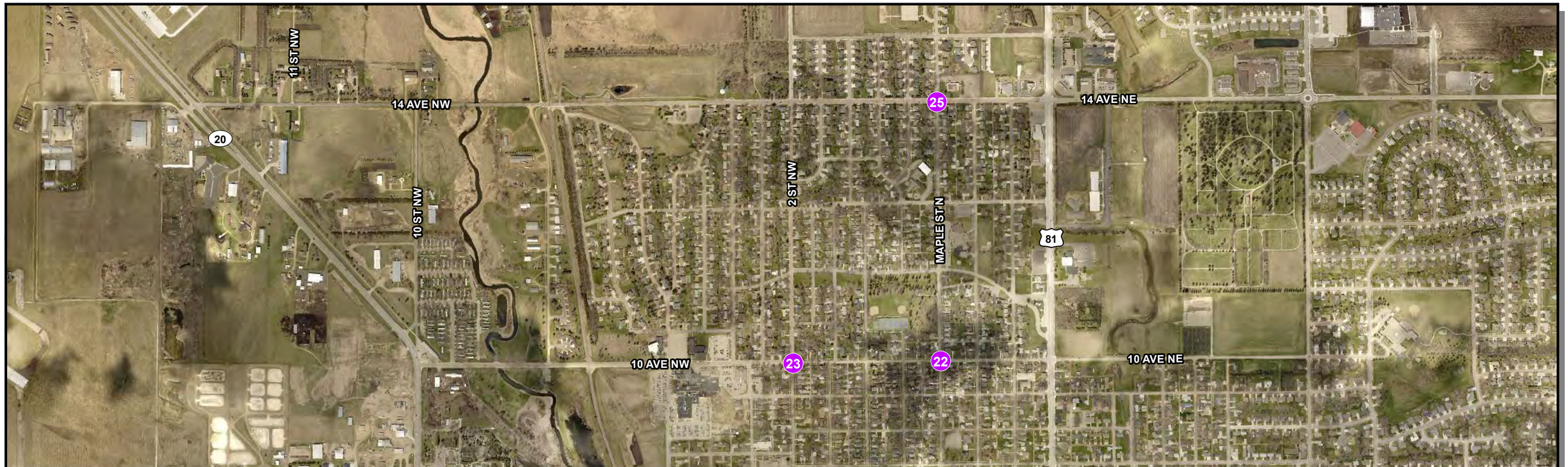
Stop Control

Roundabout

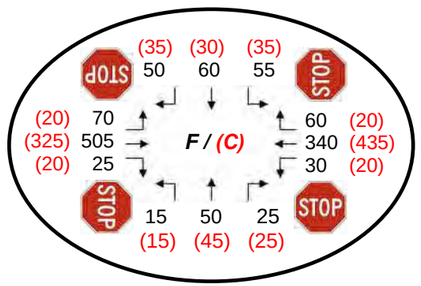
0 Miles 0.05

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS) 3RD STREET NW CORRIDOR

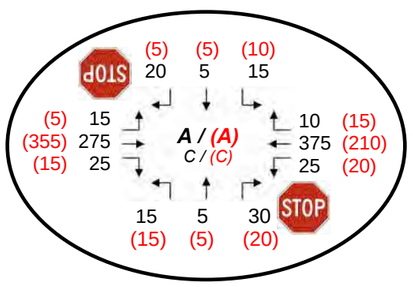
FIGURE 35



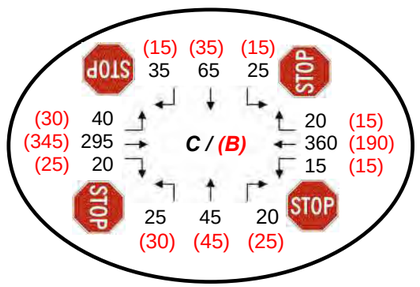
25. N Maple Street & 14th Avenue N



23. 10th Avenue NW & 2nd Street W



22. 10th Avenue N & N Maple Street



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

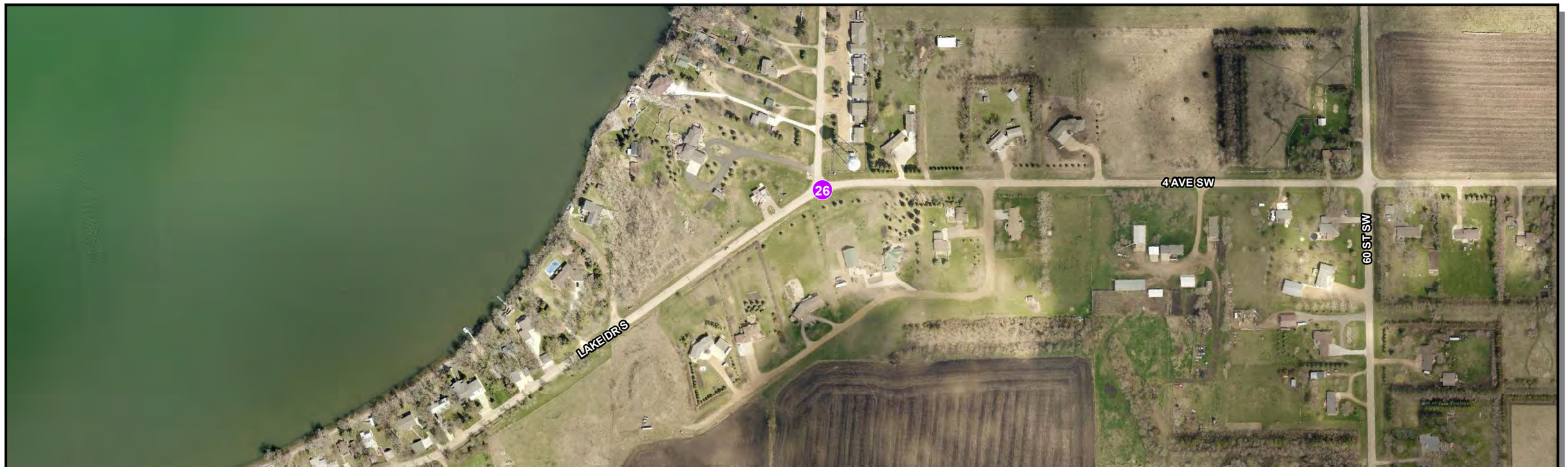
Roundabout

0 Miles 0.15

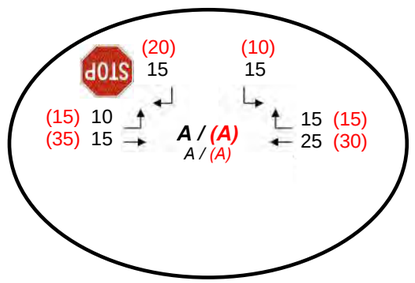
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
10TH AVENUE N / N MAPLE STREET CORRIDOR

FIGURE 36



26. South Lake Drive & 4th Avenue SW



LEGEND

1 Study Intersection

AM (PM) 2040 Planning Horizon Peak Hour Traffic Volumes (No-Build)

Intersection LOS

A / (B) — Overall Intersection

B / (B) — Worst-case Approach LOS (TWSC)

Intersection Control

Signal

Stop Control

Roundabout

0 Miles 0.05

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
SOUTH LAKE DRIVE AND 4TH AVENUE SW - ISOLATED INTERSECTION

FIGURE 37

Traffic Operations Findings

The following are general findings derived from the 2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) Conditions traffic operations analysis.

PLANNING LEVEL VOLUME TO CAPACITY OPERATIONS

Corridor segments with an observed capacity of 80% and greater (or an observed capacity of 60% and greater for US and SD highways) in a future-year scenario are outlined in **Table 3**.

Table 3: Future (No-Build) Conditions Volume to Capacity Operations

Corridor	Segment	Existing Conditions	2030 No Build Conditions	2040 No Build Conditions
US 212	14th Street E to 19th Street E	0.62	0.73	0.84
	US 81 to 14th Street E	0.61	0.72	0.83
	Broadway Street S to US 81	0.59	0.69	0.79
	SD 20 to Broadway Street S	0.52	0.61	0.70
	West of 21st Street W to SD 20	0.46	0.54	0.62
US 81	14th Avenue NE to 19th Street NE (456th Avenue)	0.55	0.64	0.73
20th Avenue S	Broadway Street S to West of Larabee Road	0.67	0.78	0.90
Kemp Avenue	Kampeska Boulevard to 1st Avenue NW	0.95	1.12	1.29
10th Avenue N	3rd Street NW to 2nd Street NW	0.83	0.98	1.13
	2nd Street NW to N Maple Street	0.79	0.94	1.08
14th Avenue N	10th Street NW to 6th Street NW	0.64	0.75	0.87
	6th Street NW to 2nd Street NW	0.62	0.73	0.84
	2nd Street NW to N Maple Street	0.95	1.11	1.28
Broadway Street	4th Avenue SW to 1st Avenue SW	0.73	0.86	0.98
	1st Avenue SW to Kemp Avenue	0.65	0.77	0.88
19th Street E	1st Avenue NE to Arrow Avenue NE	0.59	0.70	0.81

INTERSECTION OPERATIONS

Intersections that did not meet study LOS goals or had poor stop-controlled approach LOS at two-way stop-controlled intersections in a future-year scenario are outlined in **Table 4**.

Table 4: Future (No-Build) Conditions Intersection Operations

Intersection	Control	Existing Conditions		2030 No Build Conditions		2040 No Build Conditions	
		AM	PM	AM	PM	AM	PM
N Maple Street & 14th Avenue N	All-Way Stop-Control	B	B	D	B	F	C
US 212 & I-29 SB Exit 177 RTI	Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)*	A (B)	A (B)	A (C)	A (D)	A (C)	A **(E)**
US 212 & 23rd Street SE	Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)*	A (B)	A (D)	A (C)	A **(F)**	A (C)	D **(F)**
29th Street SE and 15th Avenue SE	Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)*	A (B)	A (C)	A (B)	C **(F)**	A (B)	F **(F)**
US 81 & 18th Avenue NE	Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)*	A (B)	A (B)	A (C)	A (B)	A (D)	A (C)

* Two-way Stop Control Intersection Note: It is not uncommon to see LOS F at two-way stop control intersections in urban areas during the peak hours. Delay represented by LOS values in this figure does not warrant signalization of the respective intersection.

Traffic Operations and Capacity Build Alternatives

Build alternatives listed in this section were developed to address operational and capacity needs identified by the 2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) Conditions operational analyses. In addition, an exploratory analysis was conducted at select study intersections deemed suitable candidates for a single-lane roundabout.

Approach to Developing Need-Based Build Alternatives

Build alternatives were developed for each intersection or roadway segment that demonstrated a 2030 Interim or 2040 Planning Horizon operational or capacity need using the following methodology:

- **Two-way stop-control –** Two-way stop-control intersection alternative was evaluated at some locations where an existing all-way stop-control intersection was conducive to potential two-way stop-control.
- **Turn Lanes at Unsignalized Intersections –** Turn lanes were evaluated at unsignalized intersections with future operational needs and volumes that exceed turning lane warrant thresholds.
- **Signalized Intersections –** Signalized intersection Build alternatives were evaluated where needed. The Build alternative presented represents a 'minimum build' configuration to meet study LOS goals.
    - **Signal Warrants –** The approach to building out signalized The Manual of Uniform Traffic Control Devices (MUTCD) outlines volume warrants for the installation of a traffic signal at locations permissible by state code. For this study, future-year traffic volumes were reviewed from a planning-level perspective to identify a generalized timeframe for when a traffic signal may be warranted. HCS-based signal warrant analysis sheets are provided in the **Appendix**.
- **Single-lane Roundabouts –** A single-lane roundabout was analyzed at locations where the incoming corridor cross-section was a 2-lane or 3-lane roadway (one through lane in each direction).
- **Corridors –** Typically built-out in terms of needs identified in the Planning Volume to Capacity Analysis based on projected 2030 and 2040 Daily Traffic Volumes.
- **Intersections where an operations or capacity need not identified –** If an intersection or roadway segment did not show an operational or capacity need in the No-Build conditions analyses (with the exception of intersections analyzed for the exploratory single-lane roundabout analysis), a future-year build alternative was not developed as it is anticipated that the location was sufficient through the planning horizon.

Table 5 through **Table 10** present the analyzed build alternatives for the 2030 Interim and 2040 Planning Horizon scenarios. Build alternatives that do not meet LOS goals for this study are in **Red** text and are removed from further consideration. Build alternatives that meet LOS goals should be considered for projects in the Watertown Master Transportation Plan. Proposed long range transportation projects based on operations and capacity based build alternatives are shown in **Figure 38** and summarized in **Table 11** and **Table 12**.

Synchro reports for 2030 Interim and 2040 Planning Horizon Build Alternatives and are included in the **Appendix**.

Intersection Tables Key

Cross-Section (Leg) – represents number of lanes for the respective leg (east, west, north, or south)

- 4: four through lanes, two in each direction; may or may not include a center turn lane or median
- 2/3: one through lane in each direction: two-lane roadway with left-turn lanes at high volumes intersections or a two-lane roadway with a continuous left-turn lane.

Modifications lane configurations:

- LT: left-turn lane
- T: through lane
- RT: right-turn lane
- T/RT: shared lane for through and right-turn traffic

Table 5: 2030 Interim Conditions - Intersection Build Alternatives

Intersection	Cross-Section (Leg)	Modifications	LOS	
			AM	PM
N Maple St & 14th Ave N	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain All-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT/T/RT SB: LT/T/RT	C	B
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Two-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT/T/RT SB: LT/T/RT (Stop Control: NB and SB Approaches)	TWSC: A WCSC: E	TWSC: A WCSC: C
US 212 & I-29 SB Exit 177 RTI	E: 4 W: 4 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: T, T, RT WB: LT, T, T SB: LT, T/RT (add LT lane)	TWSC: A WCSC: B	TWSC: A WCSC: C
US 212 & 23rd St SE	E: 4 W: 4 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T, T/RT WB: LT, T, T/RT NB: LT, T/RT (add LT lane) SB: LT, T/RT (add LT lane)	TWSC: A WCSC: C	TWSC: A WCSC: F
	E: 4 W: 4 N: 2/3 S: 2/3	**Install Signal** EB: LT, T, T/RT WB: LT, T, T/RT NB: LT/T/RT SB: LT/T/RT (Signal meets Warrant 3 by 2030)	A	B
29th St SE & 15th Ave SE	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT, T/RT SB: LT, T, RT (add warranted RT lane)	TWSC: A WCSC: B	TWSC: A WCSC: D
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Roundabout** EB: LT/T/RT WB: LT/T/RT NB: LT/T/RT SB: LT/T/RT	A	A
US 81 & 19th Street NE (456th Avenue)	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T, RT (add warranted LT and RT lanes) WB: LT, T, RT (add warranted LT and RT lanes) NB: LT/T/RT SB: LT/T/RT	TWSC: A WCSC: B	TWSC: A WCSC: B
US 81 & I-29 SB Exit 180 RTI	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: T, RT (add warranted RT lane) WB: LT, T (add warranted LT lane) SB: LT/T/RT	TWSC: A WCSC: A	TWSC: A WCSC: A

Table 6: 2040 Planning Horizon Conditions - Intersection Build Alternatives

Intersection	Cross-Section (Leg)	Modifications	LOS	
			AM	PM
N Maple St & 14th Ave N	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain All-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT/T/RT SB: LT/T/RT (AM: EB Approach LOS F, WB Approach LOS D)	E	C
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Two-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT/T/RT SB: LT/T/RT (Stop Control: NB and SB Approaches)	TWSC: D WCSC: F	TWSC: A WCSC: D
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Two-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT/T/RT (add LT lane) SB: LT/T/RT (add LT lane) (Stop Control: NB and SB Approaches)	TWSC: B WCSC: F	TWSC: A WCSC: C
US 212 & I-29 SB Exit 177 RTI	E: 4 W: 4 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T, T WB: T, T, RT SB: LT, T/RT (add LT lane)	TWSC: A WCSC: C	TWSC: A WCSC: C
US 212 & 23rd St SE	E: 4 W: 4 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T, T, RT (add warranted RT lane) WB: LT, T, T/RT NB: LT, T/RT (add LT lane) SB: LT, T/RT (add LT lane)	TWSC: A WCSC: D	TWSC: C WCSC: F
	E: 4 W: 4 N: 2/3 S: 2/3	**Install Signal** EB: LT, T, T/RT WB: LT, T, T/RT NB: LT/T/RT SB: LT/T/RT (Signal meets Warrant 3 by 2030)	A	B
29th St SE & 15th Ave SE	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T/RT (add LT lane) WB: LT, T/RT (add LT lane) NB: LT, T, RT (add warranted RT lane) SB: LT, T, RT (add warranted RT lane)	TWSC: A WCSC: B	TWSC: B WCSC: E
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Signal** EB: LT/T/RT WB: LT/T/RT NB: LT, T/RT SB: LT, T/RT (Signal meets Warrant 3 by 2040)	A	B
	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Roundabout** EB: LT/T/RT WB: LT/T/RT NB: LT/T/RT SB: LT/T/RT	A	A
US 81 & 19th Street NE (456th Avenue)	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T, RT (add warranted LT and RT lanes) WB: LT, T, RT (add warranted LT and RT lanes) NB: LT/T/RT SB: LT/T/RT	TWSC: A WCSC: C	TWSC: A WCSC: C
US 81 & I-29 SB Exit 180 RTI	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: T, RT (add warranted RT lane) WB: LT, T (add warranted LT lane) SB: LT/T/RT	TWSC: A WCSC: B	TWSC: A WCSC: B

Table 7: 2040 Planning Horizon Conditions - Intersection Build Alternatives (continued)

Intersection	Cross-Section (Leg)	Modifications	LOS	
			AM	PM
US 81 & I-29 NB Exit 180 RTI	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Maintain Two-Way Stop Control** EB: LT, T (add warranted LT lane) WB: T/RT NB: LT/T/RT	TWSC: A WCSC: B	TWSC: A WCSC: B
US 81 & 18th Ave NE	E: 2/3 W: 2/3 N: 2/3 S: 4	**Maintain Two-Way Stop Control** EB: LT/T/RT WB: LT, T/RT (add LT lane) NB: LT, T, RT SB: LT, T/RT	TWSC: A WCSC: D	TWSC: A WCSC: C

Table 8: Exploratory Single-Lane Roundabout Build Analysis

Intersection	Cross-Section (Leg)	Modifications	LOS			
			2030		2040	
			AM	PM	AM	PM
US 81 & 19th Street NE (456th Avenue)	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Roundabout** EB: LT/T/RT WB: LT/T/RT NB: LT/T/RT SB: LT/T/RT	A	A	A	A
19th Street NE & 14th Avenue NE	E: 2/3 W: 2/3 N: 2/3 S: 2/3	**Install Roundabout** EB: LT/T/RT WB: LT/T/RT NB: LT/T/RT SB: LT/T/RT	A	A	A	A

Table 9: 2030 Planning Horizon Conditions - Corridor Build Alternatives

Corridor Segment	Modifications	V/C Ratio
10th Avenue N: 3rd Street NW to N Maple Street	2/3-lane section (TWLTL or LT lane at major intersections)	0.36
14th Avenue N: 2nd Street NW to N Maple Street	2/3-lane section (TWLTL or LT lane at major intersections)	0.42
Kemp Avenue: Kampeska Boulevard to 3rd Street W	2/3-lane section (TWLTL or LT lane at major intersections)	0.42
Broadway Street: 4th Avenue SW to 1st Avenue SW	2/3-lane section (TWLTL or LT lane at major intersections)	0.32

Table 10: 2040 Planning Horizon Conditions - Corridor Build Alternatives

Corridor Segment	Modifications	V/C Ratio
US 212: **US 81 to 19th Street SE**	Review future requests for redevelopment and changes in access for opportunities to further access management techniques.	-
10th Avenue N: **3rd Street NW to N Maple Street**	2/3-lane section (TWLTL or LT lane at major intersections)	0.36
14th Avenue N: **10th Street NW to N Maple Street**	2/3-lane section (TWLTL or LT lane at major intersections)	0.45
20th Avenue S: **Broadway Street S to Larabee Road**	2/3-lane section (TWLTL or LT lane at major intersections)	0.45
Kemp Avenue: **Kampeska Boulevard to 3rd Street W**	2/3-lane section (TWLTL or LT lane at major intersections)	0.42
Broadway Street: **4th Avenue SW to Kemp Avenue**	2/3-lane section (TWLTL or LT lane at major intersections)	0.32
19th Street E: **1st Avenue NE to Arrow Avenue NE**	RT Lanes at Major Intersections and/or Additional Collector Roads to handle eastern development traffic	-

V/C Ratio Note: '-' denotes a V/C ratio that cannot be quantified further due to modifications that do not expand the corridor segment.

Safety Improvement Build Alternatives

Many of the intersections and corridor segments experiencing crash rates that exceeded the critical crash rate, as noted in the *Crash History Review* technical memorandum, are not identified in the previous section for capacity and operational improvements. The following are proposed Build alternatives to address safety-related needs not related to capacity or traffic operations issues. Proposed long range transportation projects based on safety improvement based build alternatives are shown in **Figure 38** and summarized in **Table 11** and **Table 12**.

US 212 and Willow Creek Drive

- Continue periodic signal timing updates as traffic patterns evolve.

SD 20 and Airport Drive

- Consider constructing a Reduced Conflict Intersection (RCI) to reduce severity and frequency of crashes.

US 212 and US 81

- Continue periodic signal timing updates as traffic patterns evolve.

US 212 and 19th Street SE

- Continue periodic signal timing updates as traffic patterns evolve.
- Explore applying different signal head configurations and reflective signal tape.
- Consider removing additional signage (i.e. directional signs) from signal mast arms and poles and relocate to sign posts along the roadside leading to intersection area.

N Maple Street and 3rd Avenue NE

- Remove objects and on-street parking within intersection sight distance triangles.
- Improve intersection visibility by providing larger stop signs and/or flashing LEDs around stop signs.
- Provide a stop line on minor approaches.
- Add a supplemental stop sign on left side of the approach.

US 212: 11th Street SE to 19th Street SE

- Review future requests for redevelopment and changes in access for opportunities to further access management techniques.

US 81: 20th Avenue SE to US 212

- Review future requests for redevelopment and changes in access for opportunities to further access management techniques.

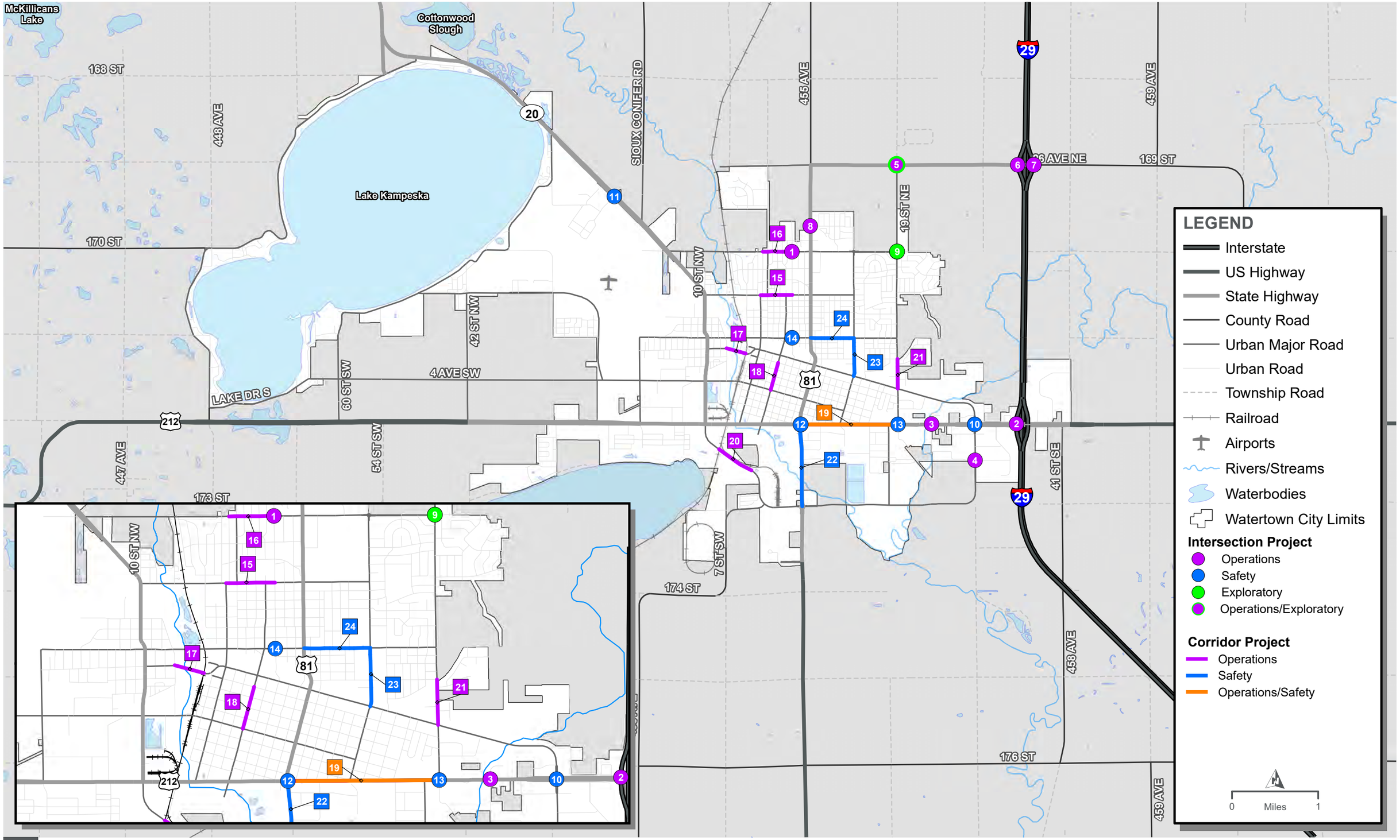
11th Street: 1st Avenue NE to 3rd Avenue NE

- Install additional speed limit signage, particularly for southbound drivers near Watertown High School and Lake Area Technical Institute parking lots.
- Install speed feedback signs that display driver speed in real time via radar.
- Upgrade signal at 11th Street NE and 3rd Avenue NE to have pedestrian countdown (per *Bicycle & Pedestrian Component of MTP* technical memorandum).

- Upgrade signal at 11th Street NE and 3rd Avenue NE to have pedestrian countdown (per *Bicycle & Pedestrian Component of MTP* technical memorandum).
- 11th Street NE between 3rd Avenue NE & Arrow Avenue NE (per *Bicycle & Pedestrian Component of MTP* technical memorandum):
    - Install mid-block crossing connecting Watertown Sr High School and Lake Area Technical College.
- 11th Street NE between Arrow Avenue NE & 1st Avenue NE (per *Bicycle & Pedestrian Component of MTP* technical memorandum):
    - Install mid-block crossing connecting overflow parking and Lake Area Technical College.
    - Install continental crosswalk and curb extension, upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6).

<u>3rd Avenue N: US 81 to 11th Street NE</u>

- Consider additional locations along this segment where left turn lanes could reduce rear-end crashes.



PROPOSED LONG RANGE TRANSPORTATION PROJECTS

Table 11: Summary of Proposed Long Range Transportation Projects

Proposed Project ID	Location	Project Type

1	N Maple Street & 14th Avenue North Intersection	Intersection (Operations)
		- Maintain All-Way Stop Control (AWSC)
		  - Add EB LT & WB LT Lanes
		- Install Two-Way Stop Control (TWSC) at NB and SB Approaches
		  - Add EB LT & WB LT Lanes
		  - Add NB LT & SB LT Lanes (2040)

2	US 212 & I-29 SB Exit 177 RTI	Intersection (Operations) - Maintain Two-Way Stop Control (TWSC) - SB LT Lane

3	US 212 & 23rd Street SE Intersection	Intersection (Operations)
		- Maintain Two-Way Stop Control (TWSC)
		  - Add NB LT & SB LT Lanes
		  - Add EB RT (2040)
		- Install Signal

4	29th Street SE & 15th Avenue SE Intersection	Intersection (Operations)
		- Maintain Two-Way Stop Control (TWSC)
		  - Add SB RT, EB LT, & WB LT Lanes
		  - Add NB RT Lane (2040)
		- Install Roundabout (Exploratory)
		- Install Signal (2040)

5	US 81 & 19th Street NE (456th Avenue) Intersection	Intersection (Operations) - Maintain Two-Way Stop Control (TWSC) - Add EB LT, EB RT, WB LT, & WB RT Lanes - Install Roundabout (Exploratory)
6	US 81 & I-29 SB Exit 180 RTI	Intersection (Operations) - Maintain Two-Way Stop Control (TWSC) - Add EB RT & WB LT Lanes
7	US 81 & I-29 NB Exit 180 RTI	Intersection (Operations) - Maintain Two-Way Stop Control (TWSC) - Add EB LT Lane
8	US 81 & 18th Avenue NE Intersection	Intersection (Operations) - Maintain Two-Way Stop Control (TWSC) - Add WB LT Lane
9	19th Street NE & 14th Avenue NE Intersection	Intersection (Operations) - Install Roundabout (Exploratory)
10	US 212 & Willow Creek Drive Intersection	Intersection (Safety) - Continue periodic signal timing as traffic patterns evolve.
11	SD 20 & Airport Drive Intersection	Intersection (Safety) - Consider constructing a Reduced Conflict Intersection (RCI) to reduce severity and frequency of crashes.
12	US 212 & US 81 Intersection	Intersection (Safety) - Continue periodic signal timing as traffic patterns evolve.
13	US 212 & 19th Street SE Intersection	Intersection (Safety) - Continue periodic signal timing updates as traffic patterns evolve. - Explore applying different signal head configurations and reflective signal tape. - Consider removing additional signage from signal mast arms and poles and relocate to sign posts along roadside.

Table 12: Summary of Proposed Long Range Transportation Projects (continued)

Proposed Project ID	Location	Project Type
14	N Maple Street & 3rd Avenue NE Intersection	Intersection (Safety) - Remove objects and on-street parking within intersection sight distance triangles. - Improve intersection visibility by providing larger stop signs and/or flashing LEDs around stop signs. - Provide a stop line on minor approaches. - Add a supplemental stop sign on left side of approach.
15	10th Avenue North – 3rd Street NW to N Maple Street	Corridor (Operations) - 2/3 lane section (TWLTL or LT lane at major intersections).
16	14th Avenue North – 2nd Street NW to N Maple Street	Corridor (Operations) - 2/3 lane section (TWLTL or LT lane at major intersections).
17	Kemp Avenue – Kampeska Boulevard to 3rd Street W	Corridor (Operations) - 2/3 lane section (TWLTL or LT lane at major intersections).
18	Broadway Street – 4th Avenue SW to Kemp Avenue	Corridor (Operations) - 2/3 lane section (TWLTL or LT lane at major intersections).
19	US 212 – US 81 to 19th Street SE	Corridor (Operations/Safety) - Review future requests for redevelopment and changes in access for opportunities to further access management techniques.
20	20th Avenue South – Broadway Street S to Larabee Road	Corridor (Operations) - 2/3 lane section (TWLTL or LT lane at major intersections).
21	19th Street East – 1st Avenue NE to Arrow Avenue NE	Corridor (Operations) - RT lanes at Major Intersections and/or additional Collector roads to handle eastern development traffic.
22	US 81 – 20th Avenue SE to US 212	Corridor (Safety) - Review future requests for redevelopment and changes in access for opportunities to further access management techniques.
23	11th Street East – 1st Avenue NE to 3rd Avenue NE	Corridor (Safety) - Install additional speed limit signage. - Install speed feedback signs. - Upgrade signal at 11th Street NE and 3rd Avenue NE with Pedestrian countdown. - Install mid-block crossings between Watertown Sr High School and Lake Area Technical College and between overflow parking and Lake Area Technical College. - Install continental crosswalk and curb extension, upgrade sign to yield to pedestrian and bikes, and add in-street pedestrian crossing signs.
24	3rd Avenue North – US 81 to 11th Street NE	Corridor (Safety) - 2/3 lane section (TWLTL or LT lane at major intersections).

Appendix

Section A – Synchro Traffic Operations Reports

2030 INTERIM (NO-BUILD) CONDITIONS – AM
2030 INTERIM (NO-BUILD) CONDITIONS – PM
2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - AM
2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - PM
2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) – AM
2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) – PM
2040 PLANNING HORIZON) CONDITIONS (BUILD ALTERNATIVES) - AM
2040 PLANNING HORIZONCONDITIONS (BUILD ALTERNATIVES) - PM

Section B – Signal Warrants

2030 INTERIM CONDITIONS
2040 PLANNING HORIZON CONDITIONS

Section A – Synchro Traffic Operations Reports

2030 INTERIM (NO-BUILD) CONDITIONS - AM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
US 81 & 20th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

2030 INTERIM (NO-BUILD) CONDITIONS - PM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
US 81 & 20th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

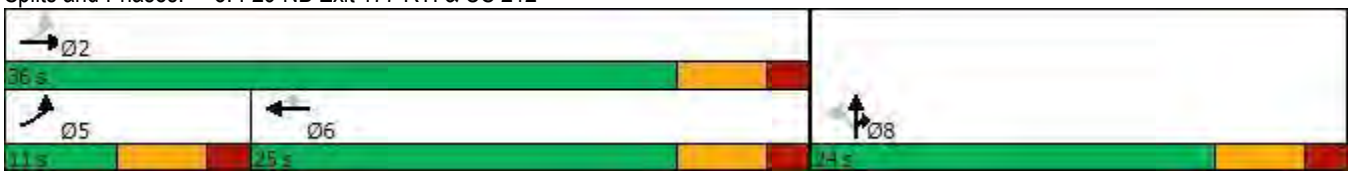
2030 INTERIM (NO-BUILD) CONDITIONS - AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	295	0	0	450	45	260	2	30	0	0	0
Future Volume (vph)	65	295	0	0	450	45	260	2	30	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	300		0	0		850	0		0	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1676	3353	0	0	3353	1500	0	1682	1500	0	0	0
Flt Permitted	0.329							0.953				
Satd. Flow (perm)	581	3353	0	0	3353	1500	0	1682	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						164			164			
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		690			1249			322			321	
Travel Time (s)		10.5			18.9			4.0			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	328	0	0	500	50	289	2	33	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	328	0	0	500	50	0	291	33	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	5	2			6			8	8			
Permitted Phases	2					6	8					
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	12.0	12.0	12.0			
Minimum Split (s)	11.0	24.0			24.0	24.0	24.0	24.0	24.0			
Total Split (s)	11.0	36.0			25.0	25.0	24.0	24.0	24.0			
Total Split (%)	18.3%	60.0%			41.7%	41.7%	40.0%	40.0%	40.0%			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Min			Min	Min	None	None	None			
Act Effct Green (s)	19.9	19.9			14.2	14.2		14.6	14.6			
Actuated g/C Ratio	0.42	0.42			0.30	0.30		0.31	0.31			
v/c Ratio	0.20	0.23			0.50	0.09		0.56	0.06			
Control Delay	9.1	8.8			16.8	0.3		20.3	0.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	9.1	8.8			16.8	0.3		20.3	0.2			
LOS	A	A			B	A		C	A			
Approach Delay		8.8			15.3			18.2				
Approach LOS		A			B			B				
Queue Length 50th (ft)	10	25			65	0		72	0			
Queue Length 95th (ft)	30	52			114	0		157	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		610			1169			242			241	
Turn Bay Length (ft)	300					850						
Base Capacity (vph)	366	2242			1420	730		675	700			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.20	0.15			0.35	0.07		0.43	0.05			

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 47.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 14.0		Intersection LOS: B	
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: I-29 NB Exit 177 RTI & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	295	0	0	450	45	260	2	30	0	0	0
Future Volume (veh/h)	65	295	0	0	450	45	260	2	30	0	0	0
Initial Q (Qb), veh	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			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1772	1772	0	0	1772	1772	1772	1772	1772			
Adj Flow Rate, veh/h	72	328	0	0	500	50	289	2	33			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	371	1495	0	0	796	355	461	3	413			
Arrive On Green	0.07	0.44	0.00	0.00	0.24	0.24	0.27	0.27	0.27			
Sat Flow, veh/h	1688	3455	0	0	3455	1502	1676	12	1502			
Grp Volume(v), veh/h	72	328	0	0	500	50	291	0	33			
Grp Sat Flow(s),veh/h/ln	1688	1683	0	0	1683	1502	1688	0	1502			
Q Serve(g_s), s	1.2	2.6	0.0	0.0	5.7	1.1	6.4	0.0	0.7			
Cycle Q Clear(g_c), s	1.2	2.6	0.0	0.0	5.7	1.1	6.4	0.0	0.7			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	371	1495	0	0	796	355	464	0	413			
V/C Ratio(X)	0.19	0.22	0.00	0.00	0.63	0.14	0.63	0.00	0.08			
Avail Cap(c_a), veh/h	455	2365	0	0	1498	668	711	0	633			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	10.2	7.3	0.0	0.0	14.6	12.9	13.6	0.0	11.5			
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.0	0.8	0.2	1.4	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.0	0.0	1.7	0.3	1.8	0.0	0.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	7.4	0.0	0.0	15.4	13.1	15.0	0.0	11.6			
LnGrp LOS	B	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		400			550			324				
Approach Delay, s/veh		7.9			15.2			14.6				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		25.0			8.9	16.1		17.7				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		30.0			5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s		4.6			3.2	7.7		8.4				
Green Ext Time (p_c), s		1.9			0.0	2.4		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.8									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	335	145	40	670	0	0	0	0	25	2	105
Future Volume (vph)	0	335	145	40	670	0	0	0	0	25	2	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.893	
Flt Protected				0.950							0.991	
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	0	1562	0
Flt Permitted				0.950							0.991	
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	0	1562	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	372	161	44	744	0	0	0	0	28	2	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	161	44	744	0	0	0	0	0	147	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	335	145	40	670	0	0	0	0	25	2	105
Future Vol, veh/h	0	335	145	40	670	0	0	0	0	25	2	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	372	161	44	744	0	0	0	0	28	2	117

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	533	0	0	1018	1365	372
Stage 1	-	-	-	-	-	-	832	832	-
Stage 2	-	-	-	-	-	-	186	533	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	1031	-	0	233	146	625
Stage 1	0	-	-	-	-	0	388	382	-
Stage 2	0	-	-	-	-	0	827	523	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1031	-	-	223	0	625
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	0	-
Stage 1	-	-	-	-	-	-	388	0	-
Stage 2	-	-	-	-	-	-	791	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.5	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1031	-	464
HCM Lane V/C Ratio	-	-	0.043	-	0.316
HCM Control Delay (s)	-	-	8.6	-	16.3
HCM Lane LOS	-	-	A	-	C
HCM 95th %tile Q(veh)	-	-	0.1	-	1.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Future Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.952			0.908	
Flt Protected	0.950			0.950				0.970			0.985	
Satd. Flow (prot)	1710	3306	0	1513	3277	0	0	1360	0	0	1610	0
Flt Permitted	0.950			0.950				0.970			0.985	
Satd. Flow (perm)	1710	3306	0	1513	3277	0	0	1360	0	0	1610	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	461	56	22	456	17	39	1	22	28	1	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	517	0	22	473	0	0	62	0	0	90	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	415	50	20	410	15	35	1	20	25	1	55
Future Vol, veh/h	45	415	50	20	410	15	35	1	20	25	1	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	13	4	0	19	0	29	0	0	0
Mvmt Flow	50	461	56	22	456	17	39	1	22	28	1	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	473	0	0	517	0	0	862	1106	259	840	1126	237
Stage 1	-	-	-	-	-	-	589	589	-	509	509	-
Stage 2	-	-	-	-	-	-	273	517	-	331	617	-
Critical Hdwy	4.1	-	-	4.36	-	-	7.88	6.5	7.48	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.33	-	-	3.69	4	3.59	3.5	4	3.3
Pot Cap-1 Maneuver	1099	-	-	972	-	-	223	212	664	262	207	771
Stage 1	-	-	-	-	-	-	422	499	-	520	541	-
Stage 2	-	-	-	-	-	-	664	537	-	662	484	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1099	-	-	972	-	-	194	198	664	239	193	771
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	198	-	239	193	-
Stage 1	-	-	-	-	-	-	403	477	-	497	529	-
Stage 2	-	-	-	-	-	-	596	525	-	609	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	23.1	15.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	260	1099	-	-	972	-	-	447
HCM Lane V/C Ratio	0.239	0.045	-	-	0.023	-	-	0.201
HCM Control Delay (s)	23.1	8.4	-	-	8.8	-	-	15.1
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	790	10	10	615	70	15	15	15	110	15	40
Future Volume (vph)	80	790	10	10	615	70	15	15	15	110	15	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	205		0	215		0	105		0	115		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.985			0.925			0.892	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3346	0	1676	3303	0	1676	1632	0	1676	1574	0
Flt Permitted	0.304			0.294			0.717			0.735		
Satd. Flow (perm)	536	3346	0	519	3303	0	1265	1632	0	1297	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			21			17			44	
Link Speed (mph)		35			35			40			25	
Link Distance (ft)		1772			1929			688			588	
Travel Time (s)		34.5			37.6			11.7			16.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	878	11	11	683	78	17	17	17	122	17	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	889	0	11	761	0	17	34	0	122	61	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	11.0	25.0		11.0	25.0		24.0	24.0		24.0	24.0	
Total Split (%)	18.3%	41.7%		18.3%	41.7%		40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	25.3	26.3		23.2	22.5		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.55	0.58		0.51	0.49		0.23	0.23		0.23	0.23	
v/c Ratio	0.21	0.46		0.03	0.47		0.06	0.09		0.41	0.16	
Control Delay	7.5	11.1		6.5	13.4		16.8	12.1		22.0	9.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.5	11.1		6.5	13.4		16.8	12.1		22.0	9.4	
LOS	A	B		A	B		B	B		C	A	
Approach Delay		10.7			13.3			13.6			17.8	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	11	71		1	94		4	4		33	4	
Queue Length 95th (ft)	32	#216		7	166		17	22		73	28	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1692			1849			608			508	
Turn Bay Length (ft)	205			215			105			115		
Base Capacity (vph)	430	2005		399	1727		530	694		543	685	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.44		0.03	0.44		0.03	0.05		0.22	0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 45.6			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 55.7%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: Broadway St S & US 212

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	790	10	10	615	70	15	15	15	110	15	40
Future Volume (veh/h)	80	790	10	10	615	70	15	15	15	110	15	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	89	878	11	11	683	78	17	17	17	122	17	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	1310	16	308	978	112	345	130	130	371	70	180
Arrive On Green	0.08	0.38	0.38	0.01	0.32	0.32	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1688	3405	43	1688	3045	347	1341	813	813	1375	437	1131
Grp Volume(v), veh/h	89	434	455	11	377	384	17	0	34	122	0	61
Grp Sat Flow(s),veh/h/ln	1688	1683	1764	1688	1683	1709	1341	0	1626	1375	0	1568
Q Serve(g_s), s	1.4	8.7	8.7	0.2	8.0	8.0	0.5	0.0	0.7	3.4	0.0	1.4
Cycle Q Clear(g_c), s	1.4	8.7	8.7	0.2	8.0	8.0	1.8	0.0	0.7	4.1	0.0	1.4
Prop In Lane	1.00		0.02	1.00		0.20	1.00		0.50	1.00		0.72
Lane Grp Cap(c), veh/h	396	648	679	308	541	549	345	0	259	371	0	250
V/C Ratio(X)	0.22	0.67	0.67	0.04	0.70	0.70	0.05	0.00	0.13	0.33	0.00	0.24
Avail Cap(c_a), veh/h	471	784	822	490	784	796	723	0	717	759	0	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	10.4	10.4	9.5	12.1	12.1	15.8	0.0	14.7	16.5	0.0	15.0
Incr Delay (d2), s/veh	0.3	1.7	1.6	0.0	1.6	1.6	0.1	0.0	0.2	0.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.6	2.7	0.1	2.5	2.5	0.1	0.0	0.2	1.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	12.1	12.0	9.6	13.7	13.7	15.9	0.0	14.9	17.0	0.0	15.5
LnGrp LOS	A	B	B	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		978			772			51			183	
Approach Delay, s/veh		11.8			13.7			15.2			16.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	21.7		12.5	9.2	19.1		12.5				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	10.7		6.1	3.4	10.0		3.8				
Green Ext Time (p_c), s	0.0	3.4		0.5	0.0	3.1		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			13.0									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	15	0	0	50	2	25	2	2	0	0	0
Future Volume (vph)	60	15	0	0	50	2	25	2	2	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.995			0.992				
Flt Protected		0.962						0.958				
Satd. Flow (prot)	0	1603	0	0	1658	0	0	1584	0	0	0	0
Flt Permitted		0.962						0.958				
Satd. Flow (perm)	0	1603	0	0	1658	0	0	1584	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	17	0	0	56	2	28	2	2	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	58	0	0	32	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	15	0	0	50	2	25	2	2	0	0	0
Future Vol, veh/h	60	15	0	0	50	2	25	2	2	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	17	0	0	56	2	28	2	2	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	58	0	-	-	-	0	208	209	17
Stage 1	-	-	-	-	-	-	151	151	-
Stage 2	-	-	-	-	-	-	57	58	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1546	-	0	0	-	-	780	688	1062
Stage 1	-	-	0	0	-	-	877	772	-
Stage 2	-	-	0	0	-	-	966	847	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1546	-	-	-	-	-	746	0	1062
Mov Cap-2 Maneuver	-	-	-	-	-	-	746	0	-
Stage 1	-	-	-	-	-	-	838	0	-
Stage 2	-	-	-	-	-	-	966	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.9	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	763	1546	-	-	-
HCM Lane V/C Ratio	0.042	0.043	-	-	-
HCM Control Delay (s)	9.9	7.4	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	75	30	10	65	0	0	0	0	2	2	90
Future Volume (vph)	0	75	30	10	65	0	0	0	0	2	2	90
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962									0.870	
Flt Protected					0.993						0.999	
Satd. Flow (prot)	0	1603	0	0	1655	0	0	0	0	0	1449	0
Flt Permitted					0.993						0.999	
Satd. Flow (perm)	0	1603	0	0	1655	0	0	0	0	0	1449	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	83	33	11	72	0	0	0	0	2	2	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	116	0	0	83	0	0	0	0	0	104	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	75	30	10	65	0	0	0	0	2	2	90
Future Vol, veh/h	0	75	30	10	65	0	0	0	0	2	2	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	83	33	11	72	0	0	0	0	2	2	100

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	116	0	0	194	210	72
Stage 1	-	-	-	-	-	-	94	94	-
Stage 2	-	-	-	-	-	-	100	116	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1473	-	0	795	687	990
Stage 1	0	-	-	-	-	0	930	817	-
Stage 2	0	-	-	-	-	0	924	800	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1473	-	-	789	0	990
Mov Cap-2 Maneuver	-	-	-	-	-	-	789	0	-
Stage 1	-	-	-	-	-	-	930	0	-
Stage 2	-	-	-	-	-	-	917	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1473	-	985
HCM Lane V/C Ratio	-	-	0.008	-	0.106
HCM Control Delay (s)	-	-	7.5	0	9.1
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Future Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969			0.998			0.939			0.940	
Flt Protected		0.993			0.984			0.986			0.994	
Satd. Flow (prot)	0	1604	0	0	1637	0	0	1543	0	0	1557	0
Flt Permitted		0.993			0.984			0.986			0.994	
Satd. Flow (perm)	0	1604	0	0	1637	0	0	1543	0	0	1557	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	78	28	56	117	2	17	17	28	11	44	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	175	0	0	62	0	0	99	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	70	25	50	105	2	15	15	25	10	40	40
Future Vol, veh/h	15	70	25	50	105	2	15	15	25	10	40	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	78	28	56	117	2	17	17	28	11	44	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	119	0	0	106	0	0	400	357	92	379	370	118
Stage 1	-	-	-	-	-	-	126	126	-	230	230	-
Stage 2	-	-	-	-	-	-	274	231	-	149	140	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1469	-	-	1485	-	-	560	569	965	579	560	934
Stage 1	-	-	-	-	-	-	878	792	-	773	714	-
Stage 2	-	-	-	-	-	-	732	713	-	854	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1469	-	-	1485	-	-	480	539	965	527	531	934
Mov Cap-2 Maneuver	-	-	-	-	-	-	480	539	-	527	531	-
Stage 1	-	-	-	-	-	-	867	782	-	764	685	-
Stage 2	-	-	-	-	-	-	626	684	-	802	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	2.4	11.1	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	647	1469	-	-	1485	-	-	656
HCM Lane V/C Ratio	0.094	0.011	-	-	0.037	-	-	0.152
HCM Control Delay (s)	11.1	7.5	0	-	7.5	0	-	11.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1	40	165	1	15	20	145	75	5	270	5
Future Volume (vph)	2	1	40	165	1	15	20	145	75	5	270	5
Ideal Flow (vphpl)	1700	1700	1700	1800	1700	1800	1700	1800	1800	1800	1800	1700
Storage Length (ft)	0		0	0		0	150		100	190		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874			0.989				0.850		0.997	
Flt Protected		0.998			0.956		0.950			0.950		
Satd. Flow (prot)	0	1454	0	0	1576	0	1583	1765	1500	1676	1759	0
Flt Permitted		0.998			0.956		0.950			0.950		
Satd. Flow (perm)	0	1454	0	0	1576	0	1583	1765	1500	1676	1759	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		520			791			1566			1307	
Travel Time (s)		14.2			21.6			30.5			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	1	44	183	1	17	22	161	83	6	300	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	201	0	22	161	83	6	306	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	40	165	1	15	20	145	75	5	270	5
Future Vol, veh/h	2	1	40	165	1	15	20	145	75	5	270	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	190	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	1	44	183	1	17	22	161	83	6	300	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	571	603	303	543	523	161	306	0	0	244	0	0
Stage 1	315	315	-	205	205	-	-	-	-	-	-	-
Stage 2	256	288	-	338	318	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	432	413	737	451	459	884	1255	-	-	1322	-	-
Stage 1	696	656	-	797	732	-	-	-	-	-	-	-
Stage 2	749	674	-	676	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	416	404	737	416	448	884	1255	-	-	1322	-	-
Mov Cap-2 Maneuver	416	404	-	416	448	-	-	-	-	-	-	-
Stage 1	683	653	-	783	719	-	-	-	-	-	-	-
Stage 2	721	662	-	631	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	20.2	0.7	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1255	-	-	699	435	1322	-	-
HCM Lane V/C Ratio	0.018	-	-	0.068	0.462	0.004	-	-
HCM Control Delay (s)	7.9	-	-	10.5	20.2	7.7	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.4	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	295	110	180	230	50	45	170	170	50	360	85
Future Volume (vph)	75	295	110	180	230	50	45	170	170	50	360	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	120		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.959			0.973			0.925			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1692	0	1676	1717	0	1676	3101	0	1676	3256	0
Flt Permitted	0.520			0.333			0.438			0.528		
Satd. Flow (perm)	918	1692	0	588	1717	0	773	3101	0	932	3256	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			19			189			50	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1194			1025			1109			1566	
Travel Time (s)		23.3			20.0			21.6			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	328	122	200	256	56	50	189	189	56	400	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	450	0	200	312	0	50	378	0	56	494	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	18.1	18.1		18.1	18.1		18.3	13.3		18.3	13.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.34	0.24		0.34	0.24	
v/c Ratio	0.27	0.77		1.03	0.54		0.15	0.42		0.15	0.59	
Control Delay	17.6	28.0		99.1	18.8		9.6	9.8		9.6	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.6	28.0		99.1	18.8		9.6	9.8		9.6	19.2	
LOS	B	C		F	B		A	A		A	B	
Approach Delay		26.4			50.2			9.7			18.2	
Approach LOS		C			D			A			B	
Queue Length 50th (ft)	19	115		~63	72		9	25		10	65	
Queue Length 95th (ft)	55	#291		#197	160		23	54		25	104	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1114			945			1029			1486	
Turn Bay Length (ft)	120			120			120			120		
Base Capacity (vph)	304	582		195	582		343	1209		382	1172	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.77		1.03	0.54		0.15	0.31		0.15	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 54.4			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 71.5%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 17: US 81 (4th Street NE) & 14th Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	295	110	180	230	50	45	170	170	50	360	85
Future Volume (veh/h)	75	295	110	180	230	50	45	170	170	50	360	85
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	83	328	122	200	256	56	50	189	189	56	400	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	425	158	244	486	106	373	361	322	408	582	135
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.10	0.21	0.21	0.10	0.21	0.21
Sat Flow, veh/h	1130	1231	458	996	1408	308	1688	1683	1502	1688	2711	631
Grp Volume(v), veh/h	83	0	450	200	0	312	50	189	189	56	247	247
Grp Sat Flow(s),veh/h/ln	1130	0	1689	996	0	1716	1688	1683	1502	1688	1683	1658
Q Serve(g_s), s	3.3	0.0	12.4	5.6	0.0	7.6	1.1	5.2	5.9	1.2	7.0	7.2
Cycle Q Clear(g_c), s	10.9	0.0	12.4	18.0	0.0	7.6	1.1	5.2	5.9	1.2	7.0	7.2
Prop In Lane	1.00		0.27	1.00		0.18	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	363	0	583	244	0	592	373	361	322	408	361	356
V/C Ratio(X)	0.23	0.00	0.77	0.82	0.00	0.53	0.13	0.52	0.59	0.14	0.68	0.69
Avail Cap(c_a), veh/h	363	0	583	244	0	592	373	613	547	408	613	604
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	15.3	24.6	0.0	13.7	13.3	18.1	18.4	13.2	18.9	18.9
Incr Delay (d2), s/veh	0.3	0.0	6.4	19.2	0.0	0.9	0.2	1.2	1.7	0.2	2.3	2.4
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	0.8	0.0	5.0	3.6	0.0	2.6	0.4	1.9	1.9	0.4	2.6	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.4	0.0	21.6	43.8	0.0	14.6	13.5	19.3	20.1	13.3	21.2	21.4
LnGrp LOS	B	A	C	D	A	B	B	B	C	B	C	C
Approach Vol, veh/h		533			512			428			550	
Approach Delay, s/veh		21.1			26.0			19.0			20.4	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	17.2		24.0	11.0	17.2		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	3.2	7.9		14.4	3.1	9.2		20.0				
Green Ext Time (p_c), s	0.0	1.7		1.1	0.0	2.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			21.7									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	265	80	75	165	45	60	485	55	200	665	60
Future Volume (vph)	70	265	80	75	165	45	60	485	55	200	665	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	75		0	75		0	100		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.965			0.968			0.985			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1703	0	1676	1708	0	1676	3303	0	1676	3313	0
Flt Permitted	0.612			0.364			0.231			0.372		
Satd. Flow (perm)	1080	1703	0	642	1708	0	408	3303	0	656	3313	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			23			21			16	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1200			1304			1548			1564	
Travel Time (s)		32.7			35.6			30.2			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	294	89	83	183	50	67	539	61	222	739	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	383	0	83	233	0	67	600	0	222	806	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	15.6	15.6		15.6	15.6		22.6	17.6		22.6	17.6	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.40	0.31		0.40	0.31	
v/c Ratio	0.26	0.78		0.47	0.48		0.24	0.58		0.63	0.77	
Control Delay	18.7	30.8		27.1	19.1		10.4	18.6		19.6	23.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.7	30.8		27.1	19.1		10.4	18.6		19.6	23.7	
LOS	B	C		C	B		B	B		B	C	
Approach Delay		28.7			21.2			17.8			22.8	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	21	114		24	60		12	90		43	133	
Queue Length 95th (ft)	51	#231		62	115		28	135		#90	193	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1120			1224			1468			1484	
Turn Bay Length (ft)	75			75			100			165		
Base Capacity (vph)	348	566		206	565		276	1137		354	1137	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.68		0.40	0.41		0.24	0.53		0.63	0.71	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 56.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: US 81 (4th Street NE) & 3rd Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	265	80	75	165	45	60	485	55	200	665	60
Future Volume (veh/h)	70	265	80	75	165	45	60	485	55	200	665	60
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	78	294	89	83	183	50	67	539	61	222	739	67
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	371	406	123	243	417	114	321	881	99	390	901	82
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.09	0.29	0.29	0.09	0.29	0.29
Sat Flow, veh/h	1215	1306	395	1059	1340	366	1688	3049	344	1688	3121	283
Grp Volume(v), veh/h	78	0	383	83	0	233	67	297	303	222	398	408
Grp Sat Flow(s),veh/h/ln	1215	0	1701	1059	0	1706	1688	1683	1710	1688	1683	1721
Q Serve(g_s), s	3.1	0.0	11.5	4.3	0.0	6.3	1.5	8.8	8.8	5.0	12.7	12.7
Cycle Q Clear(g_c), s	9.4	0.0	11.5	15.9	0.0	6.3	1.5	8.8	8.8	5.0	12.7	12.7
Prop In Lane	1.00		0.23	1.00		0.21	1.00		0.20	1.00		0.16
Lane Grp Cap(c), veh/h	371	0	529	243	0	531	321	486	494	390	486	497
V/C Ratio(X)	0.21	0.00	0.72	0.34	0.00	0.44	0.21	0.61	0.61	0.57	0.82	0.82
Avail Cap(c_a), veh/h	373	0	533	245	0	534	321	556	565	390	556	569
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	17.6	24.7	0.0	15.8	13.2	17.7	17.7	14.4	19.0	19.1
Incr Delay (d2), s/veh	0.3	0.0	4.8	0.8	0.0	0.6	0.3	1.5	1.6	2.0	8.4	8.3
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	0.9	0.0	4.8	1.1	0.0	2.3	0.5	3.2	3.2	2.0	5.4	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	0.0	22.4	25.5	0.0	16.4	13.5	19.2	19.2	16.4	27.5	27.4
LnGrp LOS	B	A	C	C	A	B	B	B	B	B	C	C
Approach Vol, veh/h		461			316			667			1028	
Approach Delay, s/veh		22.0			18.8			18.6			25.0	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	22.6		23.9	11.0	22.6		23.9				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	7.0	10.8		13.5	3.5	14.7		17.9				
Green Ext Time (p_c), s	0.0	2.2		1.1	0.0	1.9		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			21.9									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	15	15	15	25	45	30	695	15	2	35	600
Future Volume (vph)	15	15	15	15	25	45	30	695	15	2	35	600
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Storage Length (ft)	0		0	0		0	100		0		100	
Storage Lanes	0		0	0		0	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt		0.955			0.929			0.997				0.994
Flt Protected		0.984			0.991		0.950				0.950	
Satd. Flow (prot)	0	1658	0	0	1625	0	1676	3343	0	0	1676	3333
Flt Permitted		0.852			0.925		0.314				0.353	
Satd. Flow (perm)	0	1436	0	0	1516	0	554	3343	0	0	623	3333
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		17			50			6				8
Link Speed (mph)		25			25			35				35
Link Distance (ft)		761			745			370				380
Travel Time (s)		20.8			20.3			7.2				7.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	17	17	17	28	50	33	772	17	2	39	667
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	95	0	33	789	0	0	41	695
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6	6	
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		10.0	10.0	10.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		9.5	32.5		23.0	23.0	23.0
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	59.1%		41.8%	41.8%	41.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)		6.9			6.9		22.0	24.1			22.7	22.7
Actuated g/C Ratio		0.20			0.20		0.65	0.72			0.67	0.67
v/c Ratio		0.17			0.27		0.06	0.33			0.10	0.31
Control Delay		11.3			10.0		4.2	4.3			7.6	6.1
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		11.3			10.0		4.2	4.3			7.6	6.1
LOS		B			A		A	A			A	A
Approach Delay		11.3			10.0			4.3				6.2
Approach LOS		B			A			A				A
Queue Length 50th (ft)		4			5		2	34			3	29
Queue Length 95th (ft)		29			39		10	72			23	109

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	25
Future Volume (vph)	25
Ideal Flow (vphpl)	1800
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	28
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Internal Link Dist (ft)		681			665			290				300
Turn Bay Length (ft)							100				100	
Base Capacity (vph)		801			861		534	2877			447	2394
Starvation Cap Reductn		0			0		0	0			0	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0
Reduced v/c Ratio		0.06			0.11		0.06	0.27			0.09	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 33.7			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 5.7		Intersection LOS: A	
Intersection Capacity Utilization 45.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 28: US 81 (5th Street SE)/US 81 (5th Street NE) & E Kemp Avenue

Lane Group	SBR
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

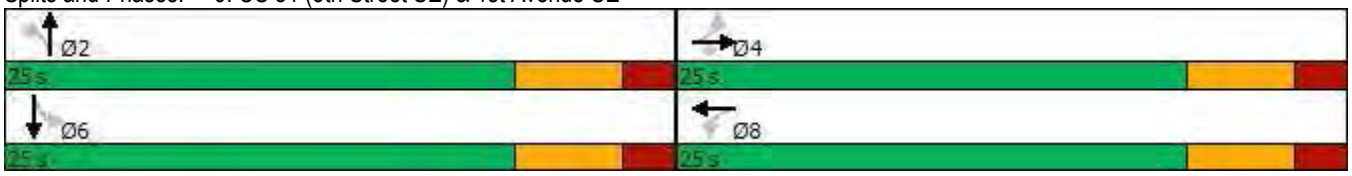
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	40	30	20	25	20	35	670	10	50	525	55
Future Volume (vph)	50	40	30	20	25	20	35	670	10	50	525	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	80		80	0		0	100		0	0		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.959			0.998			0.986	
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1676	1765	1500	0	1667	0	1676	3346	0	1676	3306	0
Flt Permitted	0.870				0.881		0.407			0.365		
Satd. Flow (perm)	1535	1765	1500	0	1491	0	718	3346	0	644	3306	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		22			3			25	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		642			750			1323			370	
Travel Time (s)		17.5			20.5			25.8			7.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	44	33	22	28	22	39	744	11	56	583	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	44	33	0	72	0	39	755	0	56	644	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	7.7	7.7	7.7		7.7		22.9	22.9		22.9	22.9	
Actuated g/C Ratio	0.22	0.22	0.22		0.22		0.67	0.67		0.67	0.67	
v/c Ratio	0.16	0.11	0.09		0.21		0.08	0.34		0.13	0.29	
Control Delay	13.0	12.4	2.7		10.8		6.5	6.0		7.1	5.6	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	13.0	12.4	2.7		10.8		6.5	6.0		7.1	5.6	
LOS	B	B	A		B		A	A		A	A	
Approach Delay		10.2			10.8			6.1			5.7	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	8	6	0		7		4	46		6	36	
Queue Length 95th (ft)	30	25	8		31		16	88		22	71	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		562			670			1243			290	
Turn Bay Length (ft)	80		80				100					
Base Capacity (vph)	858	987	867		843		513	2390		460	2368	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.07	0.04	0.04		0.09		0.08	0.32		0.12	0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 34.3			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 6.4		Intersection LOS: A	
Intersection Capacity Utilization 53.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: US 81 (5th Street SE) & 1st Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	40	30	20	25	20	35	670	10	50	525	55
Future Volume (veh/h)	50	40	30	20	25	20	35	670	10	50	525	55
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	56	44	33	22	28	22	39	744	11	56	583	61
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	529	342	290	215	160	95	461	1362	20	419	1234	129
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1435	1772	1502	288	828	491	832	3396	50	751	3076	321
Grp Volume(v), veh/h	56	44	33	72	0	0	39	369	386	56	318	326
Grp Sat Flow(s),veh/h/ln	1435	1772	1502	1607	0	0	832	1683	1763	751	1683	1714
Q Serve(g_s), s	0.0	0.6	0.5	0.0	0.0	0.0	1.1	5.0	5.0	1.8	4.1	4.1
Cycle Q Clear(g_c), s	0.8	0.6	0.5	1.1	0.0	0.0	5.2	5.0	5.0	6.8	4.1	4.1
Prop In Lane	1.00		1.00	0.31		0.31	1.00		0.03	1.00		0.19
Lane Grp Cap(c), veh/h	529	342	290	469	0	0	461	675	707	419	675	688
V/C Ratio(X)	0.11	0.13	0.11	0.15	0.00	0.00	0.08	0.55	0.55	0.13	0.47	0.47
Avail Cap(c_a), veh/h	1175	1139	965	1171	0	0	662	1082	1133	600	1082	1102
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	9.9	9.8	10.1	0.0	0.0	8.5	6.8	6.8	9.4	6.5	6.5
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.2	0.0	0.0	0.1	0.7	0.7	0.1	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	0.1	0.3	0.0	0.0	0.1	1.0	1.0	0.2	0.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.0	10.0	10.0	10.2	0.0	0.0	8.6	7.5	7.4	9.5	7.0	7.0
LnGrp LOS	B	B	B	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		133			72			794			700	
Approach Delay, s/veh		10.0			10.2			7.5			7.2	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		17.9		11.7		17.9		11.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		7.2		2.8		8.8		3.1				
Green Ext Time (p_c), s		3.7		0.4		3.1		0.3				

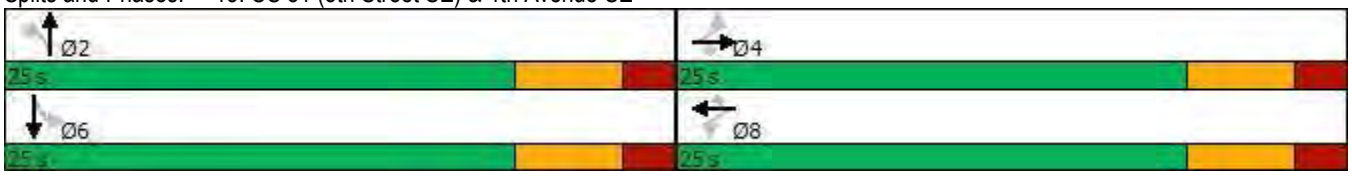
Intersection Summary												
HCM 6th Ctrl Delay			7.7									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	35	20	20	35	15	10	345	10	20	400	20
Future Volume (vph)	25	35	20	20	35	15	10	345	10	20	400	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		75	0		75	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.996			0.993	
Flt Protected		0.980			0.982		0.950			0.950		
Satd. Flow (prot)	0	1729	1500	0	1733	1500	1676	3340	0	1676	3329	0
Flt Permitted		0.978			0.938		0.484			0.519		
Satd. Flow (perm)	0	1726	1500	0	1655	1500	854	3340	0	916	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		7			11	
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		870			848			999			1323	
Travel Time (s)		19.8			23.1			19.5			25.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	39	22	22	39	17	11	383	11	22	444	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	22	0	61	17	11	394	0	22	466	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)		7.7	7.7		7.7	7.7	21.9	21.9		21.9	21.9	
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.75	0.75		0.75	0.75	
v/c Ratio		0.15	0.05		0.14	0.04	0.02	0.16		0.03	0.19	
Control Delay		9.6	1.1		9.5	0.3	5.8	4.4		5.8	4.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		9.6	1.1		9.5	0.3	5.8	4.4		5.8	4.4	
LOS		A	A		A	A	A	A		A	A	
Approach Delay		7.5			7.5			4.4			4.5	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		3	0		3	0	0	0		0	0	
Queue Length 95th (ft)		27	3		25	1	6	41		10	48	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		790			768			919			1243	
Turn Bay Length (ft)			75			75	100			100		
Base Capacity (vph)		1174	1041		1126	1041	713	2792		765	2783	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.06	0.02		0.05	0.02	0.02	0.14		0.03	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 29.1			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.19			
Intersection Signal Delay: 4.9		Intersection LOS: A	
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: US 81 (5th Street SE) & 4th Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	35	20	20	35	15	10	345	10	20	400	20
Future Volume (veh/h)	25	35	20	20	35	15	10	345	10	20	400	20
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	28	39	22	22	39	17	11	383	11	22	444	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	228	278	248	245	278	533	1238	35	569	1209	60
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	437	1229	1502	361	1322	1502	981	3342	96	1048	3265	161
Grp Volume(v), veh/h	67	0	22	61	0	17	11	193	201	22	228	238
Grp Sat Flow(s),veh/h/ln	1666	0	1502	1683	0	1502	981	1683	1755	1048	1683	1743
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	0.3	0.2	2.2	2.2	0.4	2.7	2.7
Cycle Q Clear(g_c), s	0.9	0.0	0.3	0.8	0.0	0.3	2.9	2.2	2.2	2.6	2.7	2.7
Prop In Lane	0.42		1.00	0.36		1.00	1.00		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	498	0	278	493	0	278	533	623	650	569	623	646
V/C Ratio(X)	0.13	0.00	0.08	0.12	0.00	0.06	0.02	0.31	0.31	0.04	0.37	0.37
Avail Cap(c_a), veh/h	1332	0	1057	1337	0	1057	860	1185	1235	919	1185	1226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	0.0	9.1	9.3	0.0	9.1	7.3	6.0	6.0	7.0	6.2	6.2
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.3	0.3	0.0	0.4	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	0.2	0.0	0.1	0.2	0.0	0.1	0.0	0.4	0.4	0.1	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	0.0	9.2	9.4	0.0	9.2	7.3	6.3	6.3	7.0	6.6	6.5
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		89			78			405			488	
Approach Delay, s/veh		9.4			9.3			6.3			6.6	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.0		11.0		16.0		11.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		4.9		2.9		4.7		2.8				
Green Ext Time (p_c), s		1.9		0.3		2.3		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			6.9									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	130	40	20	85	30	125	305	90	10	90	95
Future Volume (vph)	75	130	40	20	85	30	125	305	90	10	90	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.970			0.977			0.934	
Flt Protected		0.985			0.993			0.988			0.997	
Satd. Flow (prot)	0	1700	0	0	1700	0	0	1703	0	0	1643	0
Flt Permitted		0.985			0.993			0.988			0.997	
Satd. Flow (perm)	0	1700	0	0	1700	0	0	1703	0	0	1643	0
Link Speed (mph)		40			50			65			45	
Link Distance (ft)		2250			2754			1476			1428	
Travel Time (s)		38.4			37.6			15.5			21.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	144	44	22	94	33	139	339	100	11	100	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	149	0	0	578	0	0	217	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	271	149	578	217
Demand Flow Rate, veh/h	277	152	590	221
Vehicles Circulating, veh/h	135	573	243	260
Vehicles Exiting, veh/h	346	260	169	465
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.1	6.9	10.2	5.4
Approach LOS	A	A	B	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	277	152	590	221
Cap Entry Lane, veh/h	1202	769	1077	1058
Entry HV Adj Factor	0.979	0.981	0.980	0.982
Flow Entry, veh/h	271	149	578	217
Cap Entry, veh/h	1177	755	1055	1039
V/C Ratio	0.230	0.198	0.548	0.209
Control Delay, s/veh	5.1	6.9	10.2	5.4
LOS	A	A	B	A
95th %tile Queue, veh	1	1	3	1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	170	205	75	20	45
Future Volume (vph)	50	170	205	75	20	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	70	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.964			0.850
Flt Protected		0.989			0.950	
Satd. Flow (prot)	0	1759	1726	0	1598	1530
Flt Permitted		0.989			0.950	
Satd. Flow (perm)	0	1759	1726	0	1598	1530
Link Speed (mph)		25	25		25	
Link Distance (ft)		791	278		1006	
Travel Time (s)		21.6	7.6		27.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	1%	0%	2%	7%	0%
Adj. Flow (vph)	56	189	228	83	22	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	245	311	0	22	50
Sign Control		Stop	Stop		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	170	205	75	20	45
Future Vol, veh/h	50	170	205	75	20	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	1	0	2	7	0
Mvmt Flow	56	189	228	83	22	50
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9.5	9.6	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	23%	0%	100%	0%
Vol Thru, %	77%	73%	0%	0%
Vol Right, %	0%	27%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	220	280	20	45
LT Vol	50	0	20	0
Through Vol	170	205	0	0
RT Vol	0	75	0	45
Lane Flow Rate	244	311	22	50
Geometry Grp	2	2	7	7
Degree of Util (X)	0.304	0.362	0.039	0.069
Departure Headway (Hd)	4.483	4.193	6.32	4.988
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	802	859	567	718
Service Time	2.504	2.211	4.057	2.724
HCM Lane V/C Ratio	0.304	0.362	0.039	0.07
HCM Control Delay	9.5	9.6	9.3	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.3	1.7	0.1	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	170	20	15	255	25	20
Future Volume (vph)	170	20	15	255	25	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986				0.941	
Flt Protected				0.997	0.973	
Satd. Flow (prot)	1759	0	0	1778	1648	0
Flt Permitted				0.997	0.973	
Satd. Flow (perm)	1759	0	0	1778	1648	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	278			1819	482	
Travel Time (s)	7.6			49.6	13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Adj. Flow (vph)	189	22	17	283	28	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	211	0	0	300	50	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	20	15	255	25	20
Future Vol, veh/h	170	20	15	255	25	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	189	22	17	283	28	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	211	0	517	200
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1372	-	522	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	743	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	514	846
Mov Cap-2 Maneuver	-	-	-	-	514	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	732	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	623	-	-	1372	-
HCM Lane V/C Ratio	0.08	-	-	0.012	-
HCM Control Delay (s)	11.3	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	10	40	105	35	5	20	150	175	35	150	40	230
Future Volume (vph)	10	40	105	35	5	20	150	175	35	150	40	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)		215		215		145		0	150		0	150
Storage Lanes		1		1		1		1	1		0	1
Taper Length (ft)		25				25			25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850				0.850		0.969		
Flt Protected		0.950				0.950			0.950			0.950
Satd. Flow (prot)	0	1632	1800	1485	0	1703	1782	1485	1644	1704	0	1693
Flt Permitted		0.651				0.682			0.524			0.398
Satd. Flow (perm)	0	1118	1800	1485	0	1222	1782	1485	907	1704	0	709
Right Turn on Red				Yes				Yes			Yes	
Satd. Flow (RTOR)				164				194		23		
Link Speed (mph)			25				45			35		
Link Distance (ft)			1819				1221			982		
Travel Time (s)			49.6				18.5			19.1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	6%	0%	3%	2%	0%	1%	3%	4%	3%	0%	1%
Adj. Flow (vph)	11	44	117	39	6	22	167	194	39	167	44	256
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	117	39	0	28	167	194	39	211	0	256
Turn Type	Perm	Perm	NA	Perm	Perm	Perm	NA	pt+ov	Perm	NA		pm+pt
Protected Phases			4				8	8 1		2		1
Permitted Phases	4	4		4	8	8			2			6
Detector Phase	4	4	4	4	8	8	8	8 1	2	2		1
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		12.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%		40.0%	40.0%		20.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0	6.0		6.0	6.0		6.0
Lead/Lag									Lag	Lag		Lead
Lead-Lag Optimize?									Yes	Yes		Yes
Recall Mode	None	None	None	None	None	None	None		Min	Min		None
Act Effct Green (s)		9.9	9.9	9.9		9.9	9.9	22.1	10.4	10.4		22.6
Actuated g/C Ratio		0.22	0.22	0.22		0.22	0.22	0.49	0.23	0.23		0.51
v/c Ratio		0.22	0.30	0.09		0.10	0.42	0.23	0.18	0.51		0.52
Control Delay		17.4	17.2	0.4		15.6	19.2	2.3	16.6	18.3		11.3
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		17.4	17.2	0.4		15.6	19.2	2.3	16.6	18.3		11.3
LOS		B	B	A		B	B	A	B	B		B
Approach Delay			14.2				10.5			18.0		
Approach LOS			B				B			B		
Queue Length 50th (ft)		11	24	0		6	36	0	8	40		32

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	290	75
Future Volume (vph)	290	75
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.969	
Flt Protected		
Satd. Flow (prot)	1717	0
Flt Permitted		
Satd. Flow (perm)	1717	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	31	
Link Speed (mph)	35	
Link Distance (ft)	5295	
Travel Time (s)	103.1	
Peak Hour Factor	0.90	0.90
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	322	83
Shared Lane Traffic (%)		
Lane Group Flow (vph)	405	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	7.0	
Minimum Split (s)	24.0	
Total Split (s)	36.0	
Total Split (%)	60.0%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Min	
Act Effct Green (s)	22.6	
Actuated g/C Ratio	0.51	
v/c Ratio	0.46	
Control Delay	8.9	
Queue Delay	0.0	
Total Delay	8.9	
LOS	A	
Approach Delay	9.8	
Approach LOS	A	
Queue Length 50th (ft)	51	

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Queue Length 95th (ft)		37	63	0		22	86	25	29	99		82
Internal Link Dist (ft)			1739				1141			902		
Turn Bay Length (ft)		215		215		145			150			150
Base Capacity (vph)		457	736	704		500	729	816	371	711		493
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0
Reduced v/c Ratio		0.12	0.16	0.06		0.06	0.23	0.24	0.11	0.30		0.52

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 44.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 60.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: 19th St NE & 1st Ave NE/Willow Creek Dr

Lane Group	SBT	SBR
Queue Length 95th (ft)	128	
Internal Link Dist (ft)	5215	
Turn Bay Length (ft)		
Base Capacity (vph)	1181	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.34	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	10	40	105	35	5	20	150	175	35	150	40	230
Future Volume (veh/h)	10	40	105	35	5	20	150	175	35	150	40	230
Initial Q (Qb), veh		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
Parking Bus, Adj		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		
Adj Sat Flow, veh/h/ln		1716	1800	1758		1800	1786	1758	1744	1758	1800	1786
Adj Flow Rate, veh/h		44	117	39		22	167	194	39	167	44	256
Peak Hour Factor		0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %		6	0	3		0	1	3	4	3	0	1
Cap, veh/h		295	349	288		358	346	511	371	258	68	531
Arrive On Green		0.19	0.19	0.19		0.19	0.19	0.19	0.19	0.19	0.19	0.15
Sat Flow, veh/h		988	1800	1490		1250	1786	1490	965	1341	353	1701
Grp Volume(v), veh/h		44	117	39		22	167	194	39	0	211	256
Grp Sat Flow(s),veh/h/ln		988	1800	1490		1250	1786	1490	965	0	1694	1701
Q Serve(g_s), s		1.6	2.2	0.8		0.6	3.2	3.8	1.3	0.0	4.4	4.2
Cycle Q Clear(g_c), s		4.8	2.2	0.8		2.8	3.2	3.8	1.3	0.0	4.4	4.2
Prop In Lane		1.00		1.00		1.00		1.00	1.00		0.21	1.00
Lane Grp Cap(c), veh/h		295	349	288		358	346	511	371	0	325	531
V/C Ratio(X)		0.15	0.34	0.14		0.06	0.48	0.38	0.11	0.00	0.65	0.48
Avail Cap(c_a), veh/h		564	837	693		698	831	915	635	0	788	541
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		16.0	13.5	12.9		14.6	13.9	9.6	13.2	0.0	14.4	9.1
Incr Delay (d2), s/veh		0.2	0.6	0.2		0.1	1.0	0.5	0.1	0.0	2.2	0.7
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		0.3	0.8	0.3		0.1	1.0	0.8	0.2	0.0	1.5	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		16.3	14.0	13.1		14.7	14.9	10.1	13.3	0.0	16.6	9.8
LnGrp LOS		B	B	B		B	B	B	B	A	B	A
Approach Vol, veh/h			200				383			250		
Approach Delay, s/veh			14.3				12.5			16.1		
Approach LOS			B				B			B		

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.8	13.4		13.5		25.2		13.5				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	6.0	18.0		18.0		30.0		18.0				
Max Q Clear Time (g_c+I1), s	6.2	6.4		6.8		8.1		5.8				
Green Ext Time (p_c), s	0.0	1.0		0.7		2.4		1.2				

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	290	75
Future Volume (veh/h)	290	75
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1800
Adj Flow Rate, veh/h	322	83
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	2	0
Cap, veh/h	674	174
Arrive On Green	0.50	0.50
Sat Flow, veh/h	1359	350
Grp Volume(v), veh/h	0	405
Grp Sat Flow(s),veh/h/ln	0	1709
Q Serve(g_s), s	0.0	6.1
Cycle Q Clear(g_c), s	0.0	6.1
Prop In Lane		0.20
Lane Grp Cap(c), veh/h	0	848
V/C Ratio(X)	0.00	0.48
Avail Cap(c_a), veh/h	0	1325
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.4
Incr Delay (d2), s/veh	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	0.0	6.9
LnGrp LOS	A	A
Approach Vol, veh/h	661	
Approach Delay, s/veh	8.0	
Approach LOS	A	
Timer - Assigned Phs		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	40	75	310	340	40
Future Volume (vph)	40	40	75	310	340	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.932				0.984	
Flt Protected	0.976			0.990		
Satd. Flow (prot)	1637	0	0	3332	3335	0
Flt Permitted	0.976			0.990		
Satd. Flow (perm)	1637	0	0	3332	3335	0
Link Speed (mph)	30			35	45	
Link Distance (ft)	623			583	1620	
Travel Time (s)	14.2			11.4	24.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	44	44	83	344	378	44
Shared Lane Traffic (%)						
Lane Group Flow (vph)	88	0	0	427	422	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	40	75	310	340	40
Future Vol, veh/h	40	40	75	310	340	40
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, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	44	44	83	344	378	44

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	738	211	422	0	-	0
Stage 1	400	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	358	801	1148	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	326	801	1148	-	-	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	1.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1148	-	463	-	-
HCM Lane V/C Ratio	0.073	-	0.192	-	-
HCM Control Delay (s)	8.4	0.3	14.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Future Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.972			0.972			0.948	
Flt Protected		0.991			0.972		0.950			0.950		
Satd. Flow (prot)	0	1342	0	0	1701	0	1583	1722	0	1710	1633	0
Flt Permitted		0.991			0.972		0.950			0.950		
Satd. Flow (perm)	0	1342	0	0	1701	0	1583	1722	0	1710	1633	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	6	6	22	17	6	6	28	189	44	50	106	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	0	0	29	0	28	233	0	50	162	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	20	15	5	5	25	170	40	45	95	50
Future Vol, veh/h	5	5	20	15	5	5	25	170	40	45	95	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	33	0	0	0	8	2	0	0	0	13
Mvmt Flow	6	6	22	17	6	6	28	189	44	50	106	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	507	523	134	515	529	211	162	0	0	233	0	0
Stage 1	234	234	-	267	267	-	-	-	-	-	-	-
Stage 2	273	289	-	248	262	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	479	462	839	474	458	834	1381	-	-	1346	-	-
Stage 1	774	715	-	743	692	-	-	-	-	-	-	-
Stage 2	737	677	-	760	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	451	436	839	437	432	834	1381	-	-	1346	-	-
Mov Cap-2 Maneuver	451	436	-	437	432	-	-	-	-	-	-	-
Stage 1	759	689	-	728	678	-	-	-	-	-	-	-
Stage 2	711	663	-	707	669	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	12.9	0.8	1.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1381	-	-	647	482	1346	-	-
HCM Lane V/C Ratio	0.02	-	-	0.052	0.058	0.037	-	-
HCM Control Delay (s)	7.7	-	-	10.9	12.9	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2	200	10	5	2	245	30	5	5	65	45
Future Volume (vph)	25	2	200	10	5	2	245	30	5	5	65	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.881			0.962			0.977			0.947	
Flt Protected		0.994		0.950			0.950				0.998	
Satd. Flow (prot)	0	1506	0	1710	1732	0	1693	1595	0	0	1602	0
Flt Permitted		0.994		0.950			0.950				0.998	
Satd. Flow (perm)	0	1506	0	1710	1732	0	1693	1595	0	0	1602	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	42%	0%	0%	0%	0%	0%	1%	3%	50%	0%	11%	0%
Adj. Flow (vph)	28	2	222	11	6	2	272	33	6	6	72	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	252	0	11	8	0	272	39	0	0	128	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	2	200	10	5	2	245	30	5	5	65	45
Future Vol, veh/h	25	2	200	10	5	2	245	30	5	5	65	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	42	0	0	0	0	0	1	3	50	0	11	0
Mvmt Flow	28	2	222	11	6	2	272	33	6	6	72	50
Number of Lanes	0	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	13.4	9.3	13.1	10.1
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	11%	100%	0%	4%
Vol Thru, %	0%	86%	1%	0%	71%	57%
Vol Right, %	0%	14%	88%	0%	29%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	35	227	10	7	115
LT Vol	245	0	25	10	0	5
Through Vol	0	30	2	0	5	65
RT Vol	0	5	200	0	2	45
Lane Flow Rate	272	39	252	11	8	128
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.451	0.058	0.422	0.021	0.013	0.2
Departure Headway (Hd)	6.075	5.504	6.024	6.721	6.01	5.644
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	596	655	600	535	598	638
Service Time	3.775	3.204	4.024	4.437	3.726	3.661
HCM Lane V/C Ratio	0.456	0.06	0.42	0.021	0.013	0.201
HCM Control Delay	13.7	8.5	13.4	9.6	8.8	10.1
HCM Lane LOS	B	A	B	A	A	B
HCM 95th-tile Q	2.3	0.2	2.1	0.1	0	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	145	5	20	125	35	2	65	30	45	75	15
Future Volume (vph)	10	145	5	20	125	35	2	65	30	45	75	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.967			0.958			0.985	
Flt Protected		0.997		0.950				0.999			0.984	
Satd. Flow (prot)	0	1723	0	1629	1696	0	0	1691	0	0	1716	0
Flt Permitted		0.997		0.950				0.999			0.984	
Satd. Flow (perm)	0	1723	0	1629	1696	0	0	1691	0	0	1716	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		577			733			480			518	
Travel Time (s)		15.7			20.0			13.1			14.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	5%	2%	5%	0%	0%	6%	5%	0%	0%
Adj. Flow (vph)	11	161	6	22	139	39	2	72	33	50	83	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	22	178	0	0	107	0	0	150	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	145	5	20	125	35	2	65	30	45	75	15
Future Vol, veh/h	10	145	5	20	125	35	2	65	30	45	75	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	5	2	5	0	0	6	5	0	0
Mvmt Flow	11	161	6	22	139	39	2	72	33	50	83	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	178	0	0	167	0	0	439	408	164	442	392	159
Stage 1	-	-	-	-	-	-	186	186	-	203	203	-
Stage 2	-	-	-	-	-	-	253	222	-	239	189	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.1	6.5	6.26	7.15	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.5	4	3.354	3.545	4	3.3
Pot Cap-1 Maneuver	1410	-	-	1393	-	-	532	536	870	521	547	892
Stage 1	-	-	-	-	-	-	820	750	-	792	737	-
Stage 2	-	-	-	-	-	-	756	723	-	758	748	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1410	-	-	1393	-	-	451	523	870	440	533	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	451	523	-	440	533	-
Stage 1	-	-	-	-	-	-	813	743	-	785	725	-
Stage 2	-	-	-	-	-	-	646	711	-	652	741	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.8	12.4	14.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	594	1410	-	-	1393	-	-	520
HCM Lane V/C Ratio	0.181	0.008	-	-	0.016	-	-	0.288
HCM Control Delay (s)	12.4	7.6	0	-	7.6	-	-	14.7
HCM Lane LOS	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	30	45	15	30	10	20	70	15	10	75	15
Future Volume (vph)	15	30	45	15	30	10	20	70	15	10	75	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		250	0		250	0		0	0		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.980			0.979	
Flt Protected		0.983			0.983			0.991			0.995	
Satd. Flow (prot)	0	1631	1485	0	1724	1308	0	1714	0	0	1715	0
Flt Permitted		0.983			0.983			0.991			0.995	
Satd. Flow (perm)	0	1631	1485	0	1724	1308	0	1714	0	0	1715	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		765			2317			386			480	
Travel Time (s)		20.9			63.2			10.5			13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	0%	3%	0%	4%	17%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	17	33	50	17	33	11	22	78	17	11	83	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	50	0	50	11	0	117	0	0	111	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	30	45	15	30	10	20	70	15	10	75	15
Future Vol, veh/h	15	30	45	15	30	10	20	70	15	10	75	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	25	0	3	0	4	17	0	3	0	0	3	0
Mvmt Flow	17	33	50	17	33	11	22	78	17	11	83	17
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.2	8.2	8.1	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	19%	33%	0%	33%	0%	10%
Vol Thru, %	67%	67%	0%	67%	0%	75%
Vol Right, %	14%	0%	100%	0%	100%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	45	45	45	10	100
LT Vol	20	15	0	15	0	10
Through Vol	70	30	0	30	0	75
RT Vol	15	0	45	0	10	15
Lane Flow Rate	117	50	50	50	11	111
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.142	0.079	0.061	0.073	0.014	0.135
Departure Headway (Hd)	4.377	5.67	4.371	5.281	4.478	4.361
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	821	633	820	679	799	823
Service Time	2.395	3.396	2.096	3.008	2.204	2.38
HCM Lane V/C Ratio	0.143	0.079	0.061	0.074	0.014	0.135
HCM Control Delay	8.1	8.9	7.4	8.4	7.3	8.1
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.2	0.2	0	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	255	15	10	315	15	20	35	15	20	55	30
Future Volume (vph)	35	255	15	10	315	15	20	35	15	20	55	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.994			0.971			0.962	
Flt Protected		0.994			0.999			0.986			0.991	
Satd. Flow (prot)	0	1740	0	0	1771	0	0	1646	0	0	1698	0
Flt Permitted		0.994			0.999			0.986			0.991	
Satd. Flow (perm)	0	1740	0	0	1771	0	0	1646	0	0	1698	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1515			1128			1396			2664	
Travel Time (s)		41.3			30.8			38.1			72.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	0%	0%	1%	0%	9%	0%	10%	0%	2%	0%
Adj. Flow (vph)	39	283	17	11	350	17	22	39	17	22	61	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	339	0	0	378	0	0	78	0	0	116	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	255	15	10	315	15	20	35	15	20	55	30
Future Vol, veh/h	35	255	15	10	315	15	20	35	15	20	55	30
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	2	0	0	1	0	9	0	10	0	2	0
Mvmt Flow	39	283	17	11	350	17	22	39	17	22	61	33
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.6	13.2	9.9	10
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	11%	3%	19%
Vol Thru, %	50%	84%	93%	52%
Vol Right, %	21%	5%	4%	29%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	305	340	105
LT Vol	20	35	10	20
Through Vol	35	255	315	55
RT Vol	15	15	15	30
Lane Flow Rate	78	339	378	117
Geometry Grp	1	1	1	1
Degree of Util (X)	0.129	0.477	0.519	0.185
Departure Headway (Hd)	5.994	5.064	4.941	5.695
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	597	715	733	629
Service Time	4.043	3.076	2.952	3.74
HCM Lane V/C Ratio	0.131	0.474	0.516	0.186
HCM Control Delay	9.9	12.6	13.2	10
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.4	2.6	3	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	240	20	20	330	5	10	2	20	10	2	15
Future Volume (vph)	5	240	20	20	330	5	10	2	20	10	2	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.998			0.915			0.923	
Flt Protected		0.999			0.997			0.985			0.982	
Satd. Flow (prot)	0	1706	0	0	1769	0	0	1573	0	0	1631	0
Flt Permitted		0.999			0.997			0.985			0.982	
Satd. Flow (perm)	0	1706	0	0	1769	0	0	1573	0	0	1631	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1128			1515			1440			909	
Travel Time (s)		30.8			41.3			39.3			24.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	3%	17%	6%	1%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	6	267	22	22	367	6	11	2	22	11	2	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	295	0	0	395	0	0	35	0	0	30	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	240	20	20	330	5	10	2	20	10	2	15
Future Vol, veh/h	5	240	20	20	330	5	10	2	20	10	2	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	17	3	17	6	1	0	0	0	5	0	0	0
Mvmt Flow	6	267	22	22	367	6	11	2	22	11	2	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	373	0	0	289	0	0	714	707	278	716	715	370
Stage 1	-	-	-	-	-	-	290	290	-	414	414	-
Stage 2	-	-	-	-	-	-	424	417	-	302	301	-
Critical Hdwy	4.27	-	-	4.16	-	-	7.1	6.5	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.353	-	-	2.254	-	-	3.5	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1108	-	-	1250	-	-	349	363	754	348	359	680
Stage 1	-	-	-	-	-	-	722	676	-	620	597	-
Stage 2	-	-	-	-	-	-	612	595	-	712	669	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1108	-	-	1250	-	-	332	353	754	329	349	680
Mov Cap-2 Maneuver	-	-	-	-	-	-	332	353	-	329	349	-
Stage 1	-	-	-	-	-	-	718	672	-	616	584	-
Stage 2	-	-	-	-	-	-	582	582	-	685	665	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	12.5	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	514	1108	-	-	1250	-	-	464
HCM Lane V/C Ratio	0.069	0.005	-	-	0.018	-	-	0.065
HCM Control Delay (s)	12.5	8.3	0	-	7.9	0	-	13.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Future Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.980			0.964			0.957	
Flt Protected		0.994			0.997			0.993			0.984	
Satd. Flow (prot)	0	1731	0	0	1706	0	0	1663	0	0	1574	0
Flt Permitted		0.994			0.997			0.993			0.984	
Satd. Flow (perm)	0	1731	0	0	1706	0	0	1663	0	0	1574	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	67	489	22	22	328	61	11	50	22	50	56	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	578	0	0	411	0	0	83	0	0	156	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	23.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Future Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	67	489	22	22	328	61	11	50	22	50	56	50
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	31.9	17.4	11.2	12.2
HCM LOS	D	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	12%	5%	32%
Vol Thru, %	60%	85%	80%	36%
Vol Right, %	27%	4%	15%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	520	370	140
LT Vol	10	60	20	45
Through Vol	45	440	295	50
RT Vol	20	20	55	45
Lane Flow Rate	83	578	411	156
Geometry Grp	1	1	1	1
Degree of Util (X)	0.159	0.855	0.626	0.286
Departure Headway (Hd)	6.856	5.326	5.481	6.612
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	526	676	654	546
Service Time	4.866	3.411	3.576	4.618
HCM Lane V/C Ratio	0.158	0.855	0.628	0.286
HCM Control Delay	11.2	31.9	17.4	12.2
HCM Lane LOS	B	D	C	B
HCM 95th-tile Q	0.6	9.8	4.4	1.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	10	20	10	10	10
Future Volume (vph)	5	10	20	10	10	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.955		0.932	
Flt Protected		0.983			0.976	
Satd. Flow (prot)	0	1221	1533	0	1223	0
Flt Permitted		0.983			0.976	
Satd. Flow (perm)	0	1221	1533	0	1223	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		250	315		248	
Travel Time (s)		5.7	7.2		5.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	0%	7%	0%	0%	50%
Adj. Flow (vph)	6	11	22	11	11	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	17	33	0	22	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	10	20	10	10	10
Future Vol, veh/h	5	10	20	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	100	0	7	0	0	50
Mvmt Flow	6	11	22	11	11	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	33	0	-	0	51	28
Stage 1	-	-	-	-	28	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	5.1	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	3.1	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1124	-	-	-	963	925
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	1005	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1124	-	-	-	958	925
Mov Cap-2 Maneuver	-	-	-	-	958	-
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	1005	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1124	-	-	-	941
HCM Lane V/C Ratio	0.005	-	-	-	0.024
HCM Control Delay (s)	8.2	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - AM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - PM

US 212 & Interstate 29 NB Exit 177 RTI
US 212 & Interstate 29 SB Exit 177 RTI
US 212 & 23rd Street SE
US 212 & Broadway Street S
US 81 & Interstate 29 NB Exit 180 RTI
US 81 & Interstate 29 SB Exit 180 RTI
US 81 & 19th Street NE
US 81 & 18th Avenue NE
US 81 & 14th Avenue NE
US 81 & 3rd Avenue NE
US 81 & E Kemp Avenue
US 81 & 1st Avenue SE
US 81 & 4th Avenue SE
1st Avenue NE & 13th Street NE (NB)
1st Avenue NE & 13th Street NE (SB)
1st Avenue NE & 19th Street NE
Willow Creek Drive & 8th Avenue SE
29th Street SE & 15th Avenue SE
19th Street NE & 14th Avenue NE
3rd Street NW & 1st Avenue NW
3rd Street W & W Kemp Avenue
10th Avenue N & N Maple St
10th Avenue N & 2nd Street W
N Maple Street & 14th Avenue NE
South Lake Drive & 4th Avenue SW

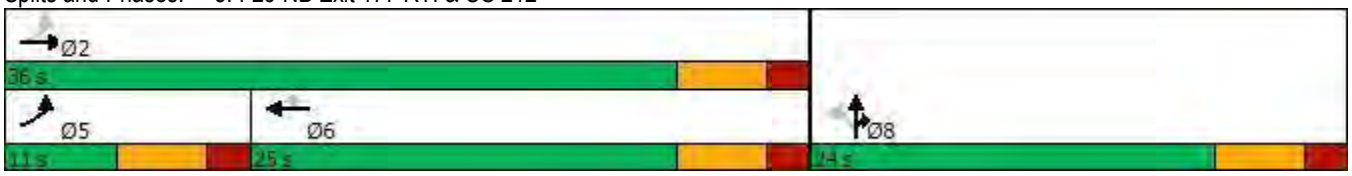
2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	345	0	0	510	55	285	5	40	0	0	0
Future Volume (vph)	75	345	0	0	510	55	285	5	40	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	300		0	0		850	0		0	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1676	3353	0	0	3353	1500	0	1682	1500	0	0	0
Flt Permitted	0.289							0.953				
Satd. Flow (perm)	510	3353	0	0	3353	1500	0	1682	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						164			164			
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		690			1249			322			321	
Travel Time (s)		10.5			18.9			4.0			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	383	0	0	567	61	317	6	44	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	383	0	0	567	61	0	323	44	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	5	2			6			8	8			
Permitted Phases	2					6	8					
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	12.0	12.0	12.0			
Minimum Split (s)	11.0	24.0			24.0	24.0	24.0	24.0	24.0			
Total Split (s)	11.0	36.0			25.0	25.0	24.0	24.0	24.0			
Total Split (%)	18.3%	60.0%			41.7%	41.7%	40.0%	40.0%	40.0%			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Min			Min	Min	None	None	None			
Act Effct Green (s)	20.4	20.4			14.8	14.8		15.3	15.3			
Actuated g/C Ratio	0.42	0.42			0.31	0.31		0.32	0.32			
v/c Ratio	0.24	0.27			0.55	0.11		0.61	0.08			
Control Delay	9.8	9.2			17.6	0.4		22.0	0.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	9.8	9.2			17.6	0.4		22.0	0.2			
LOS	A	A			B	A		C	A			
Approach Delay		9.3			15.9			19.4				
Approach LOS		A			B			B				
Queue Length 50th (ft)	13	33			80	0		89	0			
Queue Length 95th (ft)	33	60			130	0		177	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		610			1169			242			241	
Turn Bay Length (ft)	300					850						
Base Capacity (vph)	342	2206			1397	720		664	691			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.24	0.17			0.41	0.08		0.49	0.06			

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 48.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 51.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: I-29 NB Exit 177 RTI & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	345	0	0	510	55	285	5	40	0	0	0
Future Volume (veh/h)	75	345	0	0	510	55	285	5	40	0	0	0
Initial Q (Qb), veh	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			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1772	1772	0	0	1772	1772	1772	1772	1772			
Adj Flow Rate, veh/h	83	383	0	0	567	61	317	6	44			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	367	1557	0	0	860	383	443	8	401			
Arrive On Green	0.07	0.46	0.00	0.00	0.26	0.26	0.27	0.27	0.27			
Sat Flow, veh/h	1688	3455	0	0	3455	1502	1658	31	1502			
Grp Volume(v), veh/h	83	383	0	0	567	61	323	0	44			
Grp Sat Flow(s),veh/h/ln	1688	1683	0	0	1683	1502	1689	0	1502			
Q Serve(g_s), s	1.4	3.1	0.0	0.0	6.7	1.4	7.7	0.0	1.0			
Cycle Q Clear(g_c), s	1.4	3.1	0.0	0.0	6.7	1.4	7.7	0.0	1.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	367	1557	0	0	860	383	451	0	401			
V/C Ratio(X)	0.23	0.25	0.00	0.00	0.66	0.16	0.72	0.00	0.11			
Avail Cap(c_a), veh/h	435	2274	0	0	1440	642	685	0	609			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	10.1	7.2	0.0	0.0	14.8	12.8	14.7	0.0	12.3			
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.0	0.9	0.2	2.1	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.4	0.7	0.0	0.0	2.0	0.4	2.3	0.0	0.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.5	7.3	0.0	0.0	15.7	13.0	16.9	0.0	12.4			
LnGrp LOS	B	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		466			628			367				
Approach Delay, s/veh		7.9			15.4			16.3				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		26.5			9.2	17.3		17.9				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		30.0			5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s		5.1			3.4	8.7		9.7				
Green Ext Time (p_c), s		2.3			0.0	2.6		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.2									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	385	165	45	745	0	0	0	0	30	5	120
Future Volume (vph)	0	385	165	45	745	0	0	0	0	30	5	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.896	
Flt Protected				0.950							0.990	
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	0	1565	0
Flt Permitted				0.950							0.990	
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	0	1565	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	428	183	50	828	0	0	0	0	33	6	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	428	183	50	828	0	0	0	0	0	172	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	385	165	45	745	0	0	0	0	30	5	120
Future Vol, veh/h	0	385	165	45	745	0	0	0	0	30	5	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	428	183	50	828	0	0	0	0	33	6	133

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	611	0	0	1142	1539	414
Stage 1	-	-	-	-	-	-	928	928	-
Stage 2	-	-	-	-	-	-	214	611	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	964	-	0	194	115	587
Stage 1	0	-	-	-	-	0	345	345	-
Stage 2	0	-	-	-	-	0	801	482	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	964	-	-	184	0	587
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	0	-
Stage 1	-	-	-	-	-	-	345	0	-
Stage 2	-	-	-	-	-	-	759	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.5	20.1
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	964	-	408
HCM Lane V/C Ratio	-	-	0.052	-	0.422
HCM Control Delay (s)	-	-	8.9	-	20.1
HCM Lane LOS	-	-	A	-	C
HCM 95th %tile Q(veh)	-	-	0.2	-	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Future Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.949			0.910	
Flt Protected	0.950			0.950				0.971			0.985	
Satd. Flow (prot)	1710	3306	0	1513	3276	0	0	1357	0	0	1613	0
Flt Permitted	0.950			0.950				0.971			0.985	
Satd. Flow (perm)	1710	3306	0	1513	3276	0	0	1357	0	0	1613	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	517	61	28	539	17	44	2	28	28	2	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	578	0	28	556	0	0	74	0	0	91	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	465	55	25	485	15	40	2	25	25	2	55
Future Vol, veh/h	45	465	55	25	485	15	40	2	25	25	2	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	13	4	0	19	0	29	0	0	0
Mvmt Flow	50	517	61	28	539	17	44	2	28	28	2	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	556	0	0	578	0	0	975	1260	289	964	1282	278
Stage 1	-	-	-	-	-	-	648	648	-	604	604	-
Stage 2	-	-	-	-	-	-	327	612	-	360	678	-
Critical Hdwy	4.1	-	-	4.36	-	-	7.88	6.5	7.48	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.33	-	-	3.69	4	3.59	3.5	4	3.3
Pot Cap-1 Maneuver	1025	-	-	920	-	-	183	172	633	213	167	725
Stage 1	-	-	-	-	-	-	387	469	-	457	491	-
Stage 2	-	-	-	-	-	-	615	487	-	636	455	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	920	-	-	156	159	633	190	154	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	156	159	-	190	154	-
Stage 1	-	-	-	-	-	-	368	446	-	435	476	-
Stage 2	-	-	-	-	-	-	543	472	-	576	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	30	17.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	217	1025	-	-	920	-	-	372
HCM Lane V/C Ratio	0.343	0.049	-	-	0.03	-	-	0.245
HCM Control Delay (s)	30	8.7	-	-	9	-	-	17.8
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.4	0.2	-	-	0.1	-	-	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	930	15	15	725	80	20	20	20	125	20	50
Future Volume (vph)	95	930	15	15	725	80	20	20	20	125	20	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	205		0	215		0	105		0	115		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.985			0.925			0.892	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3346	0	1676	3303	0	1676	1632	0	1676	1574	0
Flt Permitted	0.232			0.236			0.706			0.728		
Satd. Flow (perm)	409	3346	0	416	3303	0	1246	1632	0	1285	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			20			22			56	
Link Speed (mph)		35			35			40			25	
Link Distance (ft)		1772			1929			688			588	
Travel Time (s)		34.5			37.6			11.7			16.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1033	17	17	806	89	22	22	22	139	22	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	1050	0	17	895	0	22	44	0	139	78	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	11.0	25.0		11.0	25.0		24.0	24.0		24.0	24.0	
Total Split (%)	18.3%	41.7%		18.3%	41.7%		40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	30.0	30.7		26.5	24.3		11.0	11.0		11.0	11.0	
Actuated g/C Ratio	0.59	0.60		0.52	0.48		0.22	0.22		0.22	0.22	
v/c Ratio	0.29	0.52		0.05	0.56		0.08	0.12		0.50	0.20	
Control Delay	8.7	12.9		7.0	16.7		16.9	11.5		25.0	9.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.7	12.9		7.0	16.7		16.9	11.5		25.0	9.1	
LOS	A	B		A	B		B	B		C	A	
Approach Delay		12.5			16.5			13.3			19.3	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	13	93		2	121		6	6		39	6	
Queue Length 95th (ft)	38	#312		10	#241		20	25		82	32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1692			1849			608			508	
Turn Bay Length (ft)	205			215			105			115		
Base Capacity (vph)	369	2024		344	1601		452	606		466	606	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.29	0.52		0.05	0.56		0.05	0.07		0.30	0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 60.8%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: Broadway St S & US 212

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	930	15	15	725	80	20	20	20	125	20	50
Future Volume (veh/h)	95	930	15	15	725	80	20	20	20	125	20	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	106	1033	17	17	806	89	22	22	22	139	22	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	367	1372	23	274	1053	116	331	140	140	364	76	194
Arrive On Green	0.08	0.40	0.40	0.02	0.34	0.34	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1688	3389	56	1688	3057	338	1321	813	813	1362	443	1127
Grp Volume(v), veh/h	106	513	537	17	444	451	22	0	44	139	0	78
Grp Sat Flow(s),veh/h/ln	1688	1683	1762	1688	1683	1711	1321	0	1626	1362	0	1569
Q Serve(g_s), s	1.7	11.7	11.7	0.3	10.5	10.5	0.7	0.0	1.0	4.3	0.0	1.9
Cycle Q Clear(g_c), s	1.7	11.7	11.7	0.3	10.5	10.5	2.6	0.0	1.0	5.4	0.0	1.9
Prop In Lane	1.00		0.03	1.00		0.20	1.00		0.50	1.00		0.72
Lane Grp Cap(c), veh/h	367	682	713	274	580	589	331	0	280	364	0	271
V/C Ratio(X)	0.29	0.75	0.75	0.06	0.77	0.77	0.07	0.00	0.16	0.38	0.00	0.29
Avail Cap(c_a), veh/h	417	713	746	426	713	725	634	0	652	676	0	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	11.4	11.4	10.0	13.1	13.1	17.3	0.0	15.8	18.1	0.0	16.2
Incr Delay (d2), s/veh	0.4	4.3	4.1	0.1	4.0	3.9	0.1	0.0	0.3	0.7	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	0.5	4.0	4.1	0.1	3.7	3.8	0.2	0.0	0.3	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.8	15.8	15.6	10.1	17.1	17.0	17.4	0.0	16.0	18.7	0.0	16.7
LnGrp LOS	A	B	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h		1156			912			66			217	
Approach Delay, s/veh		15.1			16.9			16.5			18.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	24.2		13.7	9.7	21.4		13.7				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	2.3	13.7		7.4	3.7	12.5		4.6				
Green Ext Time (p_c), s	0.0	2.9		0.6	0.0	2.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		16.1	
HCM 6th LOS		B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	25	0	0	70	10	80	5	5	0	0	0
Future Volume (vph)	125	25	0	0	70	10	80	5	5	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.983			0.992				
Flt Protected		0.960						0.958				
Satd. Flow (prot)	0	1600	0	0	1638	0	0	1584	0	0	0	0
Flt Permitted		0.960						0.958				
Satd. Flow (perm)	0	1600	0	0	1638	0	0	1584	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	28	0	0	78	11	89	6	6	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	167	0	0	89	0	0	101	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	25	0	0	70	10	80	5	5	0	0	0
Future Vol, veh/h	125	25	0	0	70	10	80	5	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	139	28	0	0	78	11	89	6	6	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	89	0	-	-	-	0	390	395	28
Stage 1	-	-	-	-	-	-	306	306	-
Stage 2	-	-	-	-	-	-	84	89	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1506	-	0	0	-	-	614	542	1047
Stage 1	-	-	0	0	-	-	747	662	-
Stage 2	-	-	0	0	-	-	939	821	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1506	-	-	-	-	-	556	0	1047
Mov Cap-2 Maneuver	-	-	-	-	-	-	556	0	-
Stage 1	-	-	-	-	-	-	677	0	-
Stage 2	-	-	-	-	-	-	939	0	-

Approach	EB	WB	NB
HCM Control Delay, s	6.4	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	572	1506	-	-	-
HCM Lane V/C Ratio	0.175	0.092	-	-	-
HCM Control Delay (s)	12.6	7.6	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.6	0.3	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	130	65	20	130	0	0	0	0	20	5	195
Future Volume (vph)	0	130	65	20	130	0	0	0	0	20	5	195
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955									0.880	
Flt Protected					0.993						0.996	
Satd. Flow (prot)	0	1592	0	0	1655	0	0	0	0	0	1461	0
Flt Permitted					0.993						0.996	
Satd. Flow (perm)	0	1592	0	0	1655	0	0	0	0	0	1461	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	144	72	22	144	0	0	0	0	22	6	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	166	0	0	0	0	0	245	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	130	65	20	130	0	0	0	0	20	5	195
Future Vol, veh/h	0	130	65	20	130	0	0	0	0	20	5	195
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	144	72	22	144	0	0	0	0	22	6	217

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	216	0	0	368	404	144
Stage 1	-	-	-	-	-	-	188	188	-
Stage 2	-	-	-	-	-	-	180	216	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1354	-	0	632	536	903
Stage 1	0	-	-	-	-	0	844	745	-
Stage 2	0	-	-	-	-	0	851	724	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1354	-	-	621	0	903
Mov Cap-2 Maneuver	-	-	-	-	-	-	621	0	-
Stage 1	-	-	-	-	-	-	844	0	-
Stage 2	-	-	-	-	-	-	836	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1354	-	866
HCM Lane V/C Ratio	-	-	0.016	-	0.282
HCM Control Delay (s)	-	-	7.7	0	10.8
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Future Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.998			0.923			0.941	
Flt Protected		0.993			0.985			0.991			0.994	
Satd. Flow (prot)	0	1617	0	0	1638	0	0	1524	0	0	1559	0
Flt Permitted		0.993			0.985			0.991			0.994	
Satd. Flow (perm)	0	1617	0	0	1638	0	0	1524	0	0	1559	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	133	33	111	244	6	22	28	67	17	61	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	0	0	361	0	0	117	0	0	139	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	120	30	100	220	5	20	25	60	15	55	55
Future Vol, veh/h	25	120	30	100	220	5	20	25	60	15	55	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	133	33	111	244	6	22	28	67	17	61	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	250	0	0	166	0	0	736	678	150	722	691	247
Stage 1	-	-	-	-	-	-	206	206	-	469	469	-
Stage 2	-	-	-	-	-	-	530	472	-	253	222	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1316	-	-	1412	-	-	335	374	896	342	368	792
Stage 1	-	-	-	-	-	-	796	731	-	575	561	-
Stage 2	-	-	-	-	-	-	533	559	-	751	720	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1316	-	-	1412	-	-	243	332	896	271	326	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	243	332	-	271	326	-
Stage 1	-	-	-	-	-	-	777	713	-	561	510	-
Stage 2	-	-	-	-	-	-	394	508	-	652	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.4	15.2	17.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	468	1316	-	-	1412	-	-	426
HCM Lane V/C Ratio	0.249	0.021	-	-	0.079	-	-	0.326
HCM Control Delay (s)	15.2	7.8	0	-	7.8	0	-	17.5
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1	0.1	-	-	0.3	-	-	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1	40	185	1	20	20	165	85	15	305	5
Future Volume (vph)	2	1	40	185	1	20	20	165	85	15	305	5
Ideal Flow (vphpl)	1700	1700	1700	1800	1700	1800	1700	1800	1800	1800	1800	1700
Storage Length (ft)	0		0	0		0	150		100	190		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874			0.987				0.850		0.997	
Flt Protected		0.998			0.957		0.950			0.950		
Satd. Flow (prot)	0	1454	0	0	1574	0	1583	1765	1500	1676	1759	0
Flt Permitted		0.998			0.957		0.950			0.950		
Satd. Flow (perm)	0	1454	0	0	1574	0	1583	1765	1500	1676	1759	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		450			791			1566			1307	
Travel Time (s)		12.3			21.6			30.5			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	1	44	206	1	22	22	183	94	17	339	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	229	0	22	183	94	17	345	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	40	185	1	20	20	165	85	15	305	5
Future Vol, veh/h	2	1	40	185	1	20	20	165	85	15	305	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	190	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	1	44	206	1	22	22	183	94	17	339	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	662	697	342	626	606	183	345	0	0	277	0	0
Stage 1	376	376	-	227	227	-	-	-	-	-	-	-
Stage 2	286	321	-	399	379	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	375	365	701	397	411	859	1214	-	-	1286	-	-
Stage 1	645	616	-	776	716	-	-	-	-	-	-	-
Stage 2	721	652	-	627	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	356	354	701	362	398	859	1214	-	-	1286	-	-
Mov Cap-2 Maneuver	356	354	-	362	398	-	-	-	-	-	-	-
Stage 1	633	608	-	762	703	-	-	-	-	-	-	-
Stage 2	689	640	-	578	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	27.3	0.6	0.4
HCM LOS	B	D		

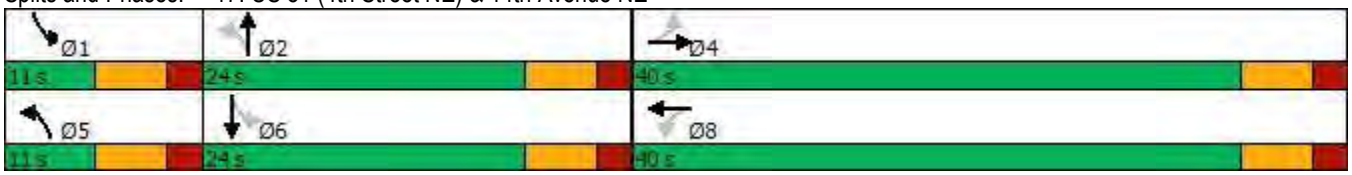
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	656	384	1286	-	-
HCM Lane V/C Ratio	0.018	-	-	0.073	0.596	0.013	-	-
HCM Control Delay (s)	8	-	-	10.9	27.3	7.8	-	-
HCM Lane LOS	A	-	-	B	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	3.7	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	340	125	210	260	55	50	195	195	55	415	95
Future Volume (vph)	90	340	125	210	260	55	50	195	195	55	415	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	120		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.960			0.974			0.925			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1694	0	1676	1719	0	1676	3101	0	1676	3259	0
Flt Permitted	0.492			0.327			0.305			0.439		
Satd. Flow (perm)	868	1694	0	577	1719	0	538	3101	0	775	3259	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			19			217			35	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1194			1025			1109			1566	
Travel Time (s)		23.3			20.0			21.6			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	378	139	233	289	61	56	217	217	61	461	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	517	0	233	350	0	56	434	0	61	567	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	40.0	40.0		40.0	40.0		11.0	24.0		11.0	24.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		14.7%	32.0%		14.7%	32.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	31.4	31.4		31.4	31.4		20.9	15.8		20.9	15.8	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.30	0.22		0.30	0.22	
v/c Ratio	0.26	0.67		0.91	0.45		0.23	0.50		0.21	0.75	
Control Delay	14.9	19.8		60.3	15.2		17.5	14.0		16.9	31.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.9	19.8		60.3	15.2		17.5	14.0		16.9	31.1	
LOS	B	B		E	B		B	B		B	C	
Approach Delay		19.0			33.2			14.4			29.7	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	28	168		95	100		16	43		18	118	
Queue Length 95th (ft)	60	273		#232	167		38	83		41	173	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1114			945			1029			1486	
Turn Bay Length (ft)	120			120			120			120		
Base Capacity (vph)	424	844		281	849		241	963		294	869	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.61		0.83	0.41		0.23	0.45		0.21	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 70.5			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 24.5		Intersection LOS: C	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 17: US 81 (4th Street NE) & 14th Avenue NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	340	125	210	260	55	50	195	195	55	415	95
Future Volume (veh/h)	90	340	125	210	260	55	50	195	195	55	415	95
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	100	378	139	233	289	61	56	217	217	61	461	106
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	468	583	214	324	670	141	258	351	314	293	568	130
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.07	0.21	0.21	0.07	0.21	0.21
Sat Flow, veh/h	1092	1236	454	936	1419	299	1688	1683	1502	1688	2722	622
Grp Volume(v), veh/h	100	0	517	233	0	350	56	217	217	61	284	283
Grp Sat Flow(s),veh/h/ln	1092	0	1690	936	0	1718	1688	1683	1502	1688	1683	1660
Q Serve(g_s), s	4.8	0.0	16.8	17.2	0.0	9.7	1.8	8.4	9.6	2.0	11.6	11.7
Cycle Q Clear(g_c), s	14.6	0.0	16.8	34.0	0.0	9.7	1.8	8.4	9.6	2.0	11.6	11.7
Prop In Lane	1.00		0.27	1.00		0.17	1.00		1.00	1.00		0.37
Lane Grp Cap(c), veh/h	468	0	798	324	0	811	258	351	314	293	351	347
V/C Ratio(X)	0.21	0.00	0.65	0.72	0.00	0.43	0.22	0.62	0.69	0.21	0.81	0.82
Avail Cap(c_a), veh/h	468	0	798	324	0	811	258	421	375	293	421	415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	14.5	27.7	0.0	12.6	20.4	25.9	26.4	20.2	27.1	27.2
Incr Delay (d2), s/veh	0.2	0.0	1.8	7.5	0.0	0.4	0.4	2.0	4.2	0.3	9.5	10.3
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	1.1	0.0	6.0	4.4	0.0	3.4	0.7	3.4	3.6	0.7	5.3	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	16.3	35.3	0.0	13.0	20.8	27.9	30.6	20.5	36.6	37.5
LnGrp LOS	B	A	B	D	A	B	C	C	C	C	D	D
Approach Vol, veh/h		617			583			490			628	
Approach Delay, s/veh		16.5			21.9			28.3			35.5	
Approach LOS		B			C			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	21.0		40.0	11.0	21.0		40.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	18.0		34.0	5.0	18.0		34.0				
Max Q Clear Time (g_c+I1), s	4.0	11.6		18.8	3.8	13.7		36.0				
Green Ext Time (p_c), s	0.0	1.4		3.3	0.0	1.3		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			25.5									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	305	90	85	190	55	75	595	70	230	765	70
Future Volume (vph)	80	305	90	85	190	55	75	595	70	230	765	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	75		0	75		0	100		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.966			0.966			0.984			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1705	0	1676	1705	0	1676	3299	0	1676	3309	0
Flt Permitted	0.543			0.286			0.229			0.245		
Satd. Flow (perm)	958	1705	0	505	1705	0	404	3299	0	432	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			25			21			17	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1200			1304			1548			1564	
Travel Time (s)		32.7			35.6			30.2			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	339	100	94	211	61	83	661	78	256	850	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	439	0	94	272	0	83	739	0	256	928	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		12.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	40.0%		20.0%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	16.9	16.9		16.9	16.9		22.5	17.5		24.5	18.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.38	0.30		0.42	0.32	
v/c Ratio	0.32	0.86		0.64	0.53		0.31	0.74		0.83	0.88	
Control Delay	20.2	37.7		42.7	20.2		11.8	23.4		37.0	30.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.2	37.7		42.7	20.2		11.8	23.4		37.0	30.6	
LOS	C	D		D	C		B	C		D	C	
Approach Delay		34.7			26.0			22.2			32.0	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	25	138		29	72		15	121		50	161	
Queue Length 95th (ft)	58	#284		#94	136		33	177		#144	#267	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1120			1224			1468			1484	
Turn Bay Length (ft)	75			75			100			165		
Base Capacity (vph)	295	544		155	544		264	1033		309	1089	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.81		0.61	0.50		0.31	0.72		0.83	0.85	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 58.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: US 81 (4th Street NE) & 3rd Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	305	90	85	190	55	75	595	70	230	765	70
Future Volume (veh/h)	80	305	90	85	190	55	75	595	70	230	765	70
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	89	339	100	94	211	61	83	661	78	256	850	78
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	322	399	118	183	401	116	295	885	104	364	962	88
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.08	0.29	0.29	0.10	0.31	0.31
Sat Flow, veh/h	1172	1314	388	1006	1321	382	1688	3033	358	1688	3118	286
Grp Volume(v), veh/h	89	0	439	94	0	272	83	366	373	256	459	469
Grp Sat Flow(s),veh/h/ln	1172	0	1702	1006	0	1703	1688	1683	1708	1688	1683	1720
Q Serve(g_s), s	4.0	0.0	14.4	3.6	0.0	7.8	1.9	11.7	11.7	6.0	15.4	15.4
Cycle Q Clear(g_c), s	11.9	0.0	14.4	18.0	0.0	7.8	1.9	11.7	11.7	6.0	15.4	15.4
Prop In Lane	1.00		0.23	1.00		0.22	1.00		0.21	1.00		0.17
Lane Grp Cap(c), veh/h	322	0	517	183	0	517	295	491	498	364	519	531
V/C Ratio(X)	0.28	0.00	0.85	0.51	0.00	0.53	0.28	0.75	0.75	0.70	0.88	0.88
Avail Cap(c_a), veh/h	322	0	517	183	0	517	295	511	518	364	539	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	19.4	28.4	0.0	17.1	14.1	19.0	19.0	15.3	19.5	19.5
Incr Delay (d2), s/veh	0.5	0.0	12.7	2.4	0.0	1.0	0.5	5.7	5.7	6.0	15.5	15.3
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	1.1	0.0	7.0	1.4	0.0	3.0	0.7	4.8	4.9	2.7	7.5	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	0.0	32.0	30.9	0.0	18.1	14.7	24.7	24.7	21.3	35.0	34.8
LnGrp LOS	C	A	C	C	A	B	B	C	C	C	D	C
Approach Vol, veh/h		528			366			822			1184	
Approach Delay, s/veh		30.4			21.4			23.7			32.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	23.3		24.0	11.0	24.3		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	18.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	8.0	13.7		16.4	3.9	17.4		20.0				
Green Ext Time (p_c), s	0.0	1.7		0.6	0.0	0.9		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		28.0	
HCM 6th LOS		C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	25	20	25	20	30	55	40	800	20	5	45	685
Future Volume (vph)	25	20	25	20	30	55	40	800	20	5	45	685
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Storage Length (ft)	0		0	0		0	100		0		100	
Storage Lanes	0		0	0		0	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt		0.952			0.929			0.996				0.993
Flt Protected		0.982			0.991		0.950				0.950	
Satd. Flow (prot)	0	1650	0	0	1625	0	1676	3340	0	0	1676	3329
Flt Permitted		0.913			0.914		0.268				0.313	
Satd. Flow (perm)	0	1534	0	0	1498	0	473	3340	0	0	552	3329
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		28			61			6				10
Link Speed (mph)		25			25			35				35
Link Distance (ft)		761			745			370				380
Travel Time (s)		20.8			20.3			7.2				7.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	22	28	22	33	61	44	889	22	6	50	761
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	78	0	0	116	0	44	911	0	0	56	800
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6	6	
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		10.0	10.0	10.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		9.5	32.5		23.0	23.0	23.0
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	59.1%		41.8%	41.8%	41.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Act Effct Green (s)		7.4			7.3		23.9	26.3			23.4	23.4
Actuated g/C Ratio		0.21			0.21		0.67	0.74			0.66	0.66
v/c Ratio		0.23			0.32		0.09	0.37			0.15	0.36
Control Delay		12.3			11.3		4.2	4.4			9.9	7.7
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		12.3			11.3		4.2	4.4			9.9	7.7
LOS		B			B		A	A			A	A
Approach Delay		12.3			11.3			4.3				7.9
Approach LOS		B			B			A				A
Queue Length 50th (ft)		7			7		3	43			4	36
Queue Length 95th (ft)		38			45		13	92			32	133

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	35
Future Volume (vph)	35
Ideal Flow (vphpl)	1800
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	39
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Internal Link Dist (ft)		681			665			290				300
Turn Bay Length (ft)							100				100	
Base Capacity (vph)		842			838		499	2716			375	2265
Starvation Cap Reductn		0			0		0	0			0	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0
Reduced v/c Ratio		0.09			0.14		0.09	0.34			0.15	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 35.5			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 51.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 28: US 81 (5th Street SE)/US 81 (5th Street NE) & E Kemp Avenue

Lane Group	SBR
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

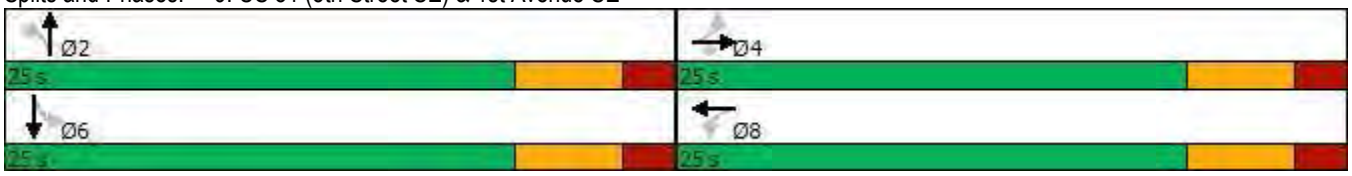
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	50	35	25	30	25	45	775	15	60	610	60
Future Volume (vph)	60	50	35	25	30	25	45	775	15	60	610	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	80		80	0		0	100		0	0		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.958			0.997			0.987	
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1676	1765	1500	0	1665	0	1676	3343	0	1676	3309	0
Flt Permitted	0.851				0.874		0.369			0.323		
Satd. Flow (perm)	1502	1765	1500	0	1478	0	651	3343	0	570	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		28			4			24	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		642			750			1323			370	
Travel Time (s)		17.5			20.5			25.8			7.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	56	39	28	33	28	50	861	17	67	678	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	56	39	0	89	0	50	878	0	67	745	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	8.1	8.1	8.1		8.1		23.6	23.6		23.6	23.6	
Actuated g/C Ratio	0.23	0.23	0.23		0.23		0.68	0.68		0.68	0.68	
v/c Ratio	0.19	0.14	0.10		0.24		0.11	0.39		0.17	0.33	
Control Delay	13.6	12.9	3.3		11.2		6.9	6.4		7.8	5.8	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	13.6	12.9	3.3		11.2		6.9	6.4		7.8	5.8	
LOS	B	B	A		B		A	A		A	A	
Approach Delay		10.9			11.2			6.4			6.0	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	11	9	0		10		5	57		7	45	
Queue Length 95th (ft)	34	29	10		36		21	111		28	88	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		562			670			1243			290	
Turn Bay Length (ft)	80		80				100					
Base Capacity (vph)	842	989	869		841		452	2324		396	2307	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.08	0.06	0.04		0.11		0.11	0.38		0.17	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 34.8			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: US 81 (5th Street SE) & 1st Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	50	35	25	30	25	45	775	15	60	610	60
Future Volume (veh/h)	60	50	35	25	30	25	45	775	15	60	610	60
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	67	56	39	28	33	28	50	861	17	67	678	67
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	509	343	291	205	153	97	432	1471	29	385	1348	133
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	1420	1772	1502	302	791	502	758	3377	67	669	3095	306
Grp Volume(v), veh/h	67	56	39	89	0	0	50	429	449	67	369	376
Grp Sat Flow(s),veh/h/ln	1420	1772	1502	1595	0	0	758	1683	1760	669	1683	1717
Q Serve(g_s), s	0.0	0.9	0.7	0.0	0.0	0.0	1.7	6.3	6.3	2.7	5.1	5.1
Cycle Q Clear(g_c), s	1.1	0.9	0.7	1.5	0.0	0.0	6.8	6.3	6.3	9.0	5.1	5.1
Prop In Lane	1.00		1.00	0.31		0.31	1.00		0.04	1.00		0.18
Lane Grp Cap(c), veh/h	509	343	291	455	0	0	432	733	767	385	733	748
V/C Ratio(X)	0.13	0.16	0.13	0.20	0.00	0.00	0.12	0.59	0.59	0.17	0.50	0.50
Avail Cap(c_a), veh/h	1068	1040	881	1063	0	0	547	988	1033	486	988	1008
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	10.9	10.8	11.1	0.0	0.0	9.1	6.9	6.9	10.3	6.6	6.6
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.2	0.0	0.0	0.1	0.7	0.7	0.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.2	0.5	0.0	0.0	0.2	1.3	1.3	0.3	1.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	11.1	11.0	11.3	0.0	0.0	9.2	7.7	7.6	10.5	7.1	7.1
LnGrp LOS	B	B	B	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		162			89			928			812	
Approach Delay, s/veh		11.1			11.3			7.7			7.4	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.1		12.3		20.1		12.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		8.8		3.1		11.0		3.5				
Green Ext Time (p_c), s		4.1		0.5		3.1		0.4				

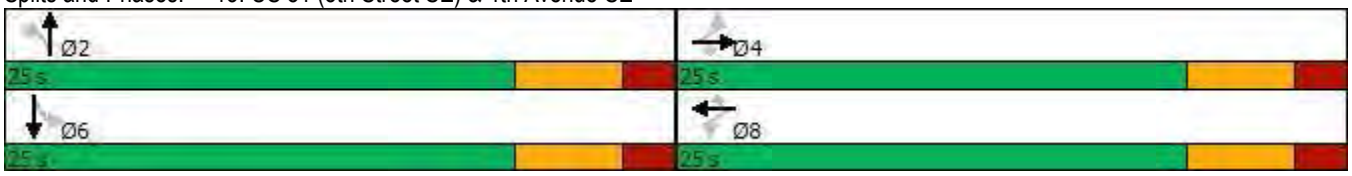
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	40	25	25	40	20	15	395	15	25	455	25
Future Volume (vph)	30	40	25	25	40	20	15	395	15	25	455	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		75	0		75	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.994			0.992	
Flt Protected		0.979			0.981		0.950			0.950		
Satd. Flow (prot)	0	1728	1500	0	1731	1500	1676	3333	0	1676	3326	0
Flt Permitted		0.828			0.839		0.453			0.489		
Satd. Flow (perm)	0	1461	1500	0	1481	1500	799	3333	0	863	3326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		9			13	
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		870			848			999			1323	
Travel Time (s)		19.8			23.1			19.5			25.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	44	28	28	44	22	17	439	17	28	506	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	28	0	72	22	17	456	0	28	534	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)		7.7	7.7		7.7	7.7	20.5	20.5		20.5	20.5	
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.63	0.63		0.63	0.63	
v/c Ratio		0.22	0.07		0.21	0.05	0.03	0.22		0.05	0.25	
Control Delay		12.1	2.0		11.9	1.2	6.7	5.8		6.8	6.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.1	2.0		11.9	1.2	6.7	5.8		6.8	6.0	
LOS		B	A		B	A	A	A		A	A	
Approach Delay		9.4			9.4			5.9			6.0	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		9	0		9	0	2	24		3	29	
Queue Length 95th (ft)		34	5		32	3	9	50		12	59	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		790			768			919			1243	
Turn Bay Length (ft)			75			75	100			100		
Base Capacity (vph)		865	914		876	914	596	2492		644	2487	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.09	0.03		0.08	0.02	0.03	0.18		0.04	0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 32.3			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.25			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: US 81 (5th Street SE) & 4th Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	40	25	25	40	20	15	395	15	25	455	25
Future Volume (veh/h)	30	40	25	25	40	20	15	395	15	25	455	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	33	44	28	28	44	22	17	439	17	28	506	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	242	299	259	256	299	489	1203	47	526	1181	65
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	442	1218	1502	387	1284	1502	922	3305	128	990	3244	179
Grp Volume(v), veh/h	77	0	28	72	0	22	17	223	233	28	262	272
Grp Sat Flow(s),veh/h/ln	1660	0	1502	1671	0	1502	922	1683	1749	990	1683	1740
Q Serve(g_s), s	0.0	0.0	0.4	0.0	0.0	0.3	0.4	2.7	2.7	0.6	3.2	3.2
Cycle Q Clear(g_c), s	1.0	0.0	0.4	0.9	0.0	0.3	3.6	2.7	2.7	3.3	3.2	3.2
Prop In Lane	0.43		1.00	0.39		1.00	1.00		0.07	1.00		0.10
Lane Grp Cap(c), veh/h	518	0	299	515	0	299	489	613	637	526	613	633
V/C Ratio(X)	0.15	0.00	0.09	0.14	0.00	0.07	0.03	0.36	0.37	0.05	0.43	0.43
Avail Cap(c_a), veh/h	1305	0	1039	1308	0	1039	791	1164	1210	850	1164	1203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	9.0	9.2	0.0	8.9	7.9	6.4	6.4	7.6	6.6	6.6
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.4	0.4	0.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.1	0.3	0.0	0.1	0.0	0.5	0.5	0.1	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.3	0.0	9.1	9.3	0.0	9.0	8.0	6.8	6.8	7.6	7.1	7.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		105			94			473			562	
Approach Delay, s/veh		9.3			9.2			6.8			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.0		11.5		16.0		11.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		5.6		3.0		5.3		2.9				
Green Ext Time (p_c), s		2.2		0.4		2.7		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			7.3									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	145	45	25	95	35	140	350	105	10	100	105
Future Volume (vph)	85	145	45	25	95	35	140	350	105	10	100	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.970			0.976			0.934	
Flt Protected		0.985			0.992			0.988			0.998	
Satd. Flow (prot)	0	1700	0	0	1698	0	0	1702	0	0	1645	0
Flt Permitted		0.985			0.992			0.988			0.998	
Satd. Flow (perm)	0	1700	0	0	1698	0	0	1702	0	0	1645	0
Link Speed (mph)		40			50			65			45	
Link Distance (ft)		2250			2754			1476			1428	
Travel Time (s)		38.4			37.6			15.5			21.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	161	50	28	106	39	156	389	117	11	111	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	305	0	0	173	0	0	662	0	0	239	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 85.5%		ICU Level of Service E	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	305	173	662	239
Demand Flow Rate, veh/h	311	177	675	243
Vehicles Circulating, veh/h	153	652	271	296
Vehicles Exiting, veh/h	386	294	193	533
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.5	8.2	12.9	5.9
Approach LOS	A	A	B	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	311	177	675	243
Cap Entry Lane, veh/h	1180	710	1047	1020
Entry HV Adj Factor	0.980	0.977	0.981	0.983
Flow Entry, veh/h	305	173	662	239
Cap Entry, veh/h	1157	693	1027	1003
V/C Ratio	0.263	0.249	0.645	0.238
Control Delay, s/veh	5.5	8.2	12.9	5.9
LOS	A	A	B	A
95th %tile Queue, veh	1	1	5	1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	205	245	85	25	55
Future Volume (vph)	60	205	245	85	25	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	70	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.965			0.850
Flt Protected		0.989			0.950	
Satd. Flow (prot)	0	1759	1728	0	1598	1530
Flt Permitted		0.989			0.950	
Satd. Flow (perm)	0	1759	1728	0	1598	1530
Link Speed (mph)		25	25		25	
Link Distance (ft)		791	278		1006	
Travel Time (s)		21.6	7.6		27.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	1%	0%	2%	7%	0%
Adj. Flow (vph)	67	228	272	94	28	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	295	366	0	28	61
Sign Control		Stop	Stop		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	205	245	85	25	55
Future Vol, veh/h	60	205	245	85	25	55
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	1	0	2	7	0
Mvmt Flow	67	228	272	94	28	61
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	10.4	10.7	8.9
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	23%	0%	100%	0%
Vol Thru, %	77%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	265	330	25	55
LT Vol	60	0	25	0
Through Vol	205	245	0	0
RT Vol	0	85	0	55
Lane Flow Rate	294	367	28	61
Geometry Grp	2	2	7	7
Degree of Util (X)	0.376	0.439	0.051	0.089
Departure Headway (Hd)	4.601	4.313	6.556	5.22
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	780	836	545	683
Service Time	2.636	2.344	4.313	2.978
HCM Lane V/C Ratio	0.377	0.439	0.051	0.089
HCM Control Delay	10.4	10.7	9.7	8.5
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	1.8	2.3	0.2	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	205	25	20	295	35	25
Future Volume (vph)	205	25	20	295	35	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.985				0.944	
Flt Protected				0.997	0.972	
Satd. Flow (prot)	1757	0	0	1778	1652	0
Flt Permitted				0.997	0.972	
Satd. Flow (perm)	1757	0	0	1778	1652	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	278			1819	482	
Travel Time (s)	7.6			49.6	13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Adj. Flow (vph)	228	28	22	328	39	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	256	0	0	350	67	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	205	25	20	295	35	25
Future Vol, veh/h	205	25	20	295	35	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	228	28	22	328	39	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	256	0	614	242
Stage 1	-	-	-	-	242	-
Stage 2	-	-	-	-	372	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1321	-	459	802
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1321	-	450	802
Mov Cap-2 Maneuver	-	-	-	-	450	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	688	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	551	-	-	1321	-
HCM Lane V/C Ratio	0.121	-	-	0.017	-
HCM Control Delay (s)	12.4	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	45	120	50	10	25	155	185	50	170	45	265
Future Volume (vph)	15	45	120	50	10	25	155	185	50	170	45	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)		215		215		145		0	150		0	150
Storage Lanes		1		1		1		1	1		0	1
Taper Length (ft)		25				25			25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850				0.850		0.969		
Flt Protected		0.950				0.950			0.950			0.950
Satd. Flow (prot)	0	1637	1800	1485	0	1700	1782	1485	1644	1704	0	1693
Flt Permitted		0.649				0.672			0.492			0.401
Satd. Flow (perm)	0	1118	1800	1485	0	1203	1782	1485	852	1704	0	715
Right Turn on Red				Yes				Yes			Yes	
Satd. Flow (RTOR)				164				206		23		
Link Speed (mph)			25				45			35		
Link Distance (ft)			1819				1221			982		
Travel Time (s)			49.6				18.5			19.1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	6%	0%	3%	2%	0%	1%	3%	4%	3%	0%	1%
Adj. Flow (vph)	17	50	133	56	11	28	172	206	56	189	50	294
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	133	56	0	39	172	206	56	239	0	294
Turn Type	Perm	Perm	NA	Perm	Perm	Perm	NA	pt+ov	Perm	NA		pm+pt
Protected Phases			4				8	8 1		2		1
Permitted Phases	4	4		4	8	8			2			6
Detector Phase	4	4	4	4	8	8	8	8 1	2	2		1
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		12.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%		40.0%	40.0%		20.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0	6.0		6.0	6.0		6.0
Lead/Lag									Lag	Lag		Lead
Lead-Lag Optimize?									Yes	Yes		Yes
Recall Mode	None	None	None	None	None	None	None		Min	Min		None
Act Effct Green (s)		10.4	10.4	10.4		10.4	10.4	22.7	11.3	11.3		23.6
Actuated g/C Ratio		0.22	0.22	0.22		0.22	0.22	0.49	0.24	0.24		0.51
v/c Ratio		0.27	0.33	0.12		0.14	0.43	0.25	0.27	0.55		0.60
Control Delay		18.5	18.1	0.5		16.5	19.7	2.4	18.4	19.4		13.5
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		18.5	18.1	0.5		16.5	19.7	2.4	18.4	19.4		13.5
LOS		B	B	A		B	B	A	B	B		B
Approach Delay			14.4				10.8			19.2		
Approach LOS			B				B			B		
Queue Length 50th (ft)		14	29	0		8	38	0	12	47		39

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	330	95
Future Volume (vph)	330	95
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.966	
Flt Protected		
Satd. Flow (prot)	1712	0
Flt Permitted		
Satd. Flow (perm)	1712	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	35	
Link Speed (mph)	35	
Link Distance (ft)	5295	
Travel Time (s)	103.1	
Peak Hour Factor	0.90	0.90
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	367	106
Shared Lane Traffic (%)		
Lane Group Flow (vph)	473	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	7.0	
Minimum Split (s)	24.0	
Total Split (s)	36.0	
Total Split (%)	60.0%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Min	
Act Effct Green (s)	23.6	
Actuated g/C Ratio	0.51	
v/c Ratio	0.53	
Control Delay	10.2	
Queue Delay	0.0	
Total Delay	10.2	
LOS	B	
Approach Delay	11.4	
Approach LOS	B	
Queue Length 50th (ft)	64	

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Queue Length 95th (ft)		45	74	0		30	93	27	40	114		100
Internal Link Dist (ft)			1739				1141			902		
Turn Bay Length (ft)		215		215		145			150			150
Base Capacity (vph)		444	715	688		477	708	811	338	691		493
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0
Reduced v/c Ratio		0.15	0.19	0.08		0.08	0.24	0.25	0.17	0.35		0.60

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 46.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 64.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: 19th St NE & 1st Ave NE/Willow Creek Dr

Lane Group	SBT	SBR
Queue Length 95th (ft)	165	
Internal Link Dist (ft)	5215	
Turn Bay Length (ft)		
Base Capacity (vph)	1145	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.41	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	15	45	120	50	10	25	155	185	50	170	45	265
Future Volume (veh/h)	15	45	120	50	10	25	155	185	50	170	45	265
Initial Q (Qb), veh		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
Parking Bus, Adj		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		
Adj Sat Flow, veh/h/ln		1716	1800	1758		1800	1786	1758	1744	1758	1800	1786
Adj Flow Rate, veh/h		50	133	56		28	172	206	56	189	50	294
Peak Hour Factor		0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %		6	0	3		0	1	3	4	3	0	1
Cap, veh/h		291	364	301		345	361	521	365	279	74	517
Arrive On Green		0.20	0.20	0.20		0.20	0.20	0.20	0.21	0.21	0.21	0.15
Sat Flow, veh/h		973	1800	1490		1213	1786	1490	906	1340	354	1701
Grp Volume(v), veh/h		50	133	56		28	172	206	56	0	239	294
Grp Sat Flow(s),veh/h/ln		973	1800	1490		1213	1786	1490	906	0	1694	1701
Q Serve(g_s), s		1.9	2.6	1.3		0.8	3.5	4.2	2.1	0.0	5.3	5.1
Cycle Q Clear(g_c), s		5.4	2.6	1.3		3.4	3.5	4.2	2.1	0.0	5.3	5.1
Prop In Lane		1.00		1.00		1.00		1.00	1.00		0.21	1.00
Lane Grp Cap(c), veh/h		291	364	301		345	361	521	365	0	352	517
V/C Ratio(X)		0.17	0.37	0.19		0.08	0.48	0.40	0.15	0.00	0.68	0.57
Avail Cap(c_a), veh/h		525	796	659		637	790	879	578	0	750	517
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		16.7	14.0	13.5		15.5	14.3	10.0	13.6	0.0	14.9	9.6
Incr Delay (d2), s/veh		0.3	0.6	0.3		0.1	1.0	0.5	0.2	0.0	2.3	1.5
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		0.4	1.0	0.4		0.2	1.1	1.0	0.4	0.0	1.9	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		17.0	14.6	13.8		15.6	15.3	10.5	13.8	0.0	17.1	11.1
LnGrp LOS		B	B	B		B	B	B	B	A	B	B
Approach Vol, veh/h			239				406			295		
Approach Delay, s/veh			14.9				12.9			16.5		
Approach LOS			B				B			B		

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	12.0	14.5		14.2		26.5		14.2
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s	6.0	18.0		18.0		30.0		18.0
Max Q Clear Time (g_c+I1), s	7.1	7.3		7.4		9.8		6.2
Green Ext Time (p_c), s	0.0	1.2		0.8		2.9		1.3

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	330	95
Future Volume (veh/h)	330	95
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1800
Adj Flow Rate, veh/h	367	106
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	2	0
Cap, veh/h	665	192
Arrive On Green	0.50	0.50
Sat Flow, veh/h	1322	382
Grp Volume(v), veh/h	0	473
Grp Sat Flow(s),veh/h/ln	0	1703
Q Serve(g_s), s	0.0	7.8
Cycle Q Clear(g_c), s	0.0	7.8
Prop In Lane		0.22
Lane Grp Cap(c), veh/h	0	857
V/C Ratio(X)	0.00	0.55
Avail Cap(c_a), veh/h	0	1256
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.0
Incr Delay (d2), s/veh	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	0.0	7.5
LnGrp LOS	A	A
Approach Vol, veh/h	767	
Approach Delay, s/veh	8.9	
Approach LOS	A	
Timer - Assigned Phs		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	50	85	325	390	50
Future Volume (vph)	50	50	85	325	390	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.932				0.983	
Flt Protected	0.976			0.990		
Satd. Flow (prot)	1637	0	0	3333	3332	0
Flt Permitted	0.976			0.990		
Satd. Flow (perm)	1637	0	0	3333	3332	0
Link Speed (mph)	30			35	45	
Link Distance (ft)	233			583	1620	
Travel Time (s)	5.3			11.4	24.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	56	56	94	361	433	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	112	0	0	455	489	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	50	85	325	390	50
Future Vol, veh/h	50	50	85	325	390	50
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, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	56	56	94	361	433	56

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	830	245	489	0	-	0
Stage 1	461	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	313	762	1085	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	279	762	1085	-	-	-
Mov Cap-2 Maneuver	279	-	-	-	-	-
Stage 1	541	-	-	-	-	-
Stage 2	675	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1085	-	408	-	-
HCM Lane V/C Ratio	0.087	-	0.272	-	-
HCM Control Delay (s)	8.6	0.3	17.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.916			0.949			0.971			0.949	
Flt Protected		0.988			0.976		0.950			0.950		
Satd. Flow (prot)	0	1352	0	0	1667	0	1583	1720	0	1710	1635	0
Flt Permitted		0.988			0.976		0.950			0.950		
Satd. Flow (perm)	0	1352	0	0	1667	0	1583	1720	0	1710	1635	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	11	6	28	22	6	17	33	206	50	56	117	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	45	0	33	256	0	56	178	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	25	20	5	15	30	185	45	50	105	55
Future Vol, veh/h	10	5	25	20	5	15	30	185	45	50	105	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	33	0	0	0	8	2	0	0	0	13
Mvmt Flow	11	6	28	22	6	17	33	206	50	56	117	61

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	569	582	148	574	587	231	178	0	0	256	0	0
Stage 1	260	260	-	297	297	-	-	-	-	-	-	-
Stage 2	309	322	-	277	290	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	436	427	823	433	425	813	1362	-	-	1321	-	-
Stage 1	749	697	-	716	671	-	-	-	-	-	-	-
Stage 2	705	655	-	734	676	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	402	399	823	393	397	813	1362	-	-	1321	-	-
Mov Cap-2 Maneuver	402	399	-	393	397	-	-	-	-	-	-	-
Stage 1	731	668	-	699	655	-	-	-	-	-	-	-
Stage 2	668	639	-	674	648	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	13.1	0.9	1.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1362	-	-	590	488	1321	-	-
HCM Lane V/C Ratio	0.024	-	-	0.075	0.091	0.042	-	-
HCM Control Delay (s)	7.7	-	-	11.6	13.1	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	230	10	10	5	280	35	15	10	90	50
Future Volume (vph)	35	5	230	10	10	5	280	35	15	10	90	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.885			0.947			0.954			0.955	
Flt Protected		0.994		0.950			0.950				0.997	
Satd. Flow (prot)	0	1502	0	1710	1705	0	1693	1464	0	0	1608	0
Flt Permitted		0.994		0.950			0.950				0.997	
Satd. Flow (perm)	0	1502	0	1710	1705	0	1693	1464	0	0	1608	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	42%	0%	0%	0%	0%	0%	1%	3%	50%	0%	11%	0%
Adj. Flow (vph)	39	6	256	11	11	6	311	39	17	11	100	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	301	0	11	17	0	311	56	0	0	167	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	5	230	10	10	5	280	35	15	10	90	50
Future Vol, veh/h	35	5	230	10	10	5	280	35	15	10	90	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	42	0	0	0	0	0	1	3	50	0	11	0
Mvmt Flow	39	6	256	11	11	6	311	39	17	11	100	56
Number of Lanes	0	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	16.4	9.7	15.5	11.4
HCM LOS	C	A	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	13%	100%	0%	7%
Vol Thru, %	0%	70%	2%	0%	67%	60%
Vol Right, %	0%	30%	85%	0%	33%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	50	270	10	15	150
LT Vol	280	0	35	10	0	10
Through Vol	0	35	5	0	10	90
RT Vol	0	15	230	0	5	50
Lane Flow Rate	311	56	300	11	17	167
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.551	0.088	0.53	0.022	0.03	0.28
Departure Headway (Hd)	6.375	5.692	6.361	7.203	6.455	6.05
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	566	629	567	496	553	593
Service Time	4.111	3.427	4.398	4.962	4.214	4.093
HCM Lane V/C Ratio	0.549	0.089	0.529	0.022	0.031	0.282
HCM Control Delay	16.7	9	16.4	10.1	9.4	11.4
HCM Lane LOS	C	A	C	B	A	B
HCM 95th-tile Q	3.3	0.3	3.1	0.1	0.1	1.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	170	15	25	145	40	5	75	35	50	95	20
Future Volume (vph)	15	170	15	25	145	40	5	75	35	50	95	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.968			0.959			0.984	
Flt Protected		0.996		0.950				0.998			0.985	
Satd. Flow (prot)	0	1717	0	1629	1698	0	0	1692	0	0	1718	0
Flt Permitted		0.996		0.950				0.998			0.985	
Satd. Flow (perm)	0	1717	0	1629	1698	0	0	1692	0	0	1718	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		577			733			480			518	
Travel Time (s)		15.7			20.0			13.1			14.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	5%	2%	5%	0%	0%	6%	5%	0%	0%
Adj. Flow (vph)	17	189	17	28	161	44	6	83	39	56	106	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	0	28	205	0	0	128	0	0	184	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	170	15	25	145	40	5	75	35	50	95	20
Future Vol, veh/h	15	170	15	25	145	40	5	75	35	50	95	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	5	2	5	0	0	6	5	0	0
Mvmt Flow	17	189	17	28	161	44	6	83	39	56	106	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	205	0	0	206	0	0	535	493	198	532	479	183
Stage 1	-	-	-	-	-	-	232	232	-	239	239	-
Stage 2	-	-	-	-	-	-	303	261	-	293	240	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.1	6.5	6.26	7.15	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.5	4	3.354	3.545	4	3.3
Pot Cap-1 Maneuver	1378	-	-	1348	-	-	459	480	833	454	489	865
Stage 1	-	-	-	-	-	-	775	716	-	758	711	-
Stage 2	-	-	-	-	-	-	711	696	-	709	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1348	-	-	361	463	833	364	472	865
Mov Cap-2 Maneuver	-	-	-	-	-	-	361	463	-	364	472	-
Stage 1	-	-	-	-	-	-	764	706	-	747	696	-
Stage 2	-	-	-	-	-	-	575	681	-	588	701	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	14	18.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	528	1378	-	-	1348	-	-	456
HCM Lane V/C Ratio	0.242	0.012	-	-	0.021	-	-	0.402
HCM Control Delay (s)	14	7.6	0	-	7.7	-	-	18.1
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	1.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	35	55	20	35	15	25	80	20	15	100	20
Future Volume (vph)	20	35	55	20	35	15	25	80	20	15	100	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		250	0		250	0		0	0		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.979			0.980	
Flt Protected		0.982			0.982			0.990			0.994	
Satd. Flow (prot)	0	1621	1485	0	1724	1308	0	1712	0	0	1715	0
Flt Permitted		0.982			0.982			0.990			0.994	
Satd. Flow (perm)	0	1621	1485	0	1724	1308	0	1712	0	0	1715	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		765			2317			386			480	
Travel Time (s)		20.9			63.2			10.5			13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	0%	3%	0%	4%	17%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	22	39	61	22	39	17	28	89	22	17	111	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	61	0	61	17	0	139	0	0	150	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	35	55	20	35	15	25	80	20	15	100	20
Future Vol, veh/h	20	35	55	20	35	15	25	80	20	15	100	20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	25	0	3	0	4	17	0	3	0	0	3	0
Mvmt Flow	22	39	61	22	39	17	28	89	22	17	111	22
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.5	8.5	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	20%	36%	0%	36%	0%	11%
Vol Thru, %	64%	64%	0%	64%	0%	74%
Vol Right, %	16%	0%	100%	0%	100%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	55	55	55	15	135
LT Vol	25	20	0	20	0	15
Through Vol	80	35	0	35	0	100
RT Vol	20	0	55	0	15	20
Lane Flow Rate	139	61	61	61	17	150
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.175	0.099	0.077	0.093	0.022	0.188
Departure Headway (Hd)	4.524	5.861	4.544	5.48	4.66	4.502
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	793	611	786	653	766	797
Service Time	2.554	3.602	2.284	3.223	2.402	2.531
HCM Lane V/C Ratio	0.175	0.1	0.078	0.093	0.022	0.188
HCM Control Delay	8.5	9.2	7.7	8.8	7.5	8.6
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.2	0.3	0.1	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	295	20	15	360	20	25	45	20	25	65	35
Future Volume (vph)	40	295	20	15	360	20	25	45	20	25	65	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.993			0.970			0.962	
Flt Protected		0.994			0.998			0.986			0.990	
Satd. Flow (prot)	0	1738	0	0	1768	0	0	1644	0	0	1697	0
Flt Permitted		0.994			0.998			0.986			0.990	
Satd. Flow (perm)	0	1738	0	0	1768	0	0	1644	0	0	1697	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1515			1128			1396			2664	
Travel Time (s)		41.3			30.8			38.1			72.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	0%	0%	1%	0%	9%	0%	10%	0%	2%	0%
Adj. Flow (vph)	44	328	22	17	400	22	28	50	22	28	72	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	394	0	0	439	0	0	100	0	0	139	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	295	20	15	360	20	25	45	20	25	65	35
Future Vol, veh/h	40	295	20	15	360	20	25	45	20	25	65	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	4	2	0	0	1	0	9	0	10	0	2	0
Mvmt Flow	44	328	22	17	400	22	28	50	22	28	72	39
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.9	17.1	10.9	11.1
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	11%	4%	20%
Vol Thru, %	50%	83%	91%	52%
Vol Right, %	22%	6%	5%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	355	395	125
LT Vol	25	40	15	25
Through Vol	45	295	360	65
RT Vol	20	20	20	35
Lane Flow Rate	100	394	439	139
Geometry Grp	1	1	1	1
Degree of Util (X)	0.179	0.588	0.638	0.237
Departure Headway (Hd)	6.451	5.366	5.234	6.148
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	553	671	689	581
Service Time	4.53	3.417	3.283	4.222
HCM Lane V/C Ratio	0.181	0.587	0.637	0.239
HCM Control Delay	10.9	15.9	17.1	11.1
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	0.6	3.8	4.6	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	275	25	25	375	10	15	5	30	15	5	20
Future Volume (vph)	15	275	25	25	375	10	15	5	30	15	5	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.997			0.920			0.934	
Flt Protected		0.998			0.997			0.985			0.981	
Satd. Flow (prot)	0	1695	0	0	1767	0	0	1584	0	0	1649	0
Flt Permitted		0.998			0.997			0.985			0.981	
Satd. Flow (perm)	0	1695	0	0	1767	0	0	1584	0	0	1649	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1128			1515			1440			909	
Travel Time (s)		30.8			41.3			39.3			24.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	3%	17%	6%	1%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	17	306	28	28	417	11	17	6	33	17	6	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	351	0	0	456	0	0	56	0	0	45	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	275	25	25	375	10	15	5	30	15	5	20
Future Vol, veh/h	15	275	25	25	375	10	15	5	30	15	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	17	3	17	6	1	0	0	0	5	0	0	0
Mvmt Flow	17	306	28	28	417	11	17	6	33	17	6	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	428	0	0	334	0	0	847	838	320	853	847	423
Stage 1	-	-	-	-	-	-	354	354	-	479	479	-
Stage 2	-	-	-	-	-	-	493	484	-	374	368	-
Critical Hdwy	4.27	-	-	4.16	-	-	7.1	6.5	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.353	-	-	2.254	-	-	3.5	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1056	-	-	1203	-	-	284	305	714	281	301	635
Stage 1	-	-	-	-	-	-	667	634	-	571	558	-
Stage 2	-	-	-	-	-	-	562	555	-	651	625	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1056	-	-	1203	-	-	260	290	714	254	286	635
Mov Cap-2 Maneuver	-	-	-	-	-	-	260	290	-	254	286	-
Stage 1	-	-	-	-	-	-	654	621	-	560	541	-
Stage 2	-	-	-	-	-	-	520	538	-	603	613	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	14.7	16.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	428	1056	-	-	1203	-	-	370
HCM Lane V/C Ratio	0.13	0.016	-	-	0.023	-	-	0.12
HCM Control Delay (s)	14.7	8.5	0	-	8.1	0	-	16.1
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Future Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.981			0.963			0.959	
Flt Protected		0.994			0.997			0.992			0.984	
Satd. Flow (prot)	0	1729	0	0	1710	0	0	1664	0	0	1583	0
Flt Permitted		0.994			0.997			0.992			0.984	
Satd. Flow (perm)	0	1729	0	0	1710	0	0	1664	0	0	1583	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	78	561	28	33	378	67	17	56	28	61	67	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	667	0	0	478	0	0	101	0	0	184	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	48.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Future Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	78	561	28	33	378	67	17	56	28	61	67	56
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	78.4	27.4	12.6	14.3
HCM LOS	F	D	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	12%	7%	33%
Vol Thru, %	56%	84%	79%	36%
Vol Right, %	28%	4%	14%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	600	430	165
LT Vol	15	70	30	55
Through Vol	50	505	340	60
RT Vol	25	25	60	50
Lane Flow Rate	100	667	478	183
Geometry Grp	1	1	1	1
Degree of Util (X)	0.204	1.065	0.781	0.357
Departure Headway (Hd)	7.675	5.752	6.1	7.322
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	471	627	597	495
Service Time	5.675	3.844	4.1	5.322
HCM Lane V/C Ratio	0.212	1.064	0.801	0.37
HCM Control Delay	12.6	78.4	27.4	14.3
HCM Lane LOS	B	F	D	B
HCM 95th-tile Q	0.8	18.4	7.4	1.6

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	15	25	15	15	15
Future Volume (vph)	10	15	25	15	15	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.949		0.932	
Flt Protected		0.981			0.976	
Satd. Flow (prot)	0	1183	1528	0	1223	0
Flt Permitted		0.981			0.976	
Satd. Flow (perm)	0	1183	1528	0	1223	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		250	315		248	
Travel Time (s)		5.7	7.2		5.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	0%	7%	0%	0%	50%
Adj. Flow (vph)	11	17	28	17	17	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	28	45	0	34	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	15	25	15	15	15
Future Vol, veh/h	10	15	25	15	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	100	0	7	0	0	50
Mvmt Flow	11	17	28	17	17	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	45	0	-	0	76	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	5.1	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	3.1	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1111	-	-	-	932	913
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	989	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1111	-	-	-	923	913
Mov Cap-2 Maneuver	-	-	-	-	923	-
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	989	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1111	-	-	-	918
HCM Lane V/C Ratio	0.01	-	-	-	0.036
HCM Control Delay (s)	8.3	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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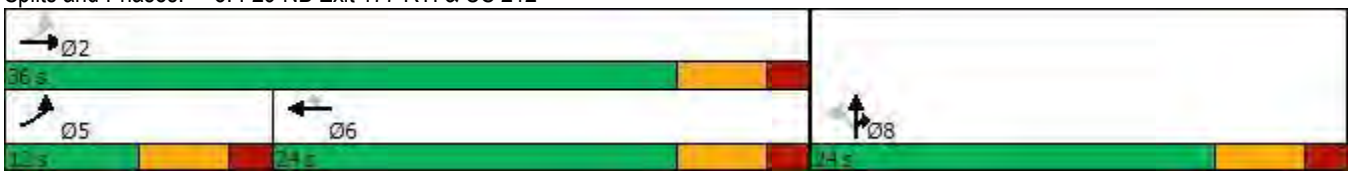
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	515	0	0	490	70	270	5	65	0	0	0
Future Volume (vph)	195	515	0	0	490	70	270	5	65	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	300		0	0		850	0		0	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1676	3353	0	0	3353	1500	0	1682	1500	0	0	0
Flt Permitted	0.285							0.953				
Satd. Flow (perm)	503	3353	0	0	3353	1500	0	1682	1500	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						164			164			
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		690			1249			322			321	
Travel Time (s)		10.5			18.9			4.0			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	217	572	0	0	544	78	300	6	72	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	572	0	0	544	78	0	306	72	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	5	2			6			8	8			
Permitted Phases	2					6	8					
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	12.0	12.0	12.0			
Minimum Split (s)	11.0	24.0			24.0	24.0	24.0	24.0	24.0			
Total Split (s)	12.0	36.0			24.0	24.0	24.0	24.0	24.0			
Total Split (%)	20.0%	60.0%			40.0%	40.0%	40.0%	40.0%	40.0%			
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0	6.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Min			Min	Min	None	None	None			
Act Effct Green (s)	26.3	26.3			14.2	14.2		14.8	14.8			
Actuated g/C Ratio	0.49	0.49			0.27	0.27		0.28	0.28			
v/c Ratio	0.57	0.35			0.61	0.15		0.66	0.13			
Control Delay	15.0	9.2			20.6	0.7		25.1	0.5			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	15.0	9.2			20.6	0.7		25.1	0.5			
LOS	B	A			C	A		C	A			
Approach Delay		10.8			18.1			20.4				
Approach LOS		B			B			C				
Queue Length 50th (ft)	36	52			77	0		85	0			
Queue Length 95th (ft)	78	90			128	2		166	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		610			1169			242			241	
Turn Bay Length (ft)	300					850						
Base Capacity (vph)	382	1910			1146	620		575	620			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.57	0.30			0.47	0.13		0.53	0.12			

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 53.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: I-29 NB Exit 177 RTI & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	515	0	0	490	70	270	5	65	0	0	0
Future Volume (veh/h)	195	515	0	0	490	70	270	5	65	0	0	0
Initial Q (Qb), veh	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			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1772	1772	0	0	1772	1772	1772	1772	1772			
Adj Flow Rate, veh/h	217	572	0	0	544	78	300	6	72			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	436	1652	0	0	809	361	420	8	381			
Arrive On Green	0.12	0.49	0.00	0.00	0.24	0.24	0.25	0.25	0.25			
Sat Flow, veh/h	1688	3455	0	0	3455	1502	1656	33	1502			
Grp Volume(v), veh/h	217	572	0	0	544	78	306	0	72			
Grp Sat Flow(s),veh/h/ln	1688	1683	0	0	1683	1502	1689	0	1502			
Q Serve(g_s), s	4.1	4.9	0.0	0.0	6.9	2.0	7.8	0.0	1.8			
Cycle Q Clear(g_c), s	4.1	4.9	0.0	0.0	6.9	2.0	7.8	0.0	1.8			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	436	1652	0	0	809	361	429	0	381			
V/C Ratio(X)	0.50	0.35	0.00	0.00	0.67	0.22	0.71	0.00	0.19			
Avail Cap(c_a), veh/h	444	2151	0	0	1291	576	648	0	576			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	10.7	7.3	0.0	0.0	16.2	14.3	16.0	0.0	13.7			
Incr Delay (d2), s/veh	0.9	0.1	0.0	0.0	1.0	0.3	2.2	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			
%ile BackOfQ(50%),veh/ln	1.1	1.1	0.0	0.0	2.2	0.5	2.4	0.0	0.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.6	7.5	0.0	0.0	17.1	14.6	18.2	0.0	14.0			
LnGrp LOS	B	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		789			622			378				
Approach Delay, s/veh		8.6			16.8			17.4				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		29.0			11.8	17.3		17.9				
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0				
Max Green Setting (Gmax), s		30.0			6.0	18.0		18.0				
Max Q Clear Time (g_c+I1), s		6.9			6.1	8.9		9.8				
Green Ext Time (p_c), s		3.5			0.0	2.4		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.3									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	655	335	55	705	0	0	0	0	55	5	220
Future Volume (vph)	0	655	335	55	705	0	0	0	0	55	5	220
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.894	
Flt Protected				0.950							0.990	
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	0	1562	0
Flt Permitted				0.950							0.990	
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	0	1562	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	728	372	61	783	0	0	0	0	61	6	244
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	728	372	61	783	0	0	0	0	0	311	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	655	335	55	705	0	0	0	0	55	5	220
Future Vol, veh/h	0	655	335	55	705	0	0	0	0	55	5	220
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	728	372	61	783	0	0	0	0	61	6	244

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1100	0	0	1269	2005	392
Stage 1	-	-	-	-	-	-	905	905	-
Stage 2	-	-	-	-	-	-	364	1100	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	630	-	0	160	59	607
Stage 1	0	-	-	-	-	0	355	353	-
Stage 2	0	-	-	-	-	0	673	286	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	630	-	-	144	0	607
Mov Cap-2 Maneuver	-	-	-	-	-	-	144	0	-
Stage 1	-	-	-	-	-	-	355	0	-
Stage 2	-	-	-	-	-	-	608	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.8	49.8
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	630	-	369
HCM Lane V/C Ratio	-	-	0.097	-	0.843
HCM Control Delay (s)	-	-	11.3	-	49.8
HCM Lane LOS	-	-	B	-	E
HCM 95th %tile Q(veh)	-	-	0.3	-	7.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Future Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.996			0.946			0.922	
Flt Protected	0.950			0.950				0.972			0.981	
Satd. Flow (prot)	1710	3211	0	1286	3279	0	0	1530	0	0	1628	0
Flt Permitted	0.950			0.950				0.972			0.981	
Satd. Flow (perm)	1710	3211	0	1286	3279	0	0	1530	0	0	1628	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	72	900	44	28	1117	33	72	2	50	22	2	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	944	0	28	1150	0	0	124	0	0	57	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	27.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	810	40	25	1005	30	65	2	45	20	2	30
Future Vol, veh/h	65	810	40	25	1005	30	65	2	45	20	2	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	42	33	4	0	3	0	16	0	0	0
Mvmt Flow	72	900	44	28	1117	33	72	2	50	22	2	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1150	0	0	944	0	0	1682	2272	472	1785	2278	575
Stage 1	-	-	-	-	-	-	1066	1066	-	1190	1190	-
Stage 2	-	-	-	-	-	-	616	1206	-	595	1088	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.56	6.5	7.22	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.53	-	-	3.53	4	3.46	3.5	4	3.3
Pot Cap-1 Maneuver	615	-	-	559	-	-	~ 61	41	502	53	40	466
Stage 1	-	-	-	-	-	-	236	301	-	202	263	-
Stage 2	-	-	-	-	-	-	442	259	-	463	294	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	615	-	-	559	-	-	~ 47	34	502	40	34	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 47	34	-	40	34	-
Stage 1	-	-	-	-	-	-	208	266	-	178	250	-
Stage 2	-	-	-	-	-	-	386	246	-	365	260	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	$ 463.8	115.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	73	615	-	-	559	-	-	83
HCM Lane V/C Ratio	1.705	0.117	-	-	0.05	-	-	0.696
HCM Control Delay (s)	$ 463.8	11.6	-	-	11.8	-	-	115.1
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	10.8	0.4	-	-	0.2	-	-	3.3

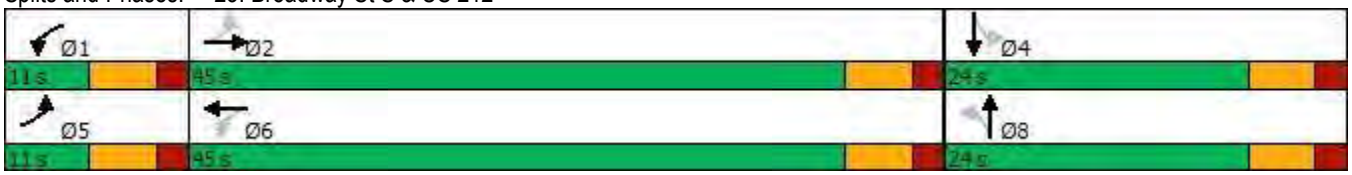
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1180	20	25	1190	155	30	25	25	225	20	70
Future Volume (vph)	95	1180	20	25	1190	155	30	25	25	225	20	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	205		0	215		0	105		0	115		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.983			0.925			0.883	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3346	0	1676	3296	0	1676	1632	0	1676	1558	0
Flt Permitted	0.096			0.123			0.692			0.720		
Satd. Flow (perm)	169	3346	0	217	3296	0	1221	1632	0	1271	1558	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			25			28			78	
Link Speed (mph)		35			35			40			25	
Link Distance (ft)		1772			1929			688			588	
Travel Time (s)		34.5			37.6			11.7			16.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	1311	22	28	1322	172	33	28	28	250	22	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	1333	0	28	1494	0	33	56	0	250	100	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	11.0	45.0		11.0	45.0		24.0	24.0		24.0	24.0	
Total Split (%)	13.8%	56.3%		13.8%	56.3%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	43.4	41.5		41.1	37.4		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.58	0.55		0.55	0.50		0.23	0.23		0.23	0.23	
v/c Ratio	0.53	0.72		0.13	0.90		0.12	0.14		0.86	0.24	
Control Delay	20.1	16.4		7.3	27.4		26.1	16.1		59.2	11.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.1	16.4		7.3	27.4		26.1	16.1		59.2	11.1	
LOS	C	B		A	C		C	B		E	B	
Approach Delay		16.7			27.0			19.8			45.4	
Approach LOS		B			C			B			D	
Queue Length 50th (ft)	19	194		5	343		13	11		121	9	
Queue Length 95th (ft)	#65	374		13	#508		36	40		#253	47	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1692			1849			608			508	
Turn Bay Length (ft)	205			215			105			115		
Base Capacity (vph)	200	1960		218	1760		298	420		310	440	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.53	0.68		0.13	0.85		0.11	0.13		0.81	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 75.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 80.3%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: Broadway St S & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	1180	20	25	1190	155	30	25	25	225	20	70
Future Volume (veh/h)	95	1180	20	25	1190	155	30	25	25	225	20	70
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	106	1311	22	28	1322	172	33	28	28	250	22	78
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	1732	29	224	1448	187	321	187	187	365	79	279
Arrive On Green	0.06	0.51	0.51	0.03	0.48	0.48	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1688	3388	57	1688	2998	388	1295	813	813	1348	342	1212
Grp Volume(v), veh/h	106	651	682	28	739	755	33	0	56	250	0	100
Grp Sat Flow(s),veh/h/ln	1688	1683	1762	1688	1683	1702	1295	0	1626	1348	0	1554
Q Serve(g_s), s	2.4	24.1	24.2	0.6	31.7	32.3	1.7	0.0	2.2	14.2	0.0	4.1
Cycle Q Clear(g_c), s	2.4	24.1	24.2	0.6	31.7	32.3	5.8	0.0	2.2	16.4	0.0	4.1
Prop In Lane	1.00		0.03	1.00		0.23	1.00		0.50	1.00		0.78
Lane Grp Cap(c), veh/h	214	861	901	224	813	822	321	0	374	365	0	357
V/C Ratio(X)	0.50	0.76	0.76	0.12	0.91	0.92	0.10	0.00	0.15	0.69	0.00	0.28
Avail Cap(c_a), veh/h	224	861	901	283	838	848	321	0	374	365	0	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	15.3	15.3	12.8	18.7	18.8	27.2	0.0	24.1	30.6	0.0	24.8
Incr Delay (d2), s/veh	1.8	3.9	3.7	0.2	13.5	14.7	0.1	0.0	0.2	5.3	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	0.9	8.9	9.3	0.2	13.8	14.4	0.5	0.0	0.8	5.0	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	19.1	19.0	13.0	32.1	33.5	27.4	0.0	24.2	35.9	0.0	25.3
LnGrp LOS	B	B	B	B	C	C	C	A	C	D	A	C
Approach Vol, veh/h		1439			1522			89			350	
Approach Delay, s/veh		19.1			32.5			25.4			32.8	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	46.0		24.0	10.5	43.8		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	39.0		18.0	5.0	39.0		18.0				
Max Q Clear Time (g_c+I1), s	2.6	26.2		18.4	4.4	34.3		7.8				
Green Ext Time (p_c), s	0.0	7.0		0.0	0.0	3.5		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			26.6									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	50	0	0	40	10	100	5	15	0	0	0
Future Volume (vph)	170	50	0	0	40	10	100	5	15	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.973			0.983				
Flt Protected		0.963						0.960				
Satd. Flow (prot)	0	1605	0	0	1622	0	0	1573	0	0	0	0
Flt Permitted		0.963						0.960				
Satd. Flow (perm)	0	1605	0	0	1622	0	0	1573	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	189	56	0	0	44	11	111	6	17	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	245	0	0	55	0	0	134	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	50	0	0	40	10	100	5	15	0	0	0
Future Vol, veh/h	170	50	0	0	40	10	100	5	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	189	56	0	0	44	11	111	6	17	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	55	0	-	-	-	0	484	489	56
Stage 1	-	-	-	-	-	-	434	434	-
Stage 2	-	-	-	-	-	-	50	55	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	0	0	-	-	542	480	1011
Stage 1	-	-	0	0	-	-	653	581	-
Stage 2	-	-	0	0	-	-	972	849	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1550	-	-	-	-	-	474	0	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	474	0	-
Stage 1	-	-	-	-	-	-	571	0	-
Stage 2	-	-	-	-	-	-	972	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.9	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	509	1550	-	-	-
HCM Lane V/C Ratio	0.262	0.122	-	-	-
HCM Control Delay (s)	14.6	7.6	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1	0.4	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	205	75	25	115	0	0	0	0	15	5	175
Future Volume (vph)	0	205	75	25	115	0	0	0	0	15	5	175
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964									0.879	
Flt Protected					0.991						0.996	
Satd. Flow (prot)	0	1607	0	0	1652	0	0	0	0	0	1459	0
Flt Permitted					0.991						0.996	
Satd. Flow (perm)	0	1607	0	0	1652	0	0	0	0	0	1459	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	228	83	28	128	0	0	0	0	17	6	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	311	0	0	156	0	0	0	0	0	217	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	205	75	25	115	0	0	0	0	15	5	175
Future Vol, veh/h	0	205	75	25	115	0	0	0	0	15	5	175
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	228	83	28	128	0	0	0	0	17	6	194

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	311	0	0	454	495	128
Stage 1	-	-	-	-	-	-	184	184	-
Stage 2	-	-	-	-	-	-	270	311	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1249	-	0	564	476	922
Stage 1	0	-	-	-	-	0	848	747	-
Stage 2	0	-	-	-	-	0	775	658	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1249	-	-	550	0	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	550	0	-
Stage 1	-	-	-	-	-	-	848	0	-
Stage 2	-	-	-	-	-	-	756	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.4	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1249	-	875
HCM Lane V/C Ratio	-	-	0.022	-	0.248
HCM Control Delay (s)	-	-	7.9	0	10.5
HCM Lane LOS	-	-	A	A	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Future Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.986			0.927			0.958	
Flt Protected		0.992			0.984			0.990			0.992	
Satd. Flow (prot)	0	1630	0	0	1617	0	0	1530	0	0	1584	0
Flt Permitted		0.992			0.984			0.990			0.992	
Satd. Flow (perm)	0	1630	0	0	1617	0	0	1530	0	0	1584	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	189	28	106	183	33	39	50	106	17	56	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	322	0	0	195	0	0	106	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	170	25	95	165	30	35	45	95	15	50	30
Future Vol, veh/h	40	170	25	95	165	30	35	45	95	15	50	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	189	28	106	183	33	39	50	106	17	56	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	216	0	0	217	0	0	747	719	203	781	717	200
Stage 1	-	-	-	-	-	-	291	291	-	412	412	-
Stage 2	-	-	-	-	-	-	456	428	-	369	305	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1354	-	-	1353	-	-	329	354	838	312	355	841
Stage 1	-	-	-	-	-	-	717	672	-	617	594	-
Stage 2	-	-	-	-	-	-	584	585	-	651	662	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1354	-	-	1353	-	-	248	310	838	217	311	841
Mov Cap-2 Maneuver	-	-	-	-	-	-	248	310	-	217	311	-
Stage 1	-	-	-	-	-	-	690	647	-	594	541	-
Stage 2	-	-	-	-	-	-	458	533	-	506	638	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	2.6	19.6	19.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	438	1354	-	-	1353	-	-	358
HCM Lane V/C Ratio	0.444	0.033	-	-	0.078	-	-	0.295
HCM Control Delay (s)	19.6	7.7	0	-	7.9	0	-	19.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.2	0.1	-	-	0.3	-	-	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	15	50	1	15	40	275	115	15	195	5
Future Volume (vph)	5	1	15	50	1	15	40	275	115	15	195	5
Ideal Flow (vphpl)	1700	1700	1700	1800	1700	1800	1700	1800	1800	1800	1800	1700
Storage Length (ft)	0		0	0		0	150		100	190		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904			0.969				0.850		0.996	
Flt Protected		0.988			0.964		0.950			0.950		
Satd. Flow (prot)	0	1489	0	0	1557	0	1583	1765	1500	1676	1758	0
Flt Permitted		0.988			0.964		0.950			0.950		
Satd. Flow (perm)	0	1489	0	0	1557	0	1583	1765	1500	1676	1758	0
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		472			791			1566			1307	
Travel Time (s)		10.7			21.6			30.5			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	1	17	56	1	17	44	306	128	17	217	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	74	0	44	306	128	17	223	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	15	50	1	15	40	275	115	15	195	5
Future Vol, veh/h	5	1	15	50	1	15	40	275	115	15	195	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	190	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	1	17	56	1	17	44	306	128	17	217	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	721	776	220	657	651	306	223	0	0	434	0	0
Stage 1	254	254	-	394	394	-	-	-	-	-	-	-
Stage 2	467	522	-	263	257	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	343	328	820	378	388	734	1346	-	-	1126	-	-
Stage 1	750	697	-	631	605	-	-	-	-	-	-	-
Stage 2	576	531	-	742	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	322	312	820	356	369	734	1346	-	-	1126	-	-
Mov Cap-2 Maneuver	322	312	-	356	369	-	-	-	-	-	-	-
Stage 1	725	687	-	610	585	-	-	-	-	-	-	-
Stage 2	543	513	-	715	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	15.9	0.7	0.6
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	567	403	1126	-	-
HCM Lane V/C Ratio	0.033	-	-	0.041	0.182	0.015	-	-
HCM Control Delay (s)	7.8	-	-	11.6	15.9	8.2	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.7	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	255	75	140	260	35	105	225	230	50	215	90
Future Volume (vph)	100	255	75	140	260	35	105	225	230	50	215	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	120		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.966			0.982			0.924			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1705	0	1676	1733	0	1676	3098	0	1676	3205	0
Flt Permitted	0.498			0.441			0.548			0.440		
Satd. Flow (perm)	879	1705	0	778	1733	0	967	3098	0	776	3205	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			12			256			100	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1194			1025			1109			1566	
Travel Time (s)		23.3			20.0			21.6			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	111	283	83	156	289	39	117	250	256	56	239	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	366	0	156	328	0	117	506	0	56	339	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	15.1	15.1		15.1	15.1		16.7	11.6		16.7	11.6	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.33	0.23		0.33	0.23	
v/c Ratio	0.42	0.69		0.66	0.62		0.30	0.55		0.16	0.41	
Control Delay	19.8	22.1		32.3	20.3		11.3	11.0		10.0	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.8	22.1		32.3	20.3		11.3	11.0		10.0	13.4	
LOS	B	C		C	C		B	B		A	B	
Approach Delay		21.6			24.1			11.1			12.9	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	24	80		37	73		21	34		10	33	
Queue Length 95th (ft)	69	179		#121	161		45	70		25	62	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1114			945			1029			1486	
Turn Bay Length (ft)	120			120			120			120		
Base Capacity (vph)	319	636		282	638		394	1347		349	1292	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.35	0.58		0.55	0.51		0.30	0.38		0.16	0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 65.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 17: US 81 (4th Street NE) & 14th Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	255	75	140	260	35	105	225	230	50	215	90
Future Volume (veh/h)	100	255	75	140	260	35	105	225	230	50	215	90
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	111	283	83	156	289	39	117	250	256	56	239	100
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	444	130	302	515	70	449	391	349	363	543	221
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.09	0.23	0.23	0.09	0.23	0.23
Sat Flow, veh/h	1114	1316	386	1076	1529	206	1688	1683	1502	1688	2336	949
Grp Volume(v), veh/h	111	0	366	156	0	328	117	250	256	56	170	169
Grp Sat Flow(s),veh/h/ln	1114	0	1702	1076	0	1735	1688	1683	1502	1688	1683	1601
Q Serve(g_s), s	4.8	0.0	9.7	7.7	0.0	8.3	2.7	7.2	8.4	1.2	4.6	4.8
Cycle Q Clear(g_c), s	13.1	0.0	9.7	17.4	0.0	8.3	2.7	7.2	8.4	1.2	4.6	4.8
Prop In Lane	1.00		0.23	1.00		0.12	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	338	0	574	302	0	585	449	391	349	363	391	372
V/C Ratio(X)	0.33	0.00	0.64	0.52	0.00	0.56	0.26	0.64	0.73	0.15	0.43	0.45
Avail Cap(c_a), veh/h	338	0	574	302	0	585	449	599	534	363	599	569
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	15.0	22.3	0.0	14.5	13.3	18.5	19.0	13.3	17.5	17.6
Incr Delay (d2), s/veh	0.6	0.0	2.4	1.5	0.0	1.2	0.3	1.7	3.0	0.2	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	3.5	1.8	0.0	2.9	0.9	2.6	2.8	0.4	1.6	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	17.3	23.8	0.0	15.7	13.6	20.2	22.0	13.4	18.3	18.5
LnGrp LOS	C	A	B	C	A	B	B	C	C	B	B	B
Approach Vol, veh/h		477			484			623			395	
Approach Delay, s/veh		18.0			18.3			19.7			17.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	18.4		24.0	11.0	18.4		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	3.2	10.4		15.1	4.7	6.8		19.4				
Green Ext Time (p_c), s	0.0	2.0		0.8	0.0	1.5		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			18.5									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	150	125	80	170	50	125	845	60	45	690	45
Future Volume (vph)	70	150	125	80	170	50	125	845	60	45	690	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	75		0	75		0	100		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.966			0.990			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1645	0	1676	1705	0	1676	3319	0	1676	3323	0
Flt Permitted	0.577			0.458			0.248			0.209		
Satd. Flow (perm)	1018	1645	0	808	1705	0	438	3319	0	369	3323	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			25			13			12	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1200			1304			1548			1564	
Travel Time (s)		32.7			35.6			30.2			30.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	167	139	89	189	56	139	939	67	50	767	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	306	0	89	245	0	139	1006	0	50	817	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0		11.0	25.0		11.0	25.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		18.3%	41.7%		18.3%	41.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	13.0	13.0		13.0	13.0		24.1	19.1		24.1	19.1	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.44	0.35		0.44	0.35	
v/c Ratio	0.33	0.69		0.47	0.58		0.46	0.87		0.18	0.71	
Control Delay	20.8	23.2		26.4	22.3		13.3	28.9		9.1	20.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.8	23.2		26.4	22.3		13.3	28.9		9.1	20.6	
LOS	C	C		C	C		B	C		A	C	
Approach Delay		22.7			23.4			27.0			19.9	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	21	69		25	63		20	157		7	117	
Queue Length 95th (ft)	52	138		61	121		51	#303		23	#198	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1120			1224			1468			1484	
Turn Bay Length (ft)	75			75			100			165		
Base Capacity (vph)	333	586		264	575		304	1155		279	1156	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.52		0.34	0.43		0.46	0.87		0.18	0.71	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 55.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 23: US 81 (4th Street NE) & 3rd Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	150	125	80	170	50	125	845	60	45	690	45
Future Volume (veh/h)	70	150	125	80	170	50	125	845	60	45	690	45
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	78	167	139	89	189	56	139	939	67	50	767	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	316	251	209	256	369	109	347	1030	74	293	1037	68
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.09	0.32	0.32	0.09	0.32	0.32
Sat Flow, veh/h	1202	894	744	1136	1313	389	1688	3187	227	1688	3209	209
Grp Volume(v), veh/h	78	0	306	89	0	245	139	496	510	50	402	415
Grp Sat Flow(s),veh/h/ln	1202	0	1638	1136	0	1702	1688	1683	1731	1688	1683	1734
Q Serve(g_s), s	3.4	0.0	9.6	4.4	0.0	7.0	3.1	16.4	16.4	1.0	12.4	12.4
Cycle Q Clear(g_c), s	10.4	0.0	9.6	14.0	0.0	7.0	3.1	16.4	16.4	1.0	12.4	12.4
Prop In Lane	1.00		0.45	1.00		0.23	1.00		0.13	1.00		0.12
Lane Grp Cap(c), veh/h	316	0	460	256	0	478	347	544	560	293	544	561
V/C Ratio(X)	0.25	0.00	0.66	0.35	0.00	0.51	0.40	0.91	0.91	0.17	0.74	0.74
Avail Cap(c_a), veh/h	351	0	507	288	0	527	347	550	566	293	550	567
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	18.5	24.6	0.0	17.5	12.7	18.9	18.9	13.0	17.5	17.5
Incr Delay (d2), s/veh	0.4	0.0	2.9	0.8	0.0	0.8	0.7	19.4	19.0	0.3	5.2	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	3.7	1.2	0.0	2.7	1.0	8.4	8.6	0.4	4.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	21.3	25.5	0.0	18.4	13.4	38.2	37.8	13.3	22.7	22.6
LnGrp LOS	C	A	C	C	A	B	B	D	D	B	C	C
Approach Vol, veh/h		384			334			1145			867	
Approach Delay, s/veh		21.5			20.3			35.1			22.1	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	24.8		22.3	11.0	24.8		22.3				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	19.0		18.0	5.0	19.0		18.0				
Max Q Clear Time (g_c+I1), s	3.0	18.4		12.4	5.1	14.4		16.0				
Green Ext Time (p_c), s	0.0	0.4		1.1	0.0	2.0		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			27.2									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	55	100	20	35	35	100	890	25	50	810	35
Future Volume (vph)	40	55	100	20	35	35	100	890	25	50	810	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.931			0.947			0.996			0.994	
Flt Protected		0.990			0.989		0.950			0.950		
Satd. Flow (prot)	0	1627	0	0	1653	0	1676	3340	0	1676	3333	0
Flt Permitted		0.908			0.915		0.179			0.282		
Satd. Flow (perm)	0	1492	0	0	1529	0	316	3340	0	498	3333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103			39			7			8	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		761			745			370			380	
Travel Time (s)		20.8			20.3			7.2			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	61	111	22	39	39	111	989	28	56	900	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	100	0	111	1017	0	56	939	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		9.5	32.5		23.0	23.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		17.3%	59.1%		41.8%	41.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Act Effct Green (s)		9.2			9.2		27.5	27.5		20.0	20.0	
Actuated g/C Ratio		0.20			0.20		0.60	0.60		0.44	0.44	
v/c Ratio		0.57			0.30		0.33	0.51		0.26	0.64	
Control Delay		15.3			12.7		7.5	6.9		14.9	14.6	
Queue Delay		0.0			0.0		0.0	0.1		0.0	0.0	
Total Delay		15.3			12.7		7.5	7.0		14.9	14.6	
LOS		B			B		A	A		B	B	
Approach Delay		15.3			12.7			7.0			14.7	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)		26			14		10	63		9	101	
Queue Length 95th (ft)		73			43		33	136		38	#196	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		681			665			290			300	
Turn Bay Length (ft)							100			100		
Base Capacity (vph)		654			630		339	2066		221	1488	
Starvation Cap Reductn		0			0		0	200		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.33			0.16		0.33	0.55		0.25	0.63	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 45.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 61.9%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 28: US 81 (5th Street SE)/US 81 (5th Street NE) & E Kemp Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	55	100	20	35	35	100	890	25	50	810	35
Future Volume (veh/h)	40	55	100	20	35	35	100	890	25	50	810	35
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	44	61	111	22	39	39	111	989	28	56	900	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	107	157	149	156	124	420	1932	55	402	1233	53
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.58	0.58	0.38	0.38	0.38
Sat Flow, veh/h	214	549	807	198	799	637	1688	3344	95	587	3287	142
Grp Volume(v), veh/h	216	0	0	100	0	0	111	498	519	56	461	478
Grp Sat Flow(s),veh/h/ln	1570	0	0	1634	0	0	1688	1683	1755	587	1683	1746
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.0	1.4	7.0	7.0	2.6	9.3	9.3
Cycle Q Clear(g_c), s	5.0	0.0	0.0	2.1	0.0	0.0	1.4	7.0	7.0	2.6	9.3	9.3
Prop In Lane	0.20		0.51	0.22		0.39	1.00		0.05	1.00		0.08
Lane Grp Cap(c), veh/h	416	0	0	430	0	0	420	973	1014	402	632	655
V/C Ratio(X)	0.52	0.00	0.00	0.23	0.00	0.00	0.26	0.51	0.51	0.14	0.73	0.73
Avail Cap(c_a), veh/h	816	0	0	827	0	0	483	1189	1240	456	786	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	0.0	13.7	0.0	0.0	7.0	5.0	5.0	8.6	10.7	10.7
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.3	0.0	0.0	0.3	0.4	0.4	0.2	2.6	2.6
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	1.7	0.0	0.0	0.7	0.0	0.0	0.3	1.2	1.3	0.3	2.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	0.0	13.9	0.0	0.0	7.3	5.4	5.4	8.7	13.3	13.2
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	B	B
Approach Vol, veh/h		216			100			1128			995	
Approach Delay, s/veh		15.8			13.9			5.6			13.0	
Approach LOS		B			B			A			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		27.4		12.2	8.0	19.4		12.2				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		28.0		18.0	5.0	18.5		18.0				
Max Q Clear Time (g_c+I1), s		9.0		7.0	3.4	11.3		4.1				
Green Ext Time (p_c), s		6.4		0.9	0.0	3.5		0.4				

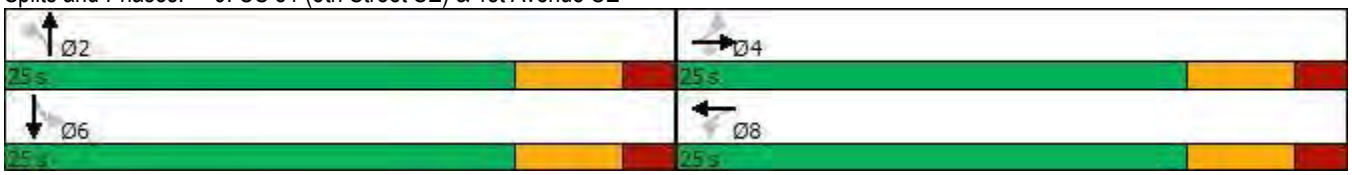
Intersection Summary												
HCM 6th Ctrl Delay			9.9									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	40	80	20	25	20	50	930	25	30	870	30
Future Volume (vph)	65	40	80	20	25	20	50	930	25	30	870	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	80		80	0		0	100		0	0		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.959			0.996			0.995	
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1676	1765	1500	0	1667	0	1676	3340	0	1676	3336	0
Flt Permitted	0.710				0.881		0.263			0.239		
Satd. Flow (perm)	1253	1765	1500	0	1491	0	464	3340	0	422	3336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		22			6			8	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		642			750			1323			370	
Travel Time (s)		17.5			20.5			25.8			7.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	44	89	22	28	22	56	1033	28	33	967	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	44	89	0	72	0	56	1061	0	33	1000	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	8.3	8.3	8.3		8.3		22.3	22.3		22.3	22.3	
Actuated g/C Ratio	0.22	0.22	0.22		0.22		0.59	0.59		0.59	0.59	
v/c Ratio	0.26	0.11	0.24		0.21		0.21	0.54		0.13	0.51	
Control Delay	15.5	13.1	7.7		11.2		9.4	8.7		8.4	8.3	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	15.5	13.1	7.7		11.2		9.4	8.7		8.4	8.3	
LOS	B	B	A		B		A	A		A	A	
Approach Delay		11.6			11.2			8.7			8.3	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	13	8	4		9		6	76		3	70	
Queue Length 95th (ft)	37	24	28		31		28	153		18	140	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		562			670			1243			290	
Turn Bay Length (ft)	80		80				100					
Base Capacity (vph)	630	888	787		761		271	1954		246	1952	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.11	0.05	0.11		0.09		0.21	0.54		0.13	0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 38.1			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: US 81 (5th Street SE) & 1st Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	40	80	20	25	20	50	930	25	30	870	30
Future Volume (veh/h)	65	40	80	20	25	20	50	930	25	30	870	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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	72	44	89	22	28	22	56	1033	28	33	967	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	488	334	283	188	157	92	354	1554	42	335	1542	53
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	1435	1772	1502	273	834	487	596	3348	91	563	3321	113
Grp Volume(v), veh/h	72	44	89	72	0	0	56	519	542	33	490	510
Grp Sat Flow(s),veh/h/ln	1435	1772	1502	1594	0	0	596	1683	1756	563	1683	1752
Q Serve(g_s), s	0.0	0.7	1.8	0.0	0.0	0.0	2.7	8.3	8.3	1.7	7.6	7.6
Cycle Q Clear(g_c), s	1.2	0.7	1.8	1.3	0.0	0.0	10.3	8.3	8.3	9.9	7.6	7.6
Prop In Lane	1.00		1.00	0.31		0.31	1.00		0.05	1.00		0.06
Lane Grp Cap(c), veh/h	488	334	283	436	0	0	354	781	815	335	781	813
V/C Ratio(X)	0.15	0.13	0.31	0.17	0.00	0.00	0.16	0.66	0.66	0.10	0.63	0.63
Avail Cap(c_a), veh/h	1007	974	826	990	0	0	405	926	966	383	926	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.9	11.7	12.1	11.9	0.0	0.0	10.9	7.2	7.2	11.0	7.0	7.0
Incr Delay (d2), s/veh	0.1	0.2	0.6	0.2	0.0	0.0	0.2	1.4	1.4	0.1	1.0	1.0
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	0.4	0.2	0.5	0.4	0.0	0.0	0.3	1.8	1.9	0.2	1.6	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	11.8	12.7	12.1	0.0	0.0	11.1	8.6	8.5	11.1	8.0	8.0
LnGrp LOS	B	B	B	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		205			72			1117			1033	
Approach Delay, s/veh		12.3			12.1			8.7			8.1	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.0		12.5		22.0		12.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		12.3		3.8		11.9		3.3				
Green Ext Time (p_c), s		3.7		0.6		3.6		0.3				

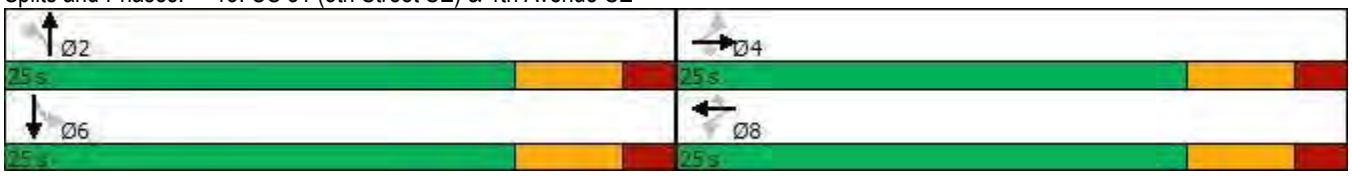
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	140	50	25	65	35	35	850	30	35	790	45
Future Volume (vph)	65	140	50	25	65	35	35	850	30	35	790	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		75	0		75	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.995			0.992	
Flt Protected		0.984			0.986		0.950			0.950		
Satd. Flow (prot)	0	1736	1500	0	1740	1500	1676	3336	0	1676	3326	0
Flt Permitted		0.857			0.833		0.277			0.255		
Satd. Flow (perm)	0	1512	1500	0	1470	1500	489	3336	0	450	3326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		8			13	
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		870			848			999			1323	
Travel Time (s)		19.8			23.1			19.5			25.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	156	56	28	72	39	39	944	33	39	878	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	56	0	100	39	39	977	0	39	928	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)		11.5	11.5		11.5	11.5	22.1	22.1		22.1	22.1	
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.54	0.54		0.54	0.54	
v/c Ratio		0.54	0.12		0.24	0.08	0.15	0.54		0.16	0.51	
Control Delay		17.8	3.9		13.1	2.5	10.9	11.1		11.3	10.6	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		17.8	3.9		13.1	2.5	10.9	11.1		11.3	10.6	
LOS		B	A		B	A	B	B		B	B	
Approach Delay		15.1			10.1			11.1			10.6	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		47	0		19	0	5	86		5	80	
Queue Length 95th (ft)		94	15		44	9	25	179		25	166	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		790			768			919			1243	
Turn Bay Length (ft)			75			75	100			100		
Base Capacity (vph)		719	747		699	747	270	1849		249	1845	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.32	0.07		0.14	0.05	0.14	0.53		0.16	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 40.9			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 63.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 13: US 81 (5th Street SE) & 4th Avenue SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	140	50	25	65	35	35	850	30	35	790	45
Future Volume (veh/h)	65	140	50	25	65	35	35	850	30	35	790	45
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	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	72	156	56	28	72	39	39	944	33	39	878	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	96	152	579	93	177	579	234	1232	43	220	1202	68
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	0	393	1502	0	459	1502	638	3318	116	610	3238	184
Grp Volume(v), veh/h	228	0	56	100	0	39	39	479	498	39	456	472
Grp Sat Flow(s),veh/h/ln	393	0	1502	459	0	1502	638	1683	1751	610	1683	1739
Q Serve(g_s), s	0.0	0.0	1.2	0.0	0.0	0.8	2.8	12.3	12.3	3.0	11.5	11.5
Cycle Q Clear(g_c), s	19.0	0.0	1.2	19.0	0.0	0.8	14.3	12.3	12.3	15.3	11.5	11.5
Prop In Lane	0.32		1.00	0.28		1.00	1.00		0.07	1.00		0.11
Lane Grp Cap(c), veh/h	248	0	579	270	0	579	234	625	650	220	625	645
V/C Ratio(X)	0.92	0.00	0.10	0.37	0.00	0.07	0.17	0.77	0.77	0.18	0.73	0.73
Avail Cap(c_a), veh/h	248	0	579	270	0	579	243	649	675	229	649	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	0.0	9.7	11.9	0.0	9.6	19.5	13.6	13.6	20.3	13.4	13.4
Incr Delay (d2), s/veh	36.5	0.0	0.1	0.8	0.0	0.0	0.3	5.3	5.1	0.4	4.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.3	0.7	0.0	0.2	0.4	4.6	4.7	0.4	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	9.7	12.7	0.0	9.6	19.9	18.9	18.7	20.7	17.4	17.3
LnGrp LOS	D	A	A	B	A	A	B	B	B	C	B	B
Approach Vol, veh/h		284			139			1016			967	
Approach Delay, s/veh		42.0			11.8			18.9			17.5	
Approach LOS		D			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.3		25.0		24.3		25.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0				
Max Q Clear Time (g_c+I1), s		16.3		21.0		17.3		21.0				
Green Ext Time (p_c), s		1.6		0.0		1.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			20.6									
HCM 6th LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	210	145	100	245	110	60	240	125	55	215	165
Future Volume (vph)	210	210	145	100	245	110	60	240	125	55	215	165
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.967			0.960			0.949	
Flt Protected		0.982			0.989			0.993			0.994	
Satd. Flow (prot)	0	1672	0	0	1688	0	0	1682	0	0	1665	0
Flt Permitted		0.982			0.989			0.993			0.994	
Satd. Flow (perm)	0	1672	0	0	1688	0	0	1682	0	0	1665	0
Link Speed (mph)		40			50			65			45	
Link Distance (ft)		2250			2754			1476			1428	
Travel Time (s)		38.4			37.6			15.5			21.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	233	161	111	272	122	67	267	139	61	239	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	505	0	0	473	0	0	483	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 97.1%		ICU Level of Service F	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	627	505	473	483
Demand Flow Rate, veh/h	640	514	482	493
Vehicles Circulating, veh/h	419	578	538	458
Vehicles Exiting, veh/h	532	442	521	634
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	17.0	17.4	14.4	12.6
Approach LOS	C	C	B	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	640	514	482	493
Cap Entry Lane, veh/h	900	765	797	865
Entry HV Adj Factor	0.980	0.982	0.981	0.980
Flow Entry, veh/h	627	505	473	483
Cap Entry, veh/h	882	751	782	848
V/C Ratio	0.711	0.672	0.605	0.570
Control Delay, s/veh	17.0	17.4	14.4	12.6
LOS	C	C	B	B
95th %tile Queue, veh	6	5	4	4

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	310	290	65	50	55
Future Volume (vph)	60	310	290	65	50	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0			0	70	0
Storage Lanes	0			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.975			0.850
Flt Protected		0.992			0.950	
Satd. Flow (prot)	0	1756	1727	0	1710	1530
Flt Permitted		0.992			0.950	
Satd. Flow (perm)	0	1756	1727	0	1710	1530
Link Speed (mph)		25	25		25	
Link Distance (ft)		791	278		1006	
Travel Time (s)		21.6	7.6		27.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Adj. Flow (vph)	67	344	322	72	56	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	411	394	0	56	61
Sign Control		Stop	Stop		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	310	290	65	50	55
Future Vol, veh/h	60	310	290	65	50	55
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	67	344	322	72	56	61
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	13.2	12.4	9.6
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	16%	0%	100%	0%
Vol Thru, %	84%	82%	0%	0%
Vol Right, %	0%	18%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	370	355	50	55
LT Vol	60	0	50	0
Through Vol	310	290	0	0
RT Vol	0	65	0	55
Lane Flow Rate	411	394	56	61
Geometry Grp	2	2	7	7
Degree of Util (X)	0.538	0.507	0.105	0.094
Departure Headway (Hd)	4.711	4.63	6.772	5.553
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	761	773	524	638
Service Time	2.767	2.686	4.572	3.353
HCM Lane V/C Ratio	0.54	0.51	0.107	0.096
HCM Control Delay	13.2	12.4	10.4	8.9
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	3.3	2.9	0.3	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	330	30	30	315	40	30
Future Volume (vph)	330	30	30	315	40	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.942	
Flt Protected				0.996	0.972	
Satd. Flow (prot)	1738	0	0	1761	1611	0
Flt Permitted				0.996	0.972	
Satd. Flow (perm)	1738	0	0	1761	1611	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	278			1819	482	
Travel Time (s)	7.6			49.6	13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	0%	2%	4%	0%
Adj. Flow (vph)	367	33	33	350	44	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	400	0	0	383	77	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	330	30	30	315	40	30
Future Vol, veh/h	330	30	30	315	40	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	7	0	2	4	0
Mvmt Flow	367	33	33	350	44	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	400	0	800	384
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	416	-
Critical Hdwy	-	-	4.1	-	6.44	6.2
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	-	-	2.2	-	3.536	3.3
Pot Cap-1 Maneuver	-	-	1170	-	351	668
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	661	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1170	-	339	668
Mov Cap-2 Maneuver	-	-	-	-	339	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	430	-	-	1170	-
HCM Lane V/C Ratio	0.181	-	-	0.028	-
HCM Control Delay (s)	15.2	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	2	95	170	95	2	55	195	395	60	415	55	200
Future Volume (vph)	2	95	170	95	2	55	195	395	60	415	55	200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)		215		215		145		0	150		0	150
Storage Lanes		1		1		1		1	1		0	1
Taper Length (ft)		25				25			25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850				0.850		0.982		
Flt Protected		0.950				0.950			0.950			0.950
Satd. Flow (prot)	0	1693	1782	1530	0	1710	1782	1515	1629	1752	0	1693
Flt Permitted		0.622				0.639			0.490			0.186
Satd. Flow (perm)	0	1109	1782	1530	0	1150	1782	1515	840	1752	0	331
Right Turn on Red				Yes				Yes			Yes	
Satd. Flow (RTOR)				164				161		12		
Link Speed (mph)			25				45			35		
Link Distance (ft)			1819				1221			1427		
Travel Time (s)			49.6				18.5			27.8		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	1%	5%	1%	0%	1%
Adj. Flow (vph)	2	106	189	106	2	61	217	439	67	461	61	222
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	189	106	0	63	217	439	67	522	0	222
Turn Type	Perm	Perm	NA	Perm	Perm	Perm	NA	pt+ov	Perm	NA		pm+pt
Protected Phases			4				8	8 1		2		1
Permitted Phases	4	4		4	8	8			2			6
Detector Phase	4	4	4	4	8	8	8	8 1	2	2		1
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0		11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		25.0	25.0		11.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%		41.7%	41.7%		18.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		6.0	6.0		6.0	6.0		6.0
Lead/Lag									Lag	Lag		Lead
Lead-Lag Optimize?									Yes	Yes		Yes
Recall Mode	None	None	None	None	None	None	None		Min	Min		None
Act Effct Green (s)		13.4	13.4	13.4		13.4	13.4	24.5	18.5	18.5		29.6
Actuated g/C Ratio		0.24	0.24	0.24		0.24	0.24	0.44	0.34	0.34		0.54
v/c Ratio		0.40	0.44	0.21		0.23	0.50	0.58	0.24	0.88		0.74
Control Delay		22.0	20.8	2.3		18.4	22.0	10.2	17.5	37.9		27.4
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		22.0	20.8	2.3		18.4	22.0	10.2	17.5	37.9		27.4
LOS		C	C	A		B	C	B	B	D		C
Approach Delay			16.2				14.5			35.6		
Approach LOS			B				B			D		
Queue Length 50th (ft)		30	53	0		17	62	59	16	158		36

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	340	90
Future Volume (vph)	340	90
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.969	
Flt Protected		
Satd. Flow (prot)	1723	0
Flt Permitted		
Satd. Flow (perm)	1723	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	32	
Link Speed (mph)	35	
Link Distance (ft)	5295	
Travel Time (s)	103.1	
Peak Hour Factor	0.90	0.90
Heavy Vehicles (%)	1%	2%
Adj. Flow (vph)	378	100
Shared Lane Traffic (%)		
Lane Group Flow (vph)	478	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	7.0	
Minimum Split (s)	24.0	
Total Split (s)	36.0	
Total Split (%)	60.0%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Min	
Act Effct Green (s)	29.6	
Actuated g/C Ratio	0.54	
v/c Ratio	0.51	
Control Delay	10.8	
Queue Delay	0.0	
Total Delay	10.8	
LOS	B	
Approach Delay	16.1	
Approach LOS	B	
Queue Length 50th (ft)	86	

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Queue Length 95th (ft)		67	101	13		43	115	131	46	#352		#118
Internal Link Dist (ft)			1739				1141			1347		
Turn Bay Length (ft)		215		215		145			150			150
Base Capacity (vph)		366	588	614		379	588	751	292	618		302
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0
Reduced v/c Ratio		0.30	0.32	0.17		0.17	0.37	0.58	0.23	0.84		0.74

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 55.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 74.9%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 2: 19th St NE & 1st Ave NE/Willow Creek Dr

Lane Group	SBT	SBR
Queue Length 95th (ft)	177	
Internal Link Dist (ft)	5215	
Turn Bay Length (ft)		
Base Capacity (vph)	962	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.50	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	140	35	615	390	35
Future Volume (vph)	30	140	35	615	390	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.889				0.988	
Flt Protected	0.991			0.997		
Satd. Flow (prot)	1586	0	0	3378	3348	0
Flt Permitted	0.991			0.997		
Satd. Flow (perm)	1586	0	0	3378	3348	0
Link Speed (mph)	30			35	45	
Link Distance (ft)	233			583	1620	
Travel Time (s)	5.3			11.4	24.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	33	156	39	683	433	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	0	722	472	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	140	35	615	390	35
Future Vol, veh/h	30	140	35	615	390	35
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, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	33	156	39	683	433	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	873	236	472	0	-	0
Stage 1	453	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	293	772	1100	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	276	772	1100	-	-	-
Mov Cap-2 Maneuver	276	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	637	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1100	-	586	-	-
HCM Lane V/C Ratio	0.035	-	0.322	-	-
HCM Control Delay (s)	8.4	0.2	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.926			0.982			0.982	
Flt Protected		0.969			0.980		0.950			0.950		
Satd. Flow (prot)	0	1536	0	0	1633	0	1024	1586	0	1710	1615	0
Flt Permitted		0.969			0.980		0.950			0.950		
Satd. Flow (perm)	0	1536	0	0	1633	0	1024	1586	0	1710	1615	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	67	6	33	206	17	272	17	322	44	39	322	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	495	0	17	366	0	39	366	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 61.2%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	57

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	30	185	15	245	15	290	40	35	290	40
Future Vol, veh/h	60	5	30	185	15	245	15	290	40	35	290	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	100	10	0	0	0	67	13	0	0	8	20
Mvmt Flow	67	6	33	206	17	272	17	322	44	39	322	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	945	822	344	820	822	344	366	0	0	366	0	0
Stage 1	422	422	-	378	378	-	-	-	-	-	-	-
Stage 2	523	400	-	442	444	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.3	7.1	6.5	6.2	4.77	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.39	3.5	4	3.3	2.803	-	-	2.2	-	-
Pot Cap-1 Maneuver	244	220	681	296	311	703	909	-	-	1204	-	-
Stage 1	613	451	-	648	619	-	-	-	-	-	-	-
Stage 2	541	463	-	598	579	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	138	209	681	265	295	703	909	-	-	1204	-	-
Mov Cap-2 Maneuver	138	209	-	265	295	-	-	-	-	-	-	-
Stage 1	601	437	-	636	607	-	-	-	-	-	-	-
Stage 2	316	454	-	543	560	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	45.8	149.3	0.4	0.8
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	189	405	1204	-	-
HCM Lane V/C Ratio	0.018	-	-	0.558	1.221	0.032	-	-
HCM Control Delay (s)	9	-	-	45.8	149.3	8.1	-	-
HCM Lane LOS	A	-	-	E	F	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	3	20.3	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	315	10	5	5	290	85	5	5	80	45
Future Volume (vph)	25	10	315	10	5	5	290	85	5	5	80	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.925			0.991			0.953	
Flt Protected		0.996		0.950			0.950				0.998	
Satd. Flow (prot)	0	1555	0	1710	1657	0	1693	1751	0	0	1625	0
Flt Permitted		0.996		0.950			0.950				0.998	
Satd. Flow (perm)	0	1555	0	1710	1657	0	1693	1751	0	0	1625	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	0%	1%	0%	0%	1%	1%	2%	0%	100%	2%	0%
Adj. Flow (vph)	28	11	350	11	6	6	322	94	6	6	89	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	389	0	11	12	0	322	100	0	0	145	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.8%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	10	315	10	5	5	290	85	5	5	80	45
Future Vol, veh/h	25	10	315	10	5	5	290	85	5	5	80	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	6	0	1	0	0	1	1	2	0	100	2	0
Mvmt Flow	28	11	350	11	6	6	322	94	6	6	89	50
Number of Lanes	0	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	1
HCM Control Delay	18.6	10	16.6	14.9
HCM LOS	C	A	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	7%	100%	0%	4%
Vol Thru, %	0%	94%	3%	0%	50%	62%
Vol Right, %	0%	6%	90%	0%	50%	35%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	90	350	10	10	130
LT Vol	290	0	25	10	0	5
Through Vol	0	85	10	0	5	80
RT Vol	0	5	315	0	5	45
Lane Flow Rate	322	100	389	11	11	144
Geometry Grp	7	7	6	7	7	6
Degree of Util (X)	0.592	0.169	0.634	0.023	0.021	0.323
Departure Headway (Hd)	6.617	6.088	5.869	7.569	6.698	8.05
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	545	588	614	471	531	446
Service Time	4.364	3.835	3.919	5.353	4.482	6.111
HCM Lane V/C Ratio	0.591	0.17	0.634	0.023	0.021	0.323
HCM Control Delay	18.6	10.1	18.6	10.5	9.6	14.9
HCM Lane LOS	C	B	C	B	A	B
HCM 95th-tile Q	3.8	0.6	4.5	0.1	0.1	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	180	15	35	180	55	10	95	30	50	70	25
Future Volume (vph)	25	180	15	35	180	55	10	95	30	50	70	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.965			0.970			0.977	
Flt Protected		0.994		0.950				0.996			0.983	
Satd. Flow (prot)	0	1717	0	1629	1691	0	0	1716	0	0	1699	0
Flt Permitted		0.994		0.950				0.996			0.983	
Satd. Flow (perm)	0	1717	0	1629	1691	0	0	1716	0	0	1699	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		577			733			480			518	
Travel Time (s)		15.7			20.0			13.1			14.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	5%	2%	5%	0%	0%	6%	5%	0%	0%
Adj. Flow (vph)	28	200	17	39	200	61	11	106	33	56	78	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	245	0	39	261	0	0	150	0	0	162	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	180	15	35	180	55	10	95	30	50	70	25
Future Vol, veh/h	25	180	15	35	180	55	10	95	30	50	70	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	5	2	5	0	0	6	5	0	0
Mvmt Flow	28	200	17	39	200	61	11	106	33	56	78	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	261	0	0	217	0	0	627	604	209	643	582	231
Stage 1	-	-	-	-	-	-	265	265	-	309	309	-
Stage 2	-	-	-	-	-	-	362	339	-	334	273	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.1	6.5	6.26	7.15	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.5	4	3.354	3.545	4	3.3
Pot Cap-1 Maneuver	1315	-	-	1335	-	-	399	415	821	382	427	813
Stage 1	-	-	-	-	-	-	745	693	-	695	663	-
Stage 2	-	-	-	-	-	-	661	643	-	674	688	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1315	-	-	1335	-	-	316	393	821	279	405	813
Mov Cap-2 Maneuver	-	-	-	-	-	-	316	393	-	279	405	-
Stage 1	-	-	-	-	-	-	727	676	-	678	644	-
Stage 2	-	-	-	-	-	-	545	624	-	533	671	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1	17.5	21.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	436	1315	-	-	1335	-	-	379
HCM Lane V/C Ratio	0.344	0.021	-	-	0.029	-	-	0.425
HCM Control Delay (s)	17.5	7.8	0	-	7.8	-	-	21.3
HCM Lane LOS	C	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	1.5	0.1	-	-	0.1	-	-	2.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	45	30	25	60	25	35	95	20	20	85	15
Future Volume (vph)	20	45	30	25	60	25	35	95	20	20	85	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		250	0		250	0		0	0		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.982			0.983	
Flt Protected		0.985			0.985			0.988			0.992	
Satd. Flow (prot)	0	1773	1530	0	1773	1530	0	1746	0	0	1755	0
Flt Permitted		0.985			0.985			0.988			0.992	
Satd. Flow (perm)	0	1773	1530	0	1773	1530	0	1746	0	0	1755	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		765			2317			386			480	
Travel Time (s)		20.9			63.2			10.5			13.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	50	33	28	67	28	39	106	22	22	94	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	33	0	95	28	0	167	0	0	133	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	45	30	25	60	25	35	95	20	20	85	15
Future Vol, veh/h	20	45	30	25	60	25	35	95	20	20	85	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	50	33	28	67	28	39	106	22	22	94	17
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.7	8.9	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	23%	31%	0%	29%	0%	17%
Vol Thru, %	63%	69%	0%	71%	0%	71%
Vol Right, %	13%	0%	100%	0%	100%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	65	30	85	25	120
LT Vol	35	20	0	25	0	20
Through Vol	95	45	0	60	0	85
RT Vol	20	0	30	0	25	15
Lane Flow Rate	167	72	33	94	28	133
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.213	0.11	0.043	0.143	0.036	0.172
Departure Headway (Hd)	4.602	5.491	4.629	5.464	4.609	4.633
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	778	651	770	655	773	772
Service Time	2.639	3.241	2.379	3.213	2.358	2.672
HCM Lane V/C Ratio	0.215	0.111	0.043	0.144	0.036	0.172
HCM Control Delay	8.9	8.9	7.6	9.1	7.5	8.6
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.8	0.4	0.1	0.5	0.1	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	345	25	15	190	15	30	45	25	15	35	15
Future Volume (vph)	30	345	25	15	190	15	30	45	25	15	35	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.991			0.966			0.969	
Flt Protected		0.996			0.997			0.985			0.988	
Satd. Flow (prot)	0	1761	0	0	1763	0	0	1713	0	0	1723	0
Flt Permitted		0.996			0.997			0.985			0.988	
Satd. Flow (perm)	0	1761	0	0	1763	0	0	1713	0	0	1723	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1515			1128			1396			2664	
Travel Time (s)		41.3			30.8			38.1			72.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	383	28	17	211	17	33	50	28	17	39	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	444	0	0	245	0	0	111	0	0	73	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	345	25	15	190	15	30	45	25	15	35	15
Future Vol, veh/h	30	345	25	15	190	15	30	45	25	15	35	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	33	383	28	17	211	17	33	50	28	17	39	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14	10.4	9.8	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	7%	7%	23%
Vol Thru, %	45%	86%	86%	54%
Vol Right, %	25%	6%	7%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	400	220	65
LT Vol	30	30	15	15
Through Vol	45	345	190	35
RT Vol	25	25	15	15
Lane Flow Rate	111	444	244	72
Geometry Grp	1	1	1	1
Degree of Util (X)	0.173	0.576	0.332	0.114
Departure Headway (Hd)	5.614	4.667	4.886	5.694
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	642	764	726	633
Service Time	3.617	2.75	2.984	3.698
HCM Lane V/C Ratio	0.173	0.581	0.336	0.114
HCM Control Delay	9.8	14	10.4	9.4
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.6	3.7	1.5	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	355	15	20	210	15	15	5	20	10	5	5
Future Volume (vph)	5	355	15	20	210	15	15	5	20	10	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.992			0.934			0.965	
Flt Protected		0.999			0.996			0.981			0.977	
Satd. Flow (prot)	0	1787	0	0	1751	0	0	1649	0	0	1466	0
Flt Permitted		0.999			0.996			0.981			0.977	
Satd. Flow (perm)	0	1787	0	0	1751	0	0	1649	0	0	1466	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1128			1515			1440			909	
Travel Time (s)		30.8			41.3			39.3			24.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	25%	0%	0%	0%	33%	0%	0%
Adj. Flow (vph)	6	394	17	22	233	17	17	6	22	11	6	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	417	0	0	272	0	0	45	0	0	23	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	5	355	15	20	210	15	15	5	20	10	5	5
Future Vol, veh/h	5	355	15	20	210	15	15	5	20	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	25	0	0	0	33	0	0
Mvmt Flow	6	394	17	22	233	17	17	6	22	11	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	250	0	0	411	0	0	707	709	403	715	709	242
Stage 1	-	-	-	-	-	-	415	415	-	286	286	-
Stage 2	-	-	-	-	-	-	292	294	-	429	423	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.43	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.3
Pot Cap-1 Maneuver	1327	-	-	1159	-	-	353	362	652	309	362	802
Stage 1	-	-	-	-	-	-	619	596	-	659	679	-
Stage 2	-	-	-	-	-	-	720	673	-	548	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1327	-	-	1159	-	-	339	352	652	289	352	802
Mov Cap-2 Maneuver	-	-	-	-	-	-	339	352	-	289	352	-
Stage 1	-	-	-	-	-	-	615	592	-	655	664	-
Stage 2	-	-	-	-	-	-	693	658	-	521	587	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	13.9	15.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	449	1327	-	-	1159	-	-	363
HCM Lane V/C Ratio	0.099	0.004	-	-	0.019	-	-	0.061
HCM Control Delay (s)	13.9	7.7	0	-	8.2	0	-	15.6
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Future Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.994			0.960			0.953	
Flt Protected		0.997			0.998			0.991			0.983	
Satd. Flow (prot)	0	1766	0	0	1705	0	0	1712	0	0	1686	0
Flt Permitted		0.997			0.998			0.991			0.983	
Satd. Flow (perm)	0	1766	0	0	1705	0	0	1712	0	0	1686	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	361	22	22	483	22	17	50	28	39	33	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	405	0	0	527	0	0	95	0	0	111	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Future Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	22	361	22	22	483	22	17	50	28	39	33	39
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.9	22.1	10.7	10.9
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	5%	4%	35%
Vol Thru, %	53%	89%	92%	30%
Vol Right, %	29%	5%	4%	35%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	365	475	100
LT Vol	15	20	20	35
Through Vol	45	325	435	30
RT Vol	25	20	20	35
Lane Flow Rate	94	406	528	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.167	0.595	0.752	0.195
Departure Headway (Hd)	6.371	5.283	5.132	6.324
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	560	681	702	564
Service Time	4.447	3.333	3.178	4.397
HCM Lane V/C Ratio	0.168	0.596	0.752	0.197
HCM Control Delay	10.7	15.9	22.1	10.9
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	0.6	4	6.9	0.7

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	35	30	15	10	20
Future Volume (vph)	15	35	30	15	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.954		0.910	
Flt Protected		0.985			0.984	
Satd. Flow (prot)	0	1236	1603	0	1261	0
Flt Permitted		0.985			0.984	
Satd. Flow (perm)	0	1236	1603	0	1261	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		250	315		248	
Travel Time (s)		5.7	7.2		5.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	5%	0%	0%	0%	29%
Adj. Flow (vph)	17	39	33	17	11	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	50	0	33	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	35	30	15	10	20
Future Vol, veh/h	15	35	30	15	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	100	5	0	0	0	29
Mvmt Flow	17	39	33	17	11	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	50	0	-	0	115	42
Stage 1	-	-	-	-	42	-
Stage 2	-	-	-	-	73	-
Critical Hdwy	5.1	-	-	-	6.4	6.49
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	3.1	-	-	-	3.5	3.561
Pot Cap-1 Maneuver	1105	-	-	-	886	957
Stage 1	-	-	-	-	986	-
Stage 2	-	-	-	-	955	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1105	-	-	-	872	957
Mov Cap-2 Maneuver	-	-	-	-	872	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1105	-	-	-	927
HCM Lane V/C Ratio	0.015	-	-	-	0.036
HCM Control Delay (s)	8.3	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) - AM

US 212 & Interstate 29 SB Exit 177 RTI (TWSC – Additional SB LT Lane)
US 212 & 23rd Street SE (TWSC – Additional NB LT and SB LT Lanes)
US 212 & 23rd Street SE (Signal)
US 81 & Interstate 29 SB Exit 180 RTI (TWSC – Additional EB RT and WB LT Lanes)
US 81 & 19th Street NE (TWSC – Additional EB LT, EB RT, WB LT, and WB RT Lanes)
US 81 & 19th Street NE (Roundabout)
29th Street SE & 15th Avenue SE (TWSC – Additional EB LT, WB LT, and SB RT Lanes)
29th Street SE & 15th Avenue SE (Roundabout)
N Maple Street & 14th Avenue NE (AWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT and WB LT Lanes)
19th Street NE & 14th Avenue NE (Roundabout)

2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) - PM

US 212 & Interstate 29 SB Exit 177 RTI (TWSC – Additional SB LT Lane)
US 212 & 23rd Street SE (TWSC – Additional NB LT and SB LT Lanes)
US 212 & 23rd Street SE (Signal)
US 81 & Interstate 29 SB Exit 180 RTI (TWSC – Additional EB RT and WB LT Lanes)
US 81 & 19th Street NE (TWSC – Additional EB LT, EB RT, WB LT, and WB RT Lanes)
US 81 & 19th Street NE (Roundabout)
29th Street SE & 15th Avenue SE (TWSC – Additional EB LT, WB LT, and SB RT Lanes)
29th Street SE & 15th Avenue SE (Roundabout)
N Maple Street & 14th Avenue NE (AWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT and WB LT Lanes)
19th Street NE & 14th Avenue NE (Roundabout)

2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) - AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	335	145	40	670	0	0	0	0	25	2	105
Future Volume (vph)	0	335	145	40	670	0	0	0	0	25	2	105
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	150		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.853	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	1676	1505	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	1676	1505	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	372	161	44	744	0	0	0	0	28	2	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	161	44	744	0	0	0	0	28	119	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	335	145	40	670	0	0	0	0	25	2	105
Future Vol, veh/h	0	335	145	40	670	0	0	0	0	25	2	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	372	161	44	744	0	0	0	0	28	2	117

Major/Minor	Major1			Major2				Minor2		
Conflicting Flow All	-	0	0	533	0	0		1018	1365	372
Stage 1	-	-	-	-	-	-		832	832	-
Stage 2	-	-	-	-	-	-		186	533	-
Critical Hdwy	-	-	-	4.14	-	-		6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-		5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-		3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	1031	-	0		233	146	625
Stage 1	0	-	-	-	-	0		388	382	-
Stage 2	0	-	-	-	-	0		827	523	-
Platoon blocked, %		-	-		-					
Mov Cap-1 Maneuver	-	-	-	1031	-	-		223	0	625
Mov Cap-2 Maneuver	-	-	-	-	-	-		223	0	-
Stage 1	-	-	-	-	-	-		388	0	-
Stage 2	-	-	-	-	-	-		791	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.5	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1031	-	223	625
HCM Lane V/C Ratio	-	-	0.043	-	0.125	0.19
HCM Control Delay (s)	-	-	8.6	-	23.4	12.1
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.4	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Future Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.857			0.852	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	3306	0	1513	3277	0	1437	1208	0	1710	1534	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3306	0	1513	3277	0	1437	1208	0	1710	1534	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	461	56	22	456	17	39	1	22	28	1	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	517	0	22	473	0	39	23	0	28	62	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	415	50	20	410	15	35	1	20	25	1	55
Future Vol, veh/h	45	415	50	20	410	15	35	1	20	25	1	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	13	4	0	19	0	29	0	0	0
Mvmt Flow	50	461	56	22	456	17	39	1	22	28	1	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	473	0	0	517	0	0	862	1106	259	840	1126	237
Stage 1	-	-	-	-	-	-	589	589	-	509	509	-
Stage 2	-	-	-	-	-	-	273	517	-	331	617	-
Critical Hdwy	4.1	-	-	4.36	-	-	7.88	6.5	7.48	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.33	-	-	3.69	4	3.59	3.5	4	3.3
Pot Cap-1 Maneuver	1099	-	-	972	-	-	223	212	664	262	207	771
Stage 1	-	-	-	-	-	-	422	499	-	520	541	-
Stage 2	-	-	-	-	-	-	664	537	-	662	484	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1099	-	-	972	-	-	194	198	664	239	193	771
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	198	-	239	193	-
Stage 1	-	-	-	-	-	-	403	477	-	497	529	-
Stage 2	-	-	-	-	-	-	596	525	-	609	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	21.9	14
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	194	597	1099	-	-	972	-	-	239	732
HCM Lane V/C Ratio	0.2	0.039	0.045	-	-	0.023	-	-	0.116	0.085
HCM Control Delay (s)	28.2	11.3	8.4	-	-	8.8	-	-	22	10.4
HCM Lane LOS	D	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.7	0.1	0.1	-	-	0.1	-	-	0.4	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Future Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.952			0.908	
Flt Protected	0.950			0.950				0.970			0.985	
Satd. Flow (prot)	1710	3306	0	1513	3277	0	0	1360	0	0	1610	0
Flt Permitted	0.459			0.461							0.971	
Satd. Flow (perm)	826	3306	0	734	3277	0	0	1402	0	0	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			8			22			61	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	461	56	22	456	17	39	1	22	28	1	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	517	0	22	473	0	0	62	0	0	90	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	13.0		5.0	13.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	19.0		11.0	19.0		13.0	13.0		13.0	13.0	
Total Split (s)	11.0	19.0		11.0	19.0		15.0	15.0		15.0	15.0	
Total Split (%)	24.4%	42.2%		24.4%	42.2%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0			6.0			6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	24.1	26.8		23.3	25.1			8.3			8.3	
Actuated g/C Ratio	0.69	0.77		0.67	0.72			0.24			0.24	
v/c Ratio	0.07	0.20		0.04	0.20			0.18			0.21	
Control Delay	4.1	5.8		4.3	7.9			11.3			8.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.1	5.8		4.3	7.9			11.3			8.5	
LOS	A	A		A	A			B			A	
Approach Delay		5.7			7.7			11.3			8.5	
Approach LOS		A			A			B			A	
Queue Length 50th (ft)	0	0		1	0			2			1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	15	90		8	85			32			34	
Internal Link Dist (ft)		822			1251			401			253	
Turn Bay Length (ft)	130			150								
Base Capacity (vph)	735	2538		635	2349			413			493	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.07	0.20		0.03	0.20			0.15			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 35			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.21			
Intersection Signal Delay: 7.0		Intersection LOS: A	
Intersection Capacity Utilization 38.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 11: 23rd St SE & US 212

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	415	50	20	410	15	35	1	20	25	1	55
Future Volume (veh/h)	45	415	50	20	410	15	35	1	20	25	1	55
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	1800	1772	1800	1617	1744	1800	1533	1800	1393	1800	1800	1800
Adj Flow Rate, veh/h	50	461	56	22	456	17	39	1	22	28	1	61
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0	13	4	0	19	0	29	0	0	0
Cap, veh/h	508	1126	136	443	1126	42	266	35	80	173	26	153
Arrive On Green	0.05	0.37	0.37	0.03	0.35	0.35	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1714	3024	366	1540	3257	121	746	236	540	318	173	1034
Grp Volume(v), veh/h	50	256	261	22	232	241	62	0	0	90	0	0
Grp Sat Flow(s),veh/h/ln	1714	1683	1706	1540	1657	1722	1522	0	0	1526	0	0
Q Serve(g_s), s	0.7	4.2	4.3	0.3	4.0	4.0	0.0	0.0	0.0	0.2	0.0	0.0
Cycle Q Clear(g_c), s	0.7	4.2	4.3	0.3	4.0	4.0	1.2	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.07	0.63		0.35	0.31		0.68
Lane Grp Cap(c), veh/h	508	627	636	443	573	595	381	0	0	352	0	0
V/C Ratio(X)	0.10	0.41	0.41	0.05	0.40	0.41	0.16	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	689	627	636	646	573	595	511	0	0	487	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.2	8.7	8.7	7.6	9.4	9.4	14.2	0.0	0.0	14.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	0.5	0.4	0.2	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	0.1	1.0	1.0	0.1	1.0	1.0	0.4	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	9.2	9.2	7.7	9.8	9.8	14.4	0.0	0.0	14.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		567			495			62			90	
Approach Delay, s/veh		9.0			9.7			14.4			14.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.6	6.0	20.0		11.6	7.0	19.0				
Change Period (Y+Rc), s		6.0	5.0	6.0		6.0	5.0	6.0				
Max Green Setting (Gmax), s		9.0	6.0	13.0		9.0	6.0	13.0				
Max Q Clear Time (g_c+I1), s		3.2	2.3	6.3		3.9	2.7	6.0				
Green Ext Time (p_c), s		0.1	0.0	1.5		0.1	0.0	1.4				

Intersection Summary												
HCM 6th Ctrl Delay			10.0									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	75	30	10	65	0	0	0	0	2	2	90
Future Volume (vph)	0	75	30	10	65	0	0	0	0	2	2	90
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	0		150	150		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.870	
Flt Protected				0.950							0.999	
Satd. Flow (prot)	0	1667	1417	1583	1667	0	0	0	0	0	1449	0
Flt Permitted				0.950							0.999	
Satd. Flow (perm)	0	1667	1417	1583	1667	0	0	0	0	0	1449	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	83	33	11	72	0	0	0	0	2	2	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	33	11	72	0	0	0	0	0	104	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	75	30	10	65	0	0	0	0	2	2	90
Future Vol, veh/h	0	75	30	10	65	0	0	0	0	2	2	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	83	33	11	72	0	0	0	0	2	2	100

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	116	0	0	194	210	72
Stage 1	-	-	-	-	-	-	94	94	-
Stage 2	-	-	-	-	-	-	100	116	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1473	-	0	795	687	990
Stage 1	0	-	-	-	-	0	930	817	-
Stage 2	0	-	-	-	-	0	924	800	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1473	-	-	789	0	990
Mov Cap-2 Maneuver	-	-	-	-	-	-	789	0	-
Stage 1	-	-	-	-	-	-	930	0	-
Stage 2	-	-	-	-	-	-	918	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1473	-	985
HCM Lane V/C Ratio	-	-	0.008	-	0.106
HCM Control Delay (s)	-	-	7.5	-	9.1
HCM Lane LOS	-	-	A	-	A
HCM 95th %tile Q(veh)	-	-	0	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Future Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.939			0.940	
Flt Protected	0.950			0.950				0.986			0.994	
Satd. Flow (prot)	1583	1667	1417	1583	1667	1417	0	1543	0	0	1557	0
Flt Permitted	0.950			0.950				0.986			0.994	
Satd. Flow (perm)	1583	1667	1417	1583	1667	1417	0	1543	0	0	1557	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	78	28	56	117	2	17	17	28	11	44	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	78	28	56	117	2	0	62	0	0	99	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	70	25	50	105	2	15	15	25	10	40	40
Future Vol, veh/h	15	70	25	50	105	2	15	15	25	10	40	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	78	28	56	117	2	17	17	28	11	44	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	119	0	0	106	0	0	386	343	78	378	369	117
Stage 1	-	-	-	-	-	-	112	112	-	229	229	-
Stage 2	-	-	-	-	-	-	274	231	-	149	140	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1469	-	-	1485	-	-	573	579	983	580	560	935
Stage 1	-	-	-	-	-	-	893	803	-	774	715	-
Stage 2	-	-	-	-	-	-	732	713	-	854	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1469	-	-	1485	-	-	492	550	983	530	532	935
Mov Cap-2 Maneuver	-	-	-	-	-	-	492	550	-	530	532	-
Stage 1	-	-	-	-	-	-	882	793	-	765	688	-
Stage 2	-	-	-	-	-	-	628	686	-	803	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	2.4	11	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	661	1469	-	-	1485	-	-	658
HCM Lane V/C Ratio	0.092	0.011	-	-	0.037	-	-	0.152
HCM Control Delay (s)	11	7.5	-	-	7.5	-	-	11.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Future Volume (vph)	15	70	25	50	105	2	15	15	25	10	40	40
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969			0.998			0.939			0.940	
Flt Protected		0.993			0.984			0.986			0.994	
Satd. Flow (prot)	0	1604	0	0	1637	0	0	1543	0	0	1557	0
Flt Permitted		0.993			0.984			0.986			0.994	
Satd. Flow (perm)	0	1604	0	0	1637	0	0	1543	0	0	1557	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	78	28	56	117	2	17	17	28	11	44	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	175	0	0	62	0	0	99	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 29.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	3.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	123	175	62	99
Demand Flow Rate, veh/h	126	178	63	101
Vehicles Circulating, veh/h	113	51	108	193
Vehicles Exiting, veh/h	181	120	131	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.8	3.9	3.4	4.0
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	126	178	63	101
Cap Entry Lane, veh/h	1230	1310	1236	1133
Entry HV Adj Factor	0.980	0.981	0.979	0.981
Flow Entry, veh/h	123	175	62	99
Cap Entry, veh/h	1205	1285	1210	1112
V/C Ratio	0.102	0.136	0.051	0.089
Control Delay, s/veh	3.8	3.9	3.4	4.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Future Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.882			0.925			0.972				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	1261	0	1710	1665	0	1583	1722	0	1710	1800	1354
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	1261	0	1710	1665	0	1583	1722	0	1710	1800	1354
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	6	6	22	17	6	6	28	189	44	50	106	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	28	0	17	12	0	28	233	0	50	106	56
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	20	15	5	5	25	170	40	45	95	50
Future Vol, veh/h	5	5	20	15	5	5	25	170	40	45	95	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	33	0	0	0	8	2	0	0	0	13
Mvmt Flow	6	6	22	17	6	6	28	189	44	50	106	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	479	495	106	515	529	211	162	0	0	233	0	0
Stage 1	206	206	-	267	267	-	-	-	-	-	-	-
Stage 2	273	289	-	248	262	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	500	479	870	474	458	834	1381	-	-	1346	-	-
Stage 1	801	735	-	743	692	-	-	-	-	-	-	-
Stage 2	737	677	-	760	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	471	452	870	438	432	834	1381	-	-	1346	-	-
Mov Cap-2 Maneuver	471	452	-	438	432	-	-	-	-	-	-	-
Stage 1	785	708	-	728	678	-	-	-	-	-	-	-
Stage 2	711	663	-	707	669	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	12.7	0.8	1.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1381	-	-	471	734	438	569	1346	-	-
HCM Lane V/C Ratio	0.02	-	-	0.012	0.038	0.038	0.02	0.037	-	-
HCM Control Delay (s)	7.7	-	-	12.7	10.1	13.5	11.5	7.8	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	0.1	0.1	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Future Volume (vph)	5	5	20	15	5	5	25	170	40	45	95	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.972			0.977			0.964	
Flt Protected		0.991			0.972			0.995			0.988	
Satd. Flow (prot)	0	1342	0	0	1701	0	0	1710	0	0	1657	0
Flt Permitted		0.991			0.972			0.995			0.988	
Satd. Flow (perm)	0	1342	0	0	1701	0	0	1710	0	0	1657	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	6	6	22	17	6	6	28	189	44	50	106	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	0	0	29	0	0	261	0	0	212	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 31.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	4.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	34	29	261	212
Demand Flow Rate, veh/h	41	29	267	219
Vehicles Circulating, veh/h	173	229	62	53
Vehicles Exiting, veh/h	99	100	152	205
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	3.5	4.6	4.3
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	41	29	267	219
Cap Entry Lane, veh/h	1157	1092	1295	1307
Entry HV Adj Factor	0.829	1.000	0.978	0.968
Flow Entry, veh/h	34	29	261	212
Cap Entry, veh/h	959	1092	1267	1265
V/C Ratio	0.035	0.027	0.206	0.168
Control Delay, s/veh	4.1	3.5	4.6	4.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Future Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.976			0.964			0.957	
Flt Protected	0.950			0.950				0.993			0.984	
Satd. Flow (prot)	1710	1733	0	1710	1701	0	0	1663	0	0	1574	0
Flt Permitted	0.950			0.950				0.993			0.984	
Satd. Flow (perm)	1710	1733	0	1710	1701	0	0	1663	0	0	1574	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	67	489	22	22	328	61	11	50	22	50	56	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	511	0	22	389	0	0	83	0	0	156	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	22.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Future Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	67	489	22	22	328	61	11	50	22	50	56	50
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	29.5	18.9	11.2	12.3
HCM LOS	D	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	100%	0%	100%	0%	32%
Vol Thru, %	60%	0%	96%	0%	84%	36%
Vol Right, %	27%	0%	4%	0%	16%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	60	460	20	350	140
LT Vol	10	60	0	20	0	45
Through Vol	45	0	440	0	295	50
RT Vol	20	0	20	0	55	45
Lane Flow Rate	83	67	511	22	389	156
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.16	0.118	0.837	0.041	0.649	0.288
Departure Headway (Hd)	6.907	6.38	5.894	6.597	6.011	6.657
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	522	558	608	538	595	543
Service Time	4.917	4.163	3.676	4.389	3.802	4.657
HCM Lane V/C Ratio	0.159	0.12	0.84	0.041	0.654	0.287
HCM Control Delay	11.2	10	32	9.7	19.4	12.3
HCM Lane LOS	B	A	D	A	C	B
HCM 95th-tile Q	0.6	0.4	8.9	0.1	4.7	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Future Volume (vph)	60	440	20	20	295	55	10	45	20	45	50	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.976			0.964			0.957	
Flt Protected	0.950			0.950				0.993			0.984	
Satd. Flow (prot)	1710	1733	0	1710	1701	0	0	1663	0	0	1574	0
Flt Permitted	0.950			0.950				0.993			0.984	
Satd. Flow (perm)	1710	1733	0	1710	1701	0	0	1663	0	0	1574	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	67	489	22	22	328	61	11	50	22	50	56	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	511	0	22	389	0	0	83	0	0	156	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Future Vol, veh/h	60	440	20	20	295	55	10	45	20	45	50	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	67	489	22	22	328	61	11	50	22	50	56	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	389	0	0	511	0	0	1090	1067	500	1073	1048	359
Stage 1	-	-	-	-	-	-	634	634	-	403	403	-
Stage 2	-	-	-	-	-	-	456	433	-	670	645	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.56	6.2	7.1	6.5	6.44
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.054	3.3	3.5	4	3.516
Pot Cap-1 Maneuver	1181	-	-	1065	-	-	194	218	575	200	230	639
Stage 1	-	-	-	-	-	-	471	467	-	628	603	-
Stage 2	-	-	-	-	-	-	588	575	-	450	471	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1181	-	-	1065	-	-	135	201	575	147	212	639
Mov Cap-2 Maneuver	-	-	-	-	-	-	135	201	-	147	212	-
Stage 1	-	-	-	-	-	-	444	440	-	592	590	-
Stage 2	-	-	-	-	-	-	481	563	-	362	444	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.5	30.1	48.6
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	1181	-	-	1065	-	-	229
HCM Lane V/C Ratio	0.37	0.056	-	-	0.021	-	-	0.679
HCM Control Delay (s)	30.1	8.2	-	-	8.5	-	-	48.6
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.6	0.2	-	-	0.1	-	-	4.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2	200	10	5	2	245	30	5	5	65	45
Future Volume (vph)	25	2	200	10	5	2	245	30	5	5	65	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.881			0.986			0.997			0.947	
Flt Protected		0.994			0.972			0.958			0.998	
Satd. Flow (prot)	0	1506	0	0	1725	0	0	1683	0	0	1602	0
Flt Permitted		0.994			0.972			0.958			0.998	
Satd. Flow (perm)	0	1506	0	0	1725	0	0	1683	0	0	1602	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	42%	0%	0%	0%	0%	0%	1%	3%	50%	0%	11%	0%
Adj. Flow (vph)	28	2	222	11	6	2	272	33	6	6	72	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	252	0	0	19	0	0	311	0	0	128	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	4.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	252	19	311	128
Demand Flow Rate, veh/h	264	19	318	136
Vehicles Circulating, veh/h	97	349	48	292
Vehicles Exiting, veh/h	331	17	313	76
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.9	3.9	4.9	5.0
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	264	19	318	136
Cap Entry Lane, veh/h	1250	967	1314	1024
Entry HV Adj Factor	0.955	1.000	0.978	0.942
Flow Entry, veh/h	252	19	311	128
Cap Entry, veh/h	1193	967	1285	965
V/C Ratio	0.211	0.020	0.242	0.133
Control Delay, s/veh	4.9	3.9	4.9	5.0
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	0

2030 INTERIM CONDITIONS (BUILD ALTERNATIVES) - PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	595	295	45	640	0	0	0	0	50	0	190
Future Volume (vph)	0	595	295	45	640	0	0	0	0	50	0	190
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	150		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	1676	1500	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	1676	1500	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	661	328	50	711	0	0	0	0	56	0	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	661	328	50	711	0	0	0	0	56	211	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	595	295	45	640	0	0	0	0	50	0	190
Future Vol, veh/h	0	595	295	45	640	0	0	0	0	50	0	190
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	661	328	50	711	0	0	0	0	56	0	211

Major/Minor	Major1			Major2				Minor2		
Conflicting Flow All	-	0	0	989	0	0		1142	1800	356
Stage 1	-	-	-	-	-	-		811	811	-
Stage 2	-	-	-	-	-	-		331	989	-
Critical Hdwy	-	-	-	4.14	-	-		6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-		5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-		3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	695	-	0		194	79	640
Stage 1	0	-	-	-	-	0		397	391	-
Stage 2	0	-	-	-	-	0		700	323	-
Platoon blocked, %		-	-		-					
Mov Cap-1 Maneuver	-	-	-	695	-	-		180	0	640
Mov Cap-2 Maneuver	-	-	-	-	-	-		180	0	-
Stage 1	-	-	-	-	-	-		397	0	-
Stage 2	-	-	-	-	-	-		650	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.7	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	695	-	180	640
HCM Lane V/C Ratio	-	-	0.072	-	0.309	0.33
HCM Control Delay (s)	-	-	10.6	-	33.7	13.4
HCM Lane LOS	-	-	B	-	D	B
HCM 95th %tile Q(veh)	-	-	0.2	-	1.2	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Future Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		150	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.995			0.854			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	3222	0	1286	3276	0	1660	1331	0	1710	1537	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3222	0	1286	3276	0	1660	1331	0	1710	1537	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	72	800	33	22	967	33	61	1	33	22	1	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	833	0	22	1000	0	61	34	0	22	34	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	720	30	20	870	30	55	1	30	20	1	30
Future Vol, veh/h	65	720	30	20	870	30	55	1	30	20	1	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	42	33	4	0	3	0	16	0	0	0
Mvmt Flow	72	800	33	22	967	33	61	1	33	22	1	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1000	0	0	833	0	0	1489	2005	417	1573	2005	500
Stage 1	-	-	-	-	-	-	961	961	-	1028	1028	-
Stage 2	-	-	-	-	-	-	528	1044	-	545	977	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.56	6.5	7.22	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.53	-	-	3.53	4	3.46	3.5	4	3.3
Pot Cap-1 Maneuver	700	-	-	625	-	-	85	60	547	76	60	522
Stage 1	-	-	-	-	-	-	273	337	-	254	314	-
Stage 2	-	-	-	-	-	-	499	309	-	495	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	700	-	-	625	-	-	70	52	547	63	52	522
Mov Cap-2 Maneuver	-	-	-	-	-	-	70	52	-	63	52	-
Stage 1	-	-	-	-	-	-	245	302	-	228	303	-
Stage 2	-	-	-	-	-	-	449	298	-	415	298	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.2	115.7	44.4
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	70	418	700	-	-	625	-	-	63	404
HCM Lane V/C Ratio	0.873	0.082	0.103	-	-	0.036	-	-	0.353	0.085
HCM Control Delay (s)	172.8	14.4	10.7	-	-	11	-	-	90.5	14.7
HCM Lane LOS	F	B	B	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	4.3	0.3	0.3	-	-	0.1	-	-	1.3	0.3

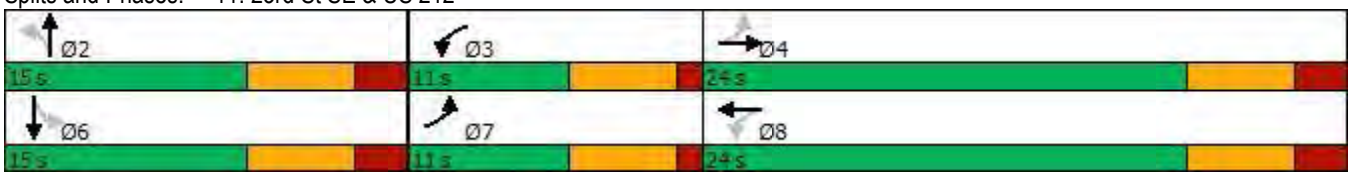
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Future Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		150	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.995			0.953			0.920	
Flt Protected	0.950			0.950				0.969			0.981	
Satd. Flow (prot)	1710	3222	0	1286	3276	0	0	1546	0	0	1625	0
Flt Permitted	0.220			0.338				0.772			0.830	
Satd. Flow (perm)	396	3222	0	457	3276	0	0	1232	0	0	1374	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			8			33			33	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	72	800	33	22	967	33	61	1	33	22	1	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	833	0	22	1000	0	0	95	0	0	56	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	12.0		5.0	13.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	19.0		11.0	19.0		13.0	13.0		13.0	13.0	
Total Split (s)	11.0	24.0		11.0	24.0		15.0	15.0		15.0	15.0	
Total Split (%)	22.0%	48.0%		22.0%	48.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0			6.0			6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	28.3	29.6		26.6	25.9			8.3			8.3	
Actuated g/C Ratio	0.68	0.71		0.63	0.62			0.20			0.20	
v/c Ratio	0.16	0.37		0.05	0.49			0.35			0.19	
Control Delay	4.8	7.4		4.7	13.0			17.0			12.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.8	7.4		4.7	13.0			17.0			12.3	
LOS	A	A		A	B			B			B	
Approach Delay		7.2			12.8			17.0			12.3	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	7	55		2	129			16			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	19	160		8	#237			50			29	
Internal Link Dist (ft)		822			1251			401			253	
Turn Bay Length (ft)	130			150								
Base Capacity (vph)	468	2280		416	2027			307			339	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.15	0.37		0.05	0.49			0.31			0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 41.9			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 10.5		Intersection LOS: B	
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			

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

Splits and Phases: 11: 23rd St SE & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	720	30	20	870	30	55	1	30	20	1	30
Future Volume (veh/h)	65	720	30	20	870	30	55	1	30	20	1	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	1800	1744	1210	1337	1744	1800	1758	1800	1575	1800	1800	1800
Adj Flow Rate, veh/h	72	800	33	22	967	33	61	1	33	22	1	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	4	42	33	4	0	3	0	16	0	0	0
Cap, veh/h	358	1351	56	323	1227	42	256	26	73	176	35	127
Arrive On Green	0.07	0.42	0.42	0.03	0.38	0.38	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1714	3243	134	1273	3269	112	793	186	521	382	251	908
Grp Volume(v), veh/h	72	409	424	22	490	510	95	0	0	56	0	0
Grp Sat Flow(s),veh/h/ln	1714	1657	1720	1273	1657	1724	1500	0	0	1540	0	0
Q Serve(g_s), s	1.0	7.8	7.8	0.4	10.7	10.7	1.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	7.8	7.8	0.4	10.7	10.7	2.2	0.0	0.0	1.3	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.06	0.64		0.35	0.39		0.59
Lane Grp Cap(c), veh/h	358	690	717	323	622	647	355	0	0	339	0	0
V/C Ratio(X)	0.20	0.59	0.59	0.07	0.79	0.79	0.27	0.00	0.00	0.17	0.00	0.00
Avail Cap(c_a), veh/h	492	729	757	475	729	759	470	0	0	457	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.2	9.2	9.2	7.9	11.3	11.3	16.0	0.0	0.0	15.6	0.0	0.0
Incr Delay (d2), s/veh	0.3	1.2	1.1	0.1	5.0	4.8	0.4	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	0.2	1.9	2.0	0.1	3.3	3.4	0.7	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	10.4	10.4	8.0	16.3	16.1	16.4	0.0	0.0	15.9	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	B	A	A	B	A	A
Approach Vol, veh/h		905			1022			95			56	
Approach Delay, s/veh		10.2			16.0			16.4			15.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.7	6.1	23.0		11.7	7.8	21.4				
Change Period (Y+Rc), s		6.0	5.0	6.0		6.0	5.0	6.0				
Max Green Setting (Gmax), s		9.0	6.0	18.0		9.0	6.0	18.0				
Max Q Clear Time (g_c+I1), s		4.2	2.4	9.8		3.3	3.0	12.7				
Green Ext Time (p_c), s		0.1	0.0	3.0		0.1	0.0	2.6				

Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	100	30	15	50	0	0	0	0	2	2	85
Future Volume (vph)	0	100	30	15	50	0	0	0	0	2	2	85
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	0		150	150		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.871	
Flt Protected				0.950							0.999	
Satd. Flow (prot)	0	1667	1417	1583	1667	0	0	0	0	0	1450	0
Flt Permitted				0.950							0.999	
Satd. Flow (perm)	0	1667	1417	1583	1667	0	0	0	0	0	1450	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	111	33	17	56	0	0	0	0	2	2	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	33	17	56	0	0	0	0	0	98	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	100	30	15	50	0	0	0	0	2	2	85
Future Vol, veh/h	0	100	30	15	50	0	0	0	0	2	2	85
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	111	33	17	56	0	0	0	0	2	2	94

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	144	0	0	218	234	56
Stage 1	-	-	-	-	-	-	90	90	-
Stage 2	-	-	-	-	-	-	128	144	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1438	-	0	770	666	1011
Stage 1	0	-	-	-	-	0	934	820	-
Stage 2	0	-	-	-	-	0	898	778	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1438	-	-	761	0	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	761	0	-
Stage 1	-	-	-	-	-	-	934	0	-
Stage 2	-	-	-	-	-	-	887	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.7	9
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1438	-	1003
HCM Lane V/C Ratio	-	-	0.012	-	0.099
HCM Control Delay (s)	-	-	7.5	-	9
HCM Lane LOS	-	-	A	-	A
HCM 95th %tile Q(veh)	-	-	0	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	75	20	45	75	15	25	25	45	10	30	20
Future Volume (vph)	25	75	20	45	75	15	25	25	45	10	30	20
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.936			0.955	
Flt Protected	0.950			0.950				0.987			0.992	
Satd. Flow (prot)	1583	1667	1417	1583	1667	1417	0	1540	0	0	1579	0
Flt Permitted	0.950			0.950				0.987			0.992	
Satd. Flow (perm)	1583	1667	1417	1583	1667	1417	0	1540	0	0	1579	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	83	22	50	83	17	28	28	50	11	33	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	83	22	50	83	17	0	106	0	0	66	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	75	20	45	75	15	25	25	45	10	30	20
Future Vol, veh/h	25	75	20	45	75	15	25	25	45	10	30	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	83	22	50	83	17	28	28	50	11	33	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	100	0	0	105	0	0	358	339	83	372	344	83
Stage 1	-	-	-	-	-	-	139	139	-	183	183	-
Stage 2	-	-	-	-	-	-	219	200	-	189	161	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1493	-	-	1486	-	-	597	582	976	585	579	976
Stage 1	-	-	-	-	-	-	864	782	-	819	748	-
Stage 2	-	-	-	-	-	-	783	736	-	813	765	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1493	-	-	1486	-	-	534	552	976	513	549	976
Mov Cap-2 Maneuver	-	-	-	-	-	-	534	552	-	513	549	-
Stage 1	-	-	-	-	-	-	848	767	-	803	723	-
Stage 2	-	-	-	-	-	-	705	711	-	729	750	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	2.5	11.2	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	687	1493	-	-	1486	-	-	634
HCM Lane V/C Ratio	0.154	0.019	-	-	0.034	-	-	0.105
HCM Control Delay (s)	11.2	7.5	-	-	7.5	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	75	20	45	75	15	25	25	45	10	30	20
Future Volume (vph)	25	75	20	45	75	15	25	25	45	10	30	20
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.985			0.936			0.955	
Flt Protected		0.990			0.984			0.987			0.992	
Satd. Flow (prot)	0	1614	0	0	1615	0	0	1540	0	0	1579	0
Flt Permitted		0.990			0.984			0.987			0.992	
Satd. Flow (perm)	0	1614	0	0	1615	0	0	1540	0	0	1579	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	83	22	50	83	17	28	28	50	11	33	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	150	0	0	106	0	0	66	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 29.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	3.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	133	150	106	66
Demand Flow Rate, veh/h	136	153	109	67
Vehicles Circulating, veh/h	96	87	125	165
Vehicles Exiting, veh/h	136	147	107	75
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.8	3.9	3.8	3.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	136	153	109	67
Cap Entry Lane, veh/h	1251	1263	1215	1166
Entry HV Adj Factor	0.980	0.983	0.976	0.990
Flow Entry, veh/h	133	150	106	66
Cap Entry, veh/h	1227	1241	1186	1155
V/C Ratio	0.109	0.121	0.090	0.057
Control Delay, s/veh	3.8	3.9	3.8	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	2	20	170	10	215	10	270	35	30	265	35
Future Volume (vph)	55	2	20	170	10	215	10	270	35	30	265	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.862			0.867			0.983				0.850
Flt Protected	0.950			0.950	0.996		0.950			0.950		
Satd. Flow (prot)	1710	1321	0	1624	1477	0	1024	1587	0	1710	1667	1275
Flt Permitted	0.950			0.950	0.996		0.950			0.950		
Satd. Flow (perm)	1710	1321	0	1624	1477	0	1024	1587	0	1710	1667	1275
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	61	2	22	189	11	239	11	300	39	33	294	39
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	61	24	0	170	269	0	11	339	0	33	294	39
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	2	20	170	10	215	10	270	35	30	265	35
Future Vol, veh/h	55	2	20	170	10	215	10	270	35	30	265	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	100	10	0	0	0	67	13	0	0	8	20
Mvmt Flow	61	2	22	189	11	239	11	300	39	33	294	39

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	827	721	294	734	741	320	333	0	0	339	0	0
Stage 1	360	360	-	342	342	-	-	-	-	-	-	-
Stage 2	467	361	-	392	399	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.3	7.1	6.5	6.2	4.77	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.39	3.5	4	3.3	2.803	-	-	2.2	-	-
Pot Cap-1 Maneuver	293	257	727	338	347	725	938	-	-	1231	-	-
Stage 1	662	485	-	677	642	-	-	-	-	-	-	-
Stage 2	580	485	-	637	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	186	247	727	316	333	725	938	-	-	1231	-	-
Mov Cap-2 Maneuver	186	247	-	316	333	-	-	-	-	-	-	-
Stage 1	654	472	-	669	634	-	-	-	-	-	-	-
Stage 2	378	479	-	598	590	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.1	20.6	0.3	0.7
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	938	-	-	186	618	316	557	1231	-	-
HCM Lane V/C Ratio	0.012	-	-	0.329	0.04	0.398	0.562	0.027	-	-
HCM Control Delay (s)	8.9	-	-	33.5	11.1	23.7	19.4	8	-	-
HCM Lane LOS	A	-	-	D	B	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0.1	1.8	3.5	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	2	20	170	10	215	10	270	35	30	265	35
Future Volume (vph)	55	2	20	170	10	215	10	270	35	30	265	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.927			0.985			0.986	
Flt Protected		0.965			0.979			0.998			0.996	
Satd. Flow (prot)	0	1597	0	0	1634	0	0	1562	0	0	1628	0
Flt Permitted		0.965			0.979			0.998			0.996	
Satd. Flow (perm)	0	1597	0	0	1634	0	0	1562	0	0	1628	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	61	2	22	189	11	239	11	300	39	33	294	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	439	0	0	350	0	0	366	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	85	439	350	366
Demand Flow Rate, veh/h	89	439	396	398
Vehicles Circulating, veh/h	540	418	98	218
Vehicles Exiting, veh/h	76	76	531	639
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.9	10.2	6.4	7.3
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	89	439	396	398
Cap Entry Lane, veh/h	796	901	1249	1105
Entry HV Adj Factor	0.955	1.000	0.884	0.921
Flow Entry, veh/h	85	439	350	366
Cap Entry, veh/h	760	901	1104	1017
V/C Ratio	0.112	0.487	0.317	0.360
Control Delay, s/veh	5.9	10.2	6.4	7.3
LOS	A	B	A	A
95th %tile Queue, veh	0	3	1	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	285	15	15	380	10	10	20	20	15	15	15
Future Volume (vph)	10	285	15	15	380	10	10	20	20	15	15	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.996			0.946			0.955	
Flt Protected	0.950			0.950				0.990			0.984	
Satd. Flow (prot)	1710	1769	0	1710	1715	0	0	1686	0	0	1691	0
Flt Permitted	0.950			0.950				0.990			0.984	
Satd. Flow (perm)	1710	1769	0	1710	1715	0	0	1686	0	0	1691	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	317	17	17	422	11	11	22	22	17	17	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	334	0	17	433	0	0	55	0	0	51	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	285	15	15	380	10	10	20	20	15	15	15
Future Vol, veh/h	10	285	15	15	380	10	10	20	20	15	15	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	11	317	17	17	422	11	11	22	22	17	17	17
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	12.6	15.7	9.3	9.4
HCM LOS	B	C	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	20%	100%	0%	100%	0%	33%
Vol Thru, %	40%	0%	95%	0%	97%	33%
Vol Right, %	40%	0%	5%	0%	3%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	10	300	15	390	45
LT Vol	10	10	0	15	0	15
Through Vol	20	0	285	0	380	15
RT Vol	20	0	15	0	10	15
Lane Flow Rate	56	11	333	17	433	50
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.089	0.018	0.479	0.026	0.619	0.081
Departure Headway (Hd)	5.777	5.692	5.17	5.596	5.143	5.856
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	624	625	693	636	698	616
Service Time	3.777	3.463	2.941	3.364	2.91	3.858
HCM Lane V/C Ratio	0.09	0.018	0.481	0.027	0.62	0.081
HCM Control Delay	9.3	8.6	12.7	8.5	16	9.4
HCM Lane LOS	A	A	B	A	C	A
HCM 95th-tile Q	0.3	0.1	2.6	0.1	4.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	285	15	15	380	10	10	20	20	15	15	15
Future Volume (vph)	10	285	15	15	380	10	10	20	20	15	15	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.996			0.946			0.955	
Flt Protected	0.950			0.950				0.990			0.984	
Satd. Flow (prot)	1710	1769	0	1710	1715	0	0	1686	0	0	1691	0
Flt Permitted	0.950			0.950				0.990			0.984	
Satd. Flow (perm)	1710	1769	0	1710	1715	0	0	1686	0	0	1691	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	317	17	17	422	11	11	22	22	17	17	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	334	0	17	433	0	0	55	0	0	51	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	285	15	15	380	10	10	20	20	15	15	15
Future Vol, veh/h	10	285	15	15	380	10	10	20	20	15	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	11	317	17	17	422	11	11	22	22	17	17	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	433	0	0	334	0	0	827	815	326	832	818	428
Stage 1	-	-	-	-	-	-	348	348	-	462	462	-
Stage 2	-	-	-	-	-	-	479	467	-	370	356	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1137	-	-	1237	-	-	293	314	720	291	313	631
Stage 1	-	-	-	-	-	-	672	638	-	584	568	-
Stage 2	-	-	-	-	-	-	571	565	-	654	633	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1137	-	-	1237	-	-	269	306	720	262	305	631
Mov Cap-2 Maneuver	-	-	-	-	-	-	269	306	-	262	305	-
Stage 1	-	-	-	-	-	-	665	632	-	578	560	-
Stage 2	-	-	-	-	-	-	532	557	-	606	627	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	16	17.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	384	1137	-	-	1237	-	-	346
HCM Lane V/C Ratio	0.145	0.01	-	-	0.013	-	-	0.145
HCM Control Delay (s)	16	8.2	-	-	8	-	-	17.2
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	275	10	5	2	255	75	5	5	55	35
Future Volume (vph)	20	5	275	10	5	2	255	75	5	5	55	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.876			0.986			0.998			0.950	
Flt Protected		0.997			0.972			0.963			0.997	
Satd. Flow (prot)	0	1552	0	0	1723	0	0	1709	0	0	1596	0
Flt Permitted		0.997			0.972			0.963			0.997	
Satd. Flow (perm)	0	1552	0	0	1723	0	0	1709	0	0	1596	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	0%	1%	0%	0%	1%	1%	2%	0%	100%	2%	0%
Adj. Flow (vph)	22	6	306	11	6	2	283	83	6	6	61	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	0	19	0	0	372	0	0	106	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	5.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	334	19	372	106
Demand Flow Rate, veh/h	338	19	377	113
Vehicles Circulating, veh/h	85	394	41	303
Vehicles Exiting, veh/h	331	24	382	110
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.3	4.1	5.3	4.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	338	19	377	113
Cap Entry Lane, veh/h	1265	923	1323	1013
Entry HV Adj Factor	0.988	1.000	0.988	0.936
Flow Entry, veh/h	334	19	372	106
Cap Entry, veh/h	1250	923	1307	948
V/C Ratio	0.267	0.021	0.285	0.112
Control Delay, s/veh	5.3	4.1	5.3	4.8
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	0

2040 PLANNING HORIZON CONDITIONS (BUILD ALTERNATIVES) - AM

US 212 & Interstate 29 SB Exit 177 RTI (TWSC – Additional SB LT Lane)
US 212 & 23rd Street SE (TWSC – Additional EB RT, NB LT, and SB LT Lanes)
US 212 & 23rd Street SE (Signal)
US 81 & Interstate 29 NB Exit 180 RTI (TWSC – Additional EB LT Lane)
US 81 & Interstate 29 SB Exit 180 RTI (TWSC – Additional EB RT and WB LT Lanes)
US 81 & 19th Street NE (TWSC – Additional EB LT, EB RT, WB LT, and WB RT Lanes)
US 81 & 19th Street NE (Roundabout)
US 81 & 18th Avenue NE (TWSC – Additional WB LT Lane)
29th Street SE & 15th Avenue SE (TWSC – Additional EB LT, WB LT, NBRT, and SB RT Lanes)
29th Street SE & 15th Avenue SE (Roundabout)
29th Street SE & 15th Avenue SE (Signal)
N Maple Street & 14th Avenue NE (AWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT, WB LT, NB LT, and SB LT Lanes)
19th Street NE & 14th Avenue NE (Roundabout)

2040 PLANNING HORIZON CONDITIONS (BUILD ALTERNATIVES) - PM

US 212 & Interstate 29 SB Exit 177 RTI (TWSC – Additional SB LT Lane)
US 212 & 23rd Street SE (TWSC – Additional EB RT, NB LT, and SB LT Lanes)
US 212 & 23rd Street SE (Signal)
US 81 & Interstate 29 NB Exit 180 RTI (TWSC – Additional EB LT Lane)
US 81 & Interstate 29 SB Exit 180 RTI (TWSC – Additional EB RT and WB LT Lanes)
US 81 & 19th Street NE (TWSC – Additional EB LT, EB RT, WB LT, and WB RT Lanes)
US 81 & 19th Street NE (Roundabout)
US 81 & 18th Avenue NE (TWSC – Additional WB LT Lane)
29th Street SE & 15th Avenue SE (TWSC – Additional EB LT, WB LT, NBRT, and SB RT Lanes)
29th Street SE & 15th Avenue SE (Roundabout)
29th Street SE & 15th Avenue SE (Signal)
N Maple Street & 14th Avenue NE (AWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT and WB LT Lanes)
N Maple Street & 14th Avenue NE (TWSC – Additional EB LT, WB LT, NB LT, and SB LT Lanes)
19th Street NE & 14th Avenue NE (Roundabout)

2040 PLANNING HORIZON CONDITIONS (BUILD ALTERNATIVES) - AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	385	165	45	750	0	0	0	0	30	5	120
Future Volume (vph)	0	385	165	45	750	0	0	0	0	30	5	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	150		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.856	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	1676	1511	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	1676	1511	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	428	183	50	833	0	0	0	0	33	6	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	428	183	50	833	0	0	0	0	33	139	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	385	165	45	750	0	0	0	0	30	5	120
Future Vol, veh/h	0	385	165	45	750	0	0	0	0	30	5	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	428	183	50	833	0	0	0	0	33	6	133

Major/Minor	Major1			Major2				Minor2		
Conflicting Flow All	-	0	0	611	0	0		1147	1544	417
Stage 1	-	-	-	-	-	-		933	933	-
Stage 2	-	-	-	-	-	-		214	611	-
Critical Hdwy	-	-	-	4.14	-	-		6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-		5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-		3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	964	-	0		192	114	585
Stage 1	0	-	-	-	-	0		343	343	-
Stage 2	0	-	-	-	-	0		801	482	-
Platoon blocked, %		-	-		-					
Mov Cap-1 Maneuver	-	-	-	964	-	-		182	0	585
Mov Cap-2 Maneuver	-	-	-	-	-	-		182	0	-
Stage 1	-	-	-	-	-	-		343	0	-
Stage 2	-	-	-	-	-	-		759	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.5	16.2
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	964	-	182	585
HCM Lane V/C Ratio	-	-	0.052	-	0.183	0.237
HCM Control Delay (s)	-	-	8.9	-	29.2	13.1
HCM Lane LOS	-	-	A	-	D	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.7	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Future Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.860			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	3353	1530	1513	3276	0	1437	1218	0	1710	1539	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3353	1530	1513	3276	0	1437	1218	0	1710	1539	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	517	61	28	539	17	44	2	28	28	2	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	517	61	28	556	0	44	30	0	28	63	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	465	55	25	485	15	40	2	25	25	2	55
Future Vol, veh/h	45	465	55	25	485	15	40	2	25	25	2	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	150	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	13	4	0	19	0	29	0	0	0
Mvmt Flow	50	517	61	28	539	17	44	2	28	28	2	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	556	0	0	578	0	0	944	1229	259	964	1282	278
Stage 1	-	-	-	-	-	-	617	617	-	604	604	-
Stage 2	-	-	-	-	-	-	327	612	-	360	678	-
Critical Hdwy	4.1	-	-	4.36	-	-	7.88	6.5	7.48	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.88	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.33	-	-	3.69	4	3.59	3.5	4	3.3
Pot Cap-1 Maneuver	1025	-	-	920	-	-	193	179	664	213	167	725
Stage 1	-	-	-	-	-	-	405	484	-	457	491	-
Stage 2	-	-	-	-	-	-	615	487	-	636	455	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	920	-	-	164	165	664	190	154	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	164	165	-	190	154	-
Stage 1	-	-	-	-	-	-	385	460	-	435	476	-
Stage 2	-	-	-	-	-	-	543	472	-	577	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	25.7	16.1
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	164	542	1025	-	-	920	-	-	190	642
HCM Lane V/C Ratio	0.271	0.055	0.049	-	-	0.03	-	-	0.146	0.099
HCM Control Delay (s)	34.9	12	8.7	-	-	9	-	-	27.2	11.2
HCM Lane LOS	D	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	1	0.2	0.2	-	-	0.1	-	-	0.5	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Future Volume (vph)	45	465	55	25	485	15	40	2	25	25	2	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.949			0.910	
Flt Protected	0.950			0.950				0.971			0.985	
Satd. Flow (prot)	1710	3306	0	1513	3276	0	0	1357	0	0	1613	0
Flt Permitted	0.427			0.434				0.765			0.869	
Satd. Flow (perm)	769	3306	0	691	3276	0	0	1069	0	0	1423	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			7			28			61	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	13%	4%	0%	19%	0%	29%	0%	0%	0%
Adj. Flow (vph)	50	517	61	28	539	17	44	2	28	28	2	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	578	0	28	556	0	0	74	0	0	91	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	13.0		5.0	13.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	19.0		11.0	19.0		13.0	13.0		13.0	13.0	
Total Split (s)	11.0	19.0		11.0	19.0		15.0	15.0		15.0	15.0	
Total Split (%)	24.4%	42.2%		24.4%	42.2%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	21.9	23.9		20.9	22.1			7.9			7.9	
Actuated g/C Ratio	0.59	0.65		0.56	0.60			0.21			0.21	
v/c Ratio	0.09	0.27		0.06	0.28			0.30			0.26	
Control Delay	5.6	7.4		5.8	9.6			13.9			9.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.6	7.4		5.8	9.6			13.9			9.6	
LOS	A	A		A	A			B			A	
Approach Delay		7.2			9.4			13.9			9.6	
Approach LOS		A			A			B			A	
Queue Length 50th (ft)	5	31		3	31			6			4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	16	102		11	102			37			34	
Internal Link Dist (ft)		822			1251			401			253	
Turn Bay Length (ft)	130			150								
Base Capacity (vph)	586	2145		504	1958			289			403	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.27		0.06	0.28			0.26			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 37			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 42.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 11: 23rd St SE & US 212

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	465	55	25	485	15	40	2	25	25	2	55
Future Volume (veh/h)	45	465	55	25	485	15	40	2	25	25	2	55
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	1800	1772	1800	1617	1744	1800	1533	1800	1393	1800	1800	1800
Adj Flow Rate, veh/h	50	517	61	28	539	17	44	2	28	28	2	61
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0	13	4	0	19	0	29	0	0	0
Cap, veh/h	453	1075	126	405	1095	35	251	39	86	167	29	153
Arrive On Green	0.05	0.35	0.35	0.03	0.33	0.33	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1714	3034	357	1540	3279	103	689	259	577	310	193	1024
Grp Volume(v), veh/h	50	286	292	28	272	284	74	0	0	91	0	0
Grp Sat Flow(s),veh/h/ln	1714	1683	1708	1540	1657	1725	1524	0	0	1527	0	0
Q Serve(g_s), s	0.7	5.1	5.2	0.5	5.1	5.1	0.0	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.7	5.1	5.2	0.5	5.1	5.1	1.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.06	0.59		0.38	0.31		0.67
Lane Grp Cap(c), veh/h	453	596	605	405	553	576	376	0	0	350	0	0
V/C Ratio(X)	0.11	0.48	0.48	0.07	0.49	0.49	0.20	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	581	596	605	552	553	576	492	0	0	471	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.9	9.8	9.8	8.2	10.3	10.3	14.7	0.0	0.0	14.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.6	0.1	0.7	0.7	0.3	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	0.2	1.3	1.3	0.1	1.3	1.3	0.5	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.0	10.4	10.4	8.3	11.0	11.0	15.0	0.0	0.0	15.3	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	B	A	A	B	A	A
Approach Vol, veh/h		628			584			74			91	
Approach Delay, s/veh		10.2			10.9			15.0			15.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.8	7.3	19.8		11.8	8.1	19.0				
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s		9.0	5.0	13.0		9.0	5.0	13.0				
Max Q Clear Time (g_c+I1), s		3.5	2.5	7.2		4.0	2.7	7.1				
Green Ext Time (p_c), s		0.1	0.0	1.6		0.1	0.0	1.5				

Intersection Summary												
HCM 6th Ctrl Delay			11.1									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	25	0	0	70	10	80	5	5	0	0	0
Future Volume (vph)	125	25	0	0	70	10	80	5	5	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.983			0.992				
Flt Protected	0.950							0.958				
Satd. Flow (prot)	1583	1667	0	0	1638	0	0	1584	0	0	0	0
Flt Permitted	0.950							0.958				
Satd. Flow (perm)	1583	1667	0	0	1638	0	0	1584	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	28	0	0	78	11	89	6	6	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	28	0	0	89	0	0	101	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	25	0	0	70	10	80	5	5	0	0	0
Future Vol, veh/h	125	25	0	0	70	10	80	5	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	139	28	0	0	78	11	89	6	6	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	89	0	-	-	-	0	390	395	28
Stage 1	-	-	-	-	-	-	306	306	-
Stage 2	-	-	-	-	-	-	84	89	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1506	-	0	0	-	-	614	542	1047
Stage 1	-	-	0	0	-	-	747	662	-
Stage 2	-	-	0	0	-	-	939	821	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1506	-	-	-	-	-	558	0	1047
Mov Cap-2 Maneuver	-	-	-	-	-	-	558	0	-
Stage 1	-	-	-	-	-	-	678	0	-
Stage 2	-	-	-	-	-	-	939	0	-

Approach	EB	WB	NB
HCM Control Delay, s	6.4	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	574	1506	-	-	-
HCM Lane V/C Ratio	0.174	0.092	-	-	-
HCM Control Delay (s)	12.6	7.6	-	-	-
HCM Lane LOS	B	A	-	-	-
HCM 95th %tile Q(veh)	0.6	0.3	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	130	65	20	130	0	0	0	0	20	5	195
Future Volume (vph)	0	130	65	20	130	0	0	0	0	20	5	195
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	0		150	150		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.880	
Flt Protected				0.950							0.996	
Satd. Flow (prot)	0	1667	1417	1583	1667	0	0	0	0	0	1461	0
Flt Permitted				0.950							0.996	
Satd. Flow (perm)	0	1667	1417	1583	1667	0	0	0	0	0	1461	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	144	72	22	144	0	0	0	0	22	6	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	72	22	144	0	0	0	0	0	245	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	130	65	20	130	0	0	0	0	20	5	195
Future Vol, veh/h	0	130	65	20	130	0	0	0	0	20	5	195
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	144	72	22	144	0	0	0	0	22	6	217

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	216	0	0	368	404	144
Stage 1	-	-	-	-	-	-	188	188	-
Stage 2	-	-	-	-	-	-	180	216	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1354	-	0	632	536	903
Stage 1	0	-	-	-	-	0	844	745	-
Stage 2	0	-	-	-	-	0	851	724	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1354	-	-	622	0	903
Mov Cap-2 Maneuver	-	-	-	-	-	-	622	0	-
Stage 1	-	-	-	-	-	-	844	0	-
Stage 2	-	-	-	-	-	-	837	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1354	-	867
HCM Lane V/C Ratio	-	-	0.016	-	0.282
HCM Control Delay (s)	-	-	7.7	-	10.8
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Future Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.923			0.941	
Flt Protected	0.950			0.950				0.991			0.994	
Satd. Flow (prot)	1583	1667	1417	1583	1667	1417	0	1524	0	0	1559	0
Flt Permitted	0.950			0.950				0.991			0.994	
Satd. Flow (perm)	1583	1667	1417	1583	1667	1417	0	1524	0	0	1559	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	133	33	111	244	6	22	28	67	17	61	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	133	33	111	244	6	0	117	0	0	139	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	120	30	100	220	5	20	25	60	15	55	55
Future Vol, veh/h	25	120	30	100	220	5	20	25	60	15	55	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	133	33	111	244	6	22	28	67	17	61	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	250	0	0	166	0	0	719	661	133	719	688	244
Stage 1	-	-	-	-	-	-	189	189	-	466	466	-
Stage 2	-	-	-	-	-	-	530	472	-	253	222	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1316	-	-	1412	-	-	344	383	916	344	369	795
Stage 1	-	-	-	-	-	-	813	744	-	577	562	-
Stage 2	-	-	-	-	-	-	533	559	-	751	720	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1316	-	-	1412	-	-	253	345	916	277	333	795
Mov Cap-2 Maneuver	-	-	-	-	-	-	253	345	-	277	333	-
Stage 1	-	-	-	-	-	-	796	728	-	565	518	-
Stage 2	-	-	-	-	-	-	400	515	-	656	705	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.4	14.8	17.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	484	1316	-	-	1412	-	-	433
HCM Lane V/C Ratio	0.241	0.021	-	-	0.079	-	-	0.321
HCM Control Delay (s)	14.8	7.8	-	-	7.8	-	-	17.2
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.3	-	-	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Future Volume (vph)	25	120	30	100	220	5	20	25	60	15	55	55
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.998			0.923			0.941	
Flt Protected		0.993			0.985			0.991			0.994	
Satd. Flow (prot)	0	1617	0	0	1638	0	0	1524	0	0	1559	0
Flt Permitted		0.993			0.985			0.991			0.994	
Satd. Flow (perm)	0	1617	0	0	1638	0	0	1524	0	0	1559	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	133	33	111	244	6	22	28	67	17	61	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	0	0	361	0	0	117	0	0	139	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	5.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	194	361	117	139
Demand Flow Rate, veh/h	199	368	119	141
Vehicles Circulating, veh/h	192	80	182	384
Vehicles Exiting, veh/h	333	221	209	64
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.8	5.5	4.1	5.4
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	199	368	119	141
Cap Entry Lane, veh/h	1134	1272	1146	933
Entry HV Adj Factor	0.977	0.981	0.987	0.984
Flow Entry, veh/h	194	361	117	139
Cap Entry, veh/h	1108	1248	1131	918
V/C Ratio	0.175	0.289	0.104	0.151
Control Delay, s/veh	4.8	5.5	4.1	5.4
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1	40	185	1	20	20	165	85	15	305	5
Future Volume (vph)	2	1	40	185	1	20	20	165	85	15	305	5
Ideal Flow (vphpl)	1700	1700	1700	1800	1700	1800	1700	1800	1800	1800	1800	1700
Storage Length (ft)	0		0	150		0	150		0	190		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874			0.857				0.850		0.997	
Flt Protected		0.998		0.950			0.950			0.950		
Satd. Flow (prot)	0	1454	0	1676	1428	0	1583	1765	1500	1676	1759	0
Flt Permitted		0.998		0.950			0.950			0.950		
Satd. Flow (perm)	0	1454	0	1676	1428	0	1583	1765	1500	1676	1759	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		450			791			1566			1307	
Travel Time (s)		12.3			21.6			30.5			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	1	44	206	1	22	22	183	94	17	339	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	206	23	0	22	183	94	17	345	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	40	185	1	20	20	165	85	15	305	5
Future Vol, veh/h	2	1	40	185	1	20	20	165	85	15	305	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	150	-	0	190	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	1	44	206	1	22	22	183	94	17	339	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	662	697	342	626	606	183	345	0	0	277	0	0
Stage 1	376	376	-	227	227	-	-	-	-	-	-	-
Stage 2	286	321	-	399	379	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	375	365	701	397	411	859	1214	-	-	1286	-	-
Stage 1	645	616	-	776	716	-	-	-	-	-	-	-
Stage 2	721	652	-	627	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	356	354	701	362	398	859	1214	-	-	1286	-	-
Mov Cap-2 Maneuver	356	354	-	362	398	-	-	-	-	-	-	-
Stage 1	633	608	-	762	703	-	-	-	-	-	-	-
Stage 2	689	640	-	578	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	25.4	0.6	0.4
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	656	362	814	1286	-	-
HCM Lane V/C Ratio	0.018	-	-	0.073	0.568	0.029	0.013	-	-
HCM Control Delay (s)	8	-	-	10.9	27.2	9.6	7.8	-	-
HCM Lane LOS	A	-	-	B	D	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	3.4	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.876			0.889				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	1240	0	1710	1600	0	1583	1765	1530	1710	1800	1354
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	1240	0	1710	1600	0	1583	1765	1530	1710	1800	1354
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	11	6	28	22	6	17	33	206	50	56	117	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	34	0	22	23	0	33	206	50	56	117	61
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	25	20	5	15	30	185	45	50	105	55
Future Vol, veh/h	10	5	25	20	5	15	30	185	45	50	105	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	33	0	0	0	8	2	0	0	0	13
Mvmt Flow	11	6	28	22	6	17	33	206	50	56	117	61

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	538	551	117	549	562	206	178	0	0	256	0	0
Stage 1	229	229	-	272	272	-	-	-	-	-	-	-
Stage 2	309	322	-	277	290	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	457	445	858	450	439	840	1362	-	-	1321	-	-
Stage 1	778	718	-	738	688	-	-	-	-	-	-	-
Stage 2	705	655	-	734	676	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	421	416	858	410	410	840	1362	-	-	1321	-	-
Mov Cap-2 Maneuver	421	416	-	410	410	-	-	-	-	-	-	-
Stage 1	759	688	-	720	671	-	-	-	-	-	-	-
Stage 2	669	639	-	675	648	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	12.5	0.9	1.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1362	-	-	421	729	410	666	1321	-	-
HCM Lane V/C Ratio	0.024	-	-	0.026	0.046	0.054	0.033	0.042	-	-
HCM Control Delay (s)	7.7	-	-	13.8	10.2	14.3	10.6	7.8	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.2	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.916			0.949			0.977			0.965	
Flt Protected		0.988			0.976			0.994			0.988	
Satd. Flow (prot)	0	1352	0	0	1667	0	0	1708	0	0	1660	0
Flt Permitted		0.988			0.976			0.994			0.988	
Satd. Flow (perm)	0	1352	0	0	1667	0	0	1708	0	0	1660	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	11	6	28	22	6	17	33	206	50	56	117	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	45	0	0	289	0	0	234	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 33.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	4.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	45	45	289	234
Demand Flow Rate, veh/h	54	45	296	242
Vehicles Circulating, veh/h	195	257	73	64
Vehicles Exiting, veh/h	111	112	176	238
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.2	3.8	4.9	4.5
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	54	45	296	242
Cap Entry Lane, veh/h	1131	1062	1281	1293
Entry HV Adj Factor	0.833	1.000	0.976	0.967
Flow Entry, veh/h	45	45	289	234
Cap Entry, veh/h	942	1062	1250	1250
V/C Ratio	0.048	0.042	0.231	0.187
Control Delay, s/veh	4.2	3.8	4.9	4.5
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.916			0.949			0.971			0.949	
Flt Protected		0.988			0.976		0.950			0.950		
Satd. Flow (prot)	0	1352	0	0	1667	0	1583	1720	0	1710	1635	0
Flt Permitted							0.645			0.601		
Satd. Flow (perm)	0	1368	0	0	1708	0	1075	1720	0	1082	1635	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			17			42			61	
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	0%	0%	8%	2%	0%	0%	0%	13%
Adj. Flow (vph)	11	6	28	22	6	17	33	206	50	56	117	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	45	0	33	256	0	56	178	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0		16.0	16.0	
Total Split (s)	15.0	15.0		15.0	15.0		25.0	25.0		25.0	25.0	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		62.5%	62.5%		62.5%	62.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		6.5			6.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio		0.22			0.23		0.88	0.88		0.88	0.88	
v/c Ratio		0.14			0.11		0.03	0.17		0.06	0.12	
Control Delay		6.2			6.9		3.5	2.8		3.4	2.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		6.2			6.9		3.5	2.8		3.4	2.5	
LOS		A			A		A	A		A	A	
Approach Delay		6.2			6.9			2.9			2.7	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		2			4		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		15			17		12	53		18	34	
Internal Link Dist (ft)		1069			1153			857			1600	
Turn Bay Length (ft)							150			150		
Base Capacity (vph)		461			563		982	1576		989	1500	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.10			0.08		0.03	0.16		0.06	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 40			
Actuated Cycle Length: 29			
Natural Cycle: 40			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.17			
Intersection Signal Delay: 3.3		Intersection LOS: A	
Intersection Capacity Utilization 41.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: 29th St SE & 15th Ave SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (veh/h)	10	5	25	20	5	15	30	185	45	50	105	55
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	1800	1800	1337	1800	1800	1800	1688	1772	1800	1800	1800	1617
Adj Flow Rate, veh/h	11	6	28	22	6	17	33	206	50	56	117	61
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	33	0	0	0	8	2	0	0	0	13
Cap, veh/h	221	20	93	292	19	55	691	567	138	649	459	239
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	389	212	990	761	207	588	1149	1377	334	1141	1114	581
Grp Volume(v), veh/h	45	0	0	45	0	0	33	0	256	56	0	178
Grp Sat Flow(s),veh/h/ln	1590	0	0	1556	0	0	1149	0	1712	1141	0	1695
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	2.5	0.9	0.0	1.7
Cycle Q Clear(g_c), s	0.6	0.0	0.0	0.6	0.0	0.0	2.1	0.0	2.5	3.4	0.0	1.7
Prop In Lane	0.24		0.62	0.49		0.38	1.00		0.20	1.00		0.34
Lane Grp Cap(c), veh/h	334	0	0	367	0	0	691	0	705	649	0	698
V/C Ratio(X)	0.13	0.00	0.00	0.12	0.00	0.00	0.05	0.00	0.36	0.09	0.00	0.25
Avail Cap(c_a), veh/h	756	0	0	779	0	0	1117	0	1340	1072	0	1327
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.2	0.0	0.0	10.2	0.0	0.0	5.4	0.0	4.9	6.1	0.0	4.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.1	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	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	0.0	0.0	10.4	0.0	0.0	5.4	0.0	5.2	6.2	0.0	4.9
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		45			45			289			234	
Approach Delay, s/veh		10.4			10.4			5.3			5.2	
Approach LOS		B			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.0		8.3		16.0		8.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		19.0		9.0		19.0		9.0				
Max Q Clear Time (g_c+I1), s		4.5		2.6		5.4		2.6				
Green Ext Time (p_c), s		1.2		0.1		0.9		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			6.0									
HCM 6th LOS			A									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Future Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		150	150		150	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.977			0.963			0.959	
Flt Protected	0.950			0.950				0.992			0.984	
Satd. Flow (prot)	1710	1731	0	1710	1704	0	0	1664	0	0	1583	0
Flt Permitted	0.950			0.950				0.992			0.984	
Satd. Flow (perm)	1710	1731	0	1710	1704	0	0	1664	0	0	1583	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	78	561	28	33	378	67	17	56	28	61	67	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	589	0	33	445	0	0	101	0	0	184	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.4%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	44.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Future Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	78	561	28	33	378	67	17	56	28	61	67	56
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	68.9	29.2	12.7	14.4
HCM LOS	F	D	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	100%	0%	100%	0%	33%
Vol Thru, %	56%	0%	95%	0%	85%	36%
Vol Right, %	28%	0%	5%	0%	15%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	70	530	30	400	165
LT Vol	15	70	0	30	0	55
Through Vol	50	0	505	0	340	60
RT Vol	25	0	25	0	60	50
Lane Flow Rate	100	78	589	33	444	183
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.207	0.149	1.05	0.065	0.799	0.363
Departure Headway (Hd)	7.692	6.91	6.418	7.207	6.622	7.324
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	470	522	571	500	551	495
Service Time	5.692	4.61	4.118	4.907	4.322	5.324
HCM Lane V/C Ratio	0.213	0.149	1.032	0.066	0.806	0.37
HCM Control Delay	12.7	10.8	76.6	10.4	30.6	14.4
HCM Lane LOS	B	B	F	B	D	B
HCM 95th-tile Q	0.8	0.5	16.7	0.2	7.6	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Future Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		150	150		150	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.977			0.963			0.959	
Flt Protected	0.950			0.950				0.992			0.984	
Satd. Flow (prot)	1710	1731	0	1710	1704	0	0	1664	0	0	1583	0
Flt Permitted	0.950			0.950				0.992			0.984	
Satd. Flow (perm)	1710	1731	0	1710	1704	0	0	1664	0	0	1583	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	78	561	28	33	378	67	17	56	28	61	67	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	589	0	33	445	0	0	101	0	0	184	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.4%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	26.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Future Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	78	561	28	33	378	67	17	56	28	61	67	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	445	0	0	589	0	0	1270	1242	575	1251	1223	412
Stage 1	-	-	-	-	-	-	731	731	-	478	478	-
Stage 2	-	-	-	-	-	-	539	511	-	773	745	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.56	6.2	7.1	6.5	6.44
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.054	3.3	3.5	4	3.516
Pot Cap-1 Maneuver	1126	-	-	996	-	-	146	172	521	151	181	595
Stage 1	-	-	-	-	-	-	416	421	-	572	559	-
Stage 2	-	-	-	-	-	-	530	530	-	395	424	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1126	-	-	996	-	-	84	155	521	96	163	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	84	155	-	96	163	-
Stage 1	-	-	-	-	-	-	387	392	-	533	541	-
Stage 2	-	-	-	-	-	-	407	513	-	299	395	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.6	56.3	170.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	1126	-	-	996	-	-	161
HCM Lane V/C Ratio	0.61	0.069	-	-	0.033	-	-	1.139
HCM Control Delay (s)	56.3	8.4	-	-	8.7	-	-	170.1
HCM Lane LOS	F	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	3.3	0.2	-	-	0.1	-	-	9.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Future Volume (vph)	70	505	25	30	340	60	15	50	25	55	60	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		150	150		150	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.977			0.950			0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	1731	0	1710	1704	0	1710	1644	0	1710	1512	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	1731	0	1710	1704	0	1710	1644	0	1710	1512	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	8%	0%	2%	10%	0%	6%	0%	0%	0%	24%
Adj. Flow (vph)	78	561	28	33	378	67	17	56	28	61	67	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	589	0	33	445	0	17	84	0	61	123	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Future Vol, veh/h	70	505	25	30	340	60	15	50	25	55	60	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	8	0	2	10	0	6	0	0	0	24
Mvmt Flow	78	561	28	33	378	67	17	56	28	61	67	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	445	0	0	589	0	0	1270	1242	575	1251	1223	412
Stage 1	-	-	-	-	-	-	731	731	-	478	478	-
Stage 2	-	-	-	-	-	-	539	511	-	773	745	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.56	6.2	7.1	6.5	6.44
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.054	3.3	3.5	4	3.516
Pot Cap-1 Maneuver	1126	-	-	996	-	-	146	172	521	151	181	595
Stage 1	-	-	-	-	-	-	416	421	-	572	559	-
Stage 2	-	-	-	-	-	-	530	530	-	395	424	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1126	-	-	996	-	-	84	155	521	96	163	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	84	155	-	96	163	-
Stage 1	-	-	-	-	-	-	387	392	-	533	541	-
Stage 2	-	-	-	-	-	-	407	513	-	299	395	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.6	38.7	53.5
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	84	202	1126	-	-	996	-	-	96	243
HCM Lane V/C Ratio	0.198	0.413	0.069	-	-	0.033	-	-	0.637	0.503
HCM Control Delay (s)	58.2	34.8	8.4	-	-	8.7	-	-	92.7	33.9
HCM Lane LOS	F	D	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	0.7	1.9	0.2	-	-	0.1	-	-	3.1	2.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	230	10	10	5	280	35	15	10	90	50
Future Volume (vph)	35	5	230	10	10	5	280	35	15	10	90	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.885			0.971			0.994			0.955	
Flt Protected		0.994			0.981			0.959			0.997	
Satd. Flow (prot)	0	1502	0	0	1715	0	0	1658	0	0	1608	0
Flt Permitted		0.994			0.981			0.959			0.997	
Satd. Flow (perm)	0	1502	0	0	1715	0	0	1658	0	0	1608	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	42%	0%	0%	0%	0%	0%	1%	3%	50%	0%	11%	0%
Adj. Flow (vph)	39	6	256	11	11	6	311	39	17	11	100	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	301	0	0	28	0	0	367	0	0	167	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	5.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	301	28	367	167
Demand Flow Rate, veh/h	317	28	380	178
Vehicles Circulating, veh/h	133	409	72	336
Vehicles Exiting, veh/h	381	42	378	101
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.6	4.2	5.6	5.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	317	28	380	178
Cap Entry Lane, veh/h	1205	909	1282	980
Entry HV Adj Factor	0.950	1.000	0.965	0.938
Flow Entry, veh/h	301	28	367	167
Cap Entry, veh/h	1144	909	1238	919
V/C Ratio	0.263	0.031	0.296	0.182
Control Delay, s/veh	5.6	4.2	5.6	5.7
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	1

2040 PLANNING HORIZON CONDITIONS (BUILD ALTERNATIVES) - PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	655	335	55	705	0	0	0	0	55	5	220
Future Volume (vph)	0	655	335	55	705	0	0	0	0	55	5	220
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		420	300		0	0		0	150		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.854	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3353	1500	1676	3353	0	0	0	0	1676	1507	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3353	1500	1676	3353	0	0	0	0	1676	1507	0
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		1232			690			351			342	
Travel Time (s)		18.7			10.5			4.4			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	728	372	61	783	0	0	0	0	61	6	244
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	728	372	61	783	0	0	0	0	61	250	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	655	335	55	705	0	0	0	0	55	5	220
Future Vol, veh/h	0	655	335	55	705	0	0	0	0	55	5	220
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	420	300	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	728	372	61	783	0	0	0	0	61	6	244

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1100	0	0	1269	2005	392
Stage 1	-	-	-	-	-	-	905	905	-
Stage 2	-	-	-	-	-	-	364	1100	-
Critical Hdwy	-	-	-	4.14	-	-	6.84	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	5.84	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.84	5.54	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	0	-	-	630	-	0	160	59	607
Stage 1	0	-	-	-	-	0	355	353	-
Stage 2	0	-	-	-	-	0	673	286	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	630	-	-	144	0	607
Mov Cap-2 Maneuver	-	-	-	-	-	-	144	0	-
Stage 1	-	-	-	-	-	-	355	0	-
Stage 2	-	-	-	-	-	-	608	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.8	21.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	630	-	144	607
HCM Lane V/C Ratio	-	-	0.097	-	0.424	0.412
HCM Control Delay (s)	-	-	11.3	-	47.3	15
HCM Lane LOS	-	-	B	-	E	C
HCM 95th %tile Q(veh)	-	-	0.3	-	1.9	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Future Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.856			0.859	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	3288	1077	1286	3279	0	1660	1335	0	1710	1546	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3288	1077	1286	3279	0	1660	1335	0	1710	1546	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	72	900	44	28	1117	33	72	2	50	22	2	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	900	44	28	1150	0	72	52	0	22	35	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	15.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	810	40	25	1005	30	65	2	45	20	2	30
Future Vol, veh/h	65	810	40	25	1005	30	65	2	45	20	2	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	150	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	42	33	4	0	3	0	16	0	0	0
Mvmt Flow	72	900	44	28	1117	33	72	2	50	22	2	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1150	0	0	944	0	0	1660	2250	450	1785	2278	575
Stage 1	-	-	-	-	-	-	1044	1044	-	1190	1190	-
Stage 2	-	-	-	-	-	-	616	1206	-	595	1088	-
Critical Hdwy	4.1	-	-	4.76	-	-	7.56	6.5	7.22	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.53	-	-	3.53	4	3.46	3.5	4	3.3
Pot Cap-1 Maneuver	615	-	-	559	-	-	~ 63	42	520	53	40	466
Stage 1	-	-	-	-	-	-	243	309	-	202	263	-
Stage 2	-	-	-	-	-	-	442	259	-	463	294	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	615	-	-	559	-	-	~ 49	35	520	40	34	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 49	35	-	40	34	-
Stage 1	-	-	-	-	-	-	215	273	-	178	250	-
Stage 2	-	-	-	-	-	-	386	246	-	366	260	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	257.3	80.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	49	327	615	-	-	559	-	-	40	260
HCM Lane V/C Ratio	1.474	0.16	0.117	-	-	0.05	-	-	0.556	0.137
HCM Control Delay (s)	$ 430.3	18.1	11.6	-	-	11.8	-	-	175.3	21
HCM Lane LOS	F	C	B	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	6.9	0.6	0.4	-	-	0.2	-	-	2	0.5

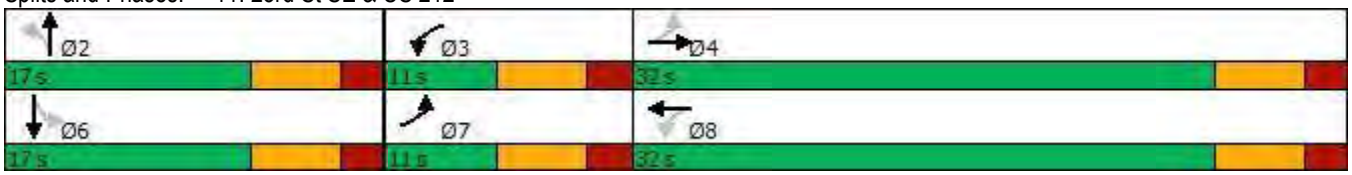
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Future Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	130		150	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.996			0.946			0.922	
Flt Protected	0.950			0.950				0.972			0.981	
Satd. Flow (prot)	1710	3211	0	1286	3279	0	0	1530	0	0	1628	0
Flt Permitted	0.170			0.265				0.789			0.869	
Satd. Flow (perm)	306	3211	0	359	3279	0	0	1242	0	0	1442	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			6			50			33	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		902			1331			481			333	
Travel Time (s)		13.7			20.2			10.9			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	42%	33%	4%	0%	3%	0%	16%	0%	0%	0%
Adj. Flow (vph)	72	900	44	28	1117	33	72	2	50	22	2	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	944	0	28	1150	0	0	124	0	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	13.0		5.0	13.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	19.0		11.0	19.0		13.0	13.0		13.0	13.0	
Total Split (s)	11.0	32.0		11.0	32.0		17.0	17.0		17.0	17.0	
Total Split (%)	18.3%	53.3%		18.3%	53.3%		28.3%	28.3%		28.3%	28.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effct Green (s)	29.8	29.9		28.8	28.0			9.1			9.1	
Actuated g/C Ratio	0.60	0.60		0.58	0.56			0.18			0.18	
v/c Ratio	0.22	0.49		0.09	0.62			0.46			0.20	
Control Delay	6.5	10.5		5.5	14.0			20.6			14.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.5	10.5		5.5	14.0			20.6			14.3	
LOS	A	B		A	B			C			B	
Approach Delay		10.3			13.8			20.6			14.3	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	8	72		3	166			24			7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	21	194		11	256			67			34	
Internal Link Dist (ft)		822			1251			401			253	
Turn Bay Length (ft)	130			150								
Base Capacity (vph)	332	2059		305	1977			329			363	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.22	0.46		0.09	0.58			0.38			0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 49.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 60.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: 23rd St SE & US 212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	810	40	25	1005	30	65	2	45	20	2	30
Future Volume (veh/h)	65	810	40	25	1005	30	65	2	45	20	2	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	1800	1744	1210	1337	1744	1800	1758	1800	1575	1800	1800	1800
Adj Flow Rate, veh/h	72	900	44	28	1117	33	72	2	50	22	2	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	4	42	33	4	0	3	0	16	0	0	0
Cap, veh/h	328	1491	73	304	1420	42	218	18	81	154	37	121
Arrive On Green	0.06	0.46	0.46	0.03	0.43	0.43	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1714	3215	157	1273	3286	97	764	139	610	389	281	920
Grp Volume(v), veh/h	72	464	480	28	563	587	124	0	0	57	0	0
Grp Sat Flow(s),veh/h/ln	1714	1657	1716	1273	1657	1726	1513	0	0	1590	0	0
Q Serve(g_s), s	1.1	10.1	10.1	0.6	14.2	14.2	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.1	10.1	10.1	0.6	14.2	14.2	3.6	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.06	0.58		0.40	0.39		0.58
Lane Grp Cap(c), veh/h	328	768	796	304	716	746	317	0	0	313	0	0
V/C Ratio(X)	0.22	0.60	0.60	0.09	0.79	0.79	0.39	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	395	890	921	395	890	927	455	0	0	453	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.8	9.7	9.7	7.9	11.8	11.8	19.7	0.0	0.0	18.9	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.9	0.9	0.1	3.8	3.6	0.8	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	0.3	2.5	2.6	0.1	4.2	4.4	1.3	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	10.5	10.5	8.0	15.6	15.5	20.5	0.0	0.0	19.2	0.0	0.0
LnGrp LOS	A	B	B	A	B	B	C	A	A	B	A	A
Approach Vol, veh/h		1016			1178			124			57	
Approach Delay, s/veh		10.4			15.4			20.5			19.2	
Approach LOS		B			B			C			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.4	7.6	28.5		12.4	9.1	26.9				
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s		11.0	5.0	26.0		11.0	5.0	26.0				
Max Q Clear Time (g_c+I1), s		5.6	2.6	12.1		3.5	3.1	16.2				
Green Ext Time (p_c), s		0.2	0.0	4.7		0.1	0.0	4.8				

Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	50	0	0	40	10	100	5	15	0	0	0
Future Volume (vph)	170	50	0	0	40	10	100	5	15	0	0	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.973			0.983				
Flt Protected	0.950							0.960				
Satd. Flow (prot)	1583	1667	0	0	1622	0	0	1573	0	0	0	0
Flt Permitted	0.950							0.960				
Satd. Flow (perm)	1583	1667	0	0	1622	0	0	1573	0	0	0	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		1035			897			617			615	
Travel Time (s)		12.8			11.1			7.6			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	189	56	0	0	44	11	111	6	17	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	189	56	0	0	55	0	0	134	0	0	0	0
Sign Control		Free			Free			Stop			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	50	0	0	40	10	100	5	15	0	0	0
Future Vol, veh/h	170	50	0	0	40	10	100	5	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	189	56	0	0	44	11	111	6	17	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	55	0	-	-	-	0	484	489	56
Stage 1	-	-	-	-	-	-	434	434	-
Stage 2	-	-	-	-	-	-	50	55	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	0	0	-	-	542	480	1011
Stage 1	-	-	0	0	-	-	653	581	-
Stage 2	-	-	0	0	-	-	972	849	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1550	-	-	-	-	-	476	0	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	476	0	-
Stage 1	-	-	-	-	-	-	573	0	-
Stage 2	-	-	-	-	-	-	972	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.9	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	511	1550	-	-	-
HCM Lane V/C Ratio	0.261	0.122	-	-	-
HCM Control Delay (s)	14.5	7.6	-	-	-
HCM Lane LOS	B	A	-	-	-
HCM 95th %tile Q(veh)	1	0.4	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	205	75	25	115	0	0	0	0	15	5	175
Future Volume (vph)	0	205	75	25	115	0	0	0	0	15	5	175
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	0		150	150		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.879	
Flt Protected				0.950							0.996	
Satd. Flow (prot)	0	1667	1417	1583	1667	0	0	0	0	0	1459	0
Flt Permitted				0.950							0.996	
Satd. Flow (perm)	0	1667	1417	1583	1667	0	0	0	0	0	1459	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		2073			1035			625			611	
Travel Time (s)		25.7			12.8			7.7			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	228	83	28	128	0	0	0	0	17	6	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	83	28	128	0	0	0	0	0	217	0
Sign Control		Free			Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	205	75	25	115	0	0	0	0	15	5	175
Future Vol, veh/h	0	205	75	25	115	0	0	0	0	15	5	175
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	228	83	28	128	0	0	0	0	17	6	194

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	311	0	0	454	495	128
Stage 1	-	-	-	-	-	-	184	184	-
Stage 2	-	-	-	-	-	-	270	311	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1249	-	0	564	476	922
Stage 1	0	-	-	-	-	0	848	747	-
Stage 2	0	-	-	-	-	0	775	658	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1249	-	-	552	0	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	552	0	-
Stage 1	-	-	-	-	-	-	848	0	-
Stage 2	-	-	-	-	-	-	758	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.4	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1249	-	876
HCM Lane V/C Ratio	-	-	0.022	-	0.247
HCM Control Delay (s)	-	-	7.9	-	10.5
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Future Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.927			0.958	
Flt Protected	0.950			0.950				0.990			0.992	
Satd. Flow (prot)	1583	1667	1417	1583	1667	1417	0	1530	0	0	1584	0
Flt Permitted	0.950			0.950				0.990			0.992	
Satd. Flow (perm)	1583	1667	1417	1583	1667	1417	0	1530	0	0	1584	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	189	28	106	183	33	39	50	106	17	56	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	189	28	106	183	33	0	195	0	0	106	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	170	25	95	165	30	35	45	95	15	50	30
Future Vol, veh/h	40	170	25	95	165	30	35	45	95	15	50	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	189	28	106	183	33	39	50	106	17	56	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	216	0	0	217	0	0	733	705	189	764	700	183
Stage 1	-	-	-	-	-	-	277	277	-	395	395	-
Stage 2	-	-	-	-	-	-	456	428	-	369	305	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1354	-	-	1353	-	-	336	361	853	321	363	859
Stage 1	-	-	-	-	-	-	729	681	-	630	605	-
Stage 2	-	-	-	-	-	-	584	585	-	651	662	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1354	-	-	1353	-	-	258	322	853	228	324	859
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	322	-	228	324	-
Stage 1	-	-	-	-	-	-	706	659	-	610	558	-
Stage 2	-	-	-	-	-	-	466	539	-	510	641	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	2.6	18.8	18.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	452	1354	-	-	1353	-	-	372
HCM Lane V/C Ratio	0.43	0.033	-	-	0.078	-	-	0.284
HCM Control Delay (s)	18.8	7.7	-	-	7.9	-	-	18.5
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	2.1	0.1	-	-	0.3	-	-	1.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Future Volume (vph)	40	170	25	95	165	30	35	45	95	15	50	30
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.986			0.927			0.958	
Flt Protected		0.992			0.984			0.990			0.992	
Satd. Flow (prot)	0	1630	0	0	1617	0	0	1530	0	0	1584	0
Flt Permitted		0.992			0.984			0.990			0.992	
Satd. Flow (perm)	0	1630	0	0	1617	0	0	1530	0	0	1584	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		4507			2073			773			992	
Travel Time (s)		55.9			25.7			9.6			12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	189	28	106	183	33	39	50	106	17	56	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	322	0	0	195	0	0	106	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	5.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	261	322	195	106
Demand Flow Rate, veh/h	267	329	199	108
Vehicles Circulating, veh/h	182	136	255	335
Vehicles Exiting, veh/h	261	318	194	130
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.3	5.6	5.2	4.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	267	329	199	108
Cap Entry Lane, veh/h	1146	1201	1064	981
Entry HV Adj Factor	0.978	0.980	0.980	0.980
Flow Entry, veh/h	261	322	195	106
Cap Entry, veh/h	1121	1177	1042	961
V/C Ratio	0.233	0.274	0.187	0.110
Control Delay, s/veh	5.3	5.6	5.2	4.8
LOS	A	A	A	A
95th %tile Queue, veh	1	1	1	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	15	50	1	15	40	275	115	15	195	5
Future Volume (vph)	5	1	15	50	1	15	40	275	115	15	195	5
Ideal Flow (vphpl)	1700	1700	1700	1800	1700	1800	1700	1800	1800	1800	1800	1700
Storage Length (ft)	0		0	150		0	150		100	190		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904			0.858				0.850		0.996	
Flt Protected		0.988		0.950			0.950			0.950		
Satd. Flow (prot)	0	1489	0	1676	1430	0	1583	1765	1500	1676	1758	0
Flt Permitted		0.988		0.950			0.950			0.950		
Satd. Flow (perm)	0	1489	0	1676	1430	0	1583	1765	1500	1676	1758	0
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		472			791			1566			1307	
Travel Time (s)		10.7			21.6			30.5			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	1	17	56	1	17	44	306	128	17	217	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	56	18	0	44	306	128	17	223	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	15	50	1	15	40	275	115	15	195	5
Future Vol, veh/h	5	1	15	50	1	15	40	275	115	15	195	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	150	-	-	190	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	1	17	56	1	17	44	306	128	17	217	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	721	776	220	657	651	306	223	0	0	434	0	0
Stage 1	254	254	-	394	394	-	-	-	-	-	-	-
Stage 2	467	522	-	263	257	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	343	328	820	378	388	734	1346	-	-	1126	-	-
Stage 1	750	697	-	631	605	-	-	-	-	-	-	-
Stage 2	576	531	-	742	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	322	312	820	356	369	734	1346	-	-	1126	-	-
Mov Cap-2 Maneuver	322	312	-	356	369	-	-	-	-	-	-	-
Stage 1	725	687	-	610	585	-	-	-	-	-	-	-
Stage 2	543	513	-	715	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	15.4	0.7	0.6
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	567	356	691	1126	-	-
HCM Lane V/C Ratio	0.033	-	-	0.041	0.156	0.026	0.015	-	-
HCM Control Delay (s)	7.8	-	-	11.6	17	10.3	8.2	-	-
HCM Lane LOS	A	-	-	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.5	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873			0.859				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	1269	0	1710	1546	0	1024	1593	1530	1710	1667	1275
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	1269	0	1710	1546	0	1024	1593	1530	1710	1667	1275
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	67	6	33	206	17	272	17	322	44	39	322	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	39	0	206	289	0	17	322	44	39	322	44
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	30	185	15	245	15	290	40	35	290	40
Future Vol, veh/h	60	5	30	185	15	245	15	290	40	35	290	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	100	10	0	0	0	67	13	0	0	8	20
Mvmt Flow	67	6	33	206	17	272	17	322	44	39	322	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	923	800	322	798	800	322	366	0	0	366	0	0
Stage 1	400	400	-	356	356	-	-	-	-	-	-	-
Stage 2	523	400	-	442	444	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.3	7.1	6.5	6.2	4.77	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.39	3.5	4	3.3	2.803	-	-	2.2	-	-
Pot Cap-1 Maneuver	252	228	701	306	320	724	909	-	-	1204	-	-
Stage 1	630	463	-	666	633	-	-	-	-	-	-	-
Stage 2	541	463	-	598	579	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	145	217	701	275	304	724	909	-	-	1204	-	-
Mov Cap-2 Maneuver	145	217	-	275	304	-	-	-	-	-	-	-
Stage 1	618	448	-	653	621	-	-	-	-	-	-	-
Stage 2	322	454	-	544	560	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.7	28.6	0.4	0.8
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	145	532	275	671	1204	-	-
HCM Lane V/C Ratio	0.018	-	-	0.46	0.073	0.747	0.431	0.032	-	-
HCM Control Delay (s)	9	-	-	49.4	12.3	48.6	14.4	8.1	-	-
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.1	0.2	5.5	2.2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.926			0.984			0.985	
Flt Protected		0.969			0.980			0.998			0.995	
Satd. Flow (prot)	0	1536	0	0	1633	0	0	1552	0	0	1625	0
Flt Permitted		0.969			0.980			0.998			0.995	
Satd. Flow (perm)	0	1536	0	0	1633	0	0	1552	0	0	1625	0
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	67	6	33	206	17	272	17	322	44	39	322	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	495	0	0	383	0	0	405	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 68.9%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	106	495	383	405
Demand Flow Rate, veh/h	115	495	436	440
Vehicles Circulating, veh/h	593	459	118	251
Vehicles Exiting, veh/h	98	95	590	703
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.9	12.5	7.0	8.3
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	115	495	436	440
Cap Entry Lane, veh/h	754	864	1223	1068
Entry HV Adj Factor	0.922	1.000	0.879	0.921
Flow Entry, veh/h	106	495	383	405
Cap Entry, veh/h	695	864	1075	984
V/C Ratio	0.153	0.573	0.356	0.412
Control Delay, s/veh	6.9	12.5	7.0	8.3
LOS	A	B	A	A
95th %tile Queue, veh	1	4	2	2

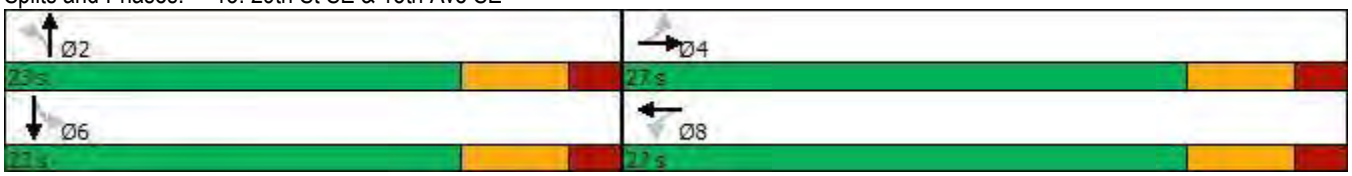
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		150	150		150
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.926			0.982			0.982	
Flt Protected		0.969			0.980		0.950			0.950		
Satd. Flow (prot)	0	1536	0	0	1633	0	1024	1586	0	1710	1615	0
Flt Permitted		0.647			0.817		0.496			0.496		
Satd. Flow (perm)	0	1026	0	0	1362	0	535	1586	0	893	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			151			15			15	
Link Speed (mph)		25			25			50			40	
Link Distance (ft)		1149			1233			937			1680	
Travel Time (s)		31.3			33.6			12.8			28.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	100%	10%	0%	0%	0%	67%	13%	0%	0%	8%	20%
Adj. Flow (vph)	67	6	33	206	17	272	17	322	44	39	322	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	495	0	17	366	0	39	366	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0		16.0	16.0	
Total Split (s)	27.0	27.0		27.0	27.0		23.0	23.0		23.0	23.0	
Total Split (%)	54.0%	54.0%		54.0%	54.0%		46.0%	46.0%		46.0%	46.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		16.3			16.3		14.2	14.2		14.2	14.2	
Actuated g/C Ratio		0.38			0.38		0.33	0.33		0.33	0.33	
v/c Ratio		0.26			0.81		0.10	0.69		0.13	0.67	
Control Delay		8.8			21.3		13.0	21.0		12.7	20.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		8.8			21.3		13.0	21.0		12.7	20.3	
LOS		A			C		B	C		B	C	
Approach Delay		8.8			21.3			20.7			19.6	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)		12			72		3	80		7	80	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		38			#224		15	#173		24	#166	
Internal Link Dist (ft)		1069			1153			857			1600	
Turn Bay Length (ft)							150			150		
Base Capacity (vph)		537			765		219	660		366	672	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.20			0.65		0.08	0.55		0.11	0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 43			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 19.7		Intersection LOS: B	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 13: 29th St SE & 15th Ave SE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (veh/h)	60	5	30	185	15	245	15	290	40	35	290	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	1800	396	1660	1800	1800	1800	859	1617	1800	1800	1688	1519
Adj Flow Rate, veh/h	67	6	33	206	17	272	17	322	44	39	322	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	100	10	0	0	0	67	13	0	0	8	20
Cap, veh/h	193	12	35	347	53	353	209	425	58	256	443	61
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	151	29	81	544	123	813	493	1393	190	1032	1453	199
Grp Volume(v), veh/h	106	0	0	495	0	0	17	0	366	39	0	366
Grp Sat Flow(s),veh/h/ln	261	0	0	1479	0	0	493	0	1583	1032	0	1652
Q Serve(g_s), s	4.9	0.0	0.0	0.0	0.0	0.0	1.5	0.0	9.6	1.6	0.0	9.1
Cycle Q Clear(g_c), s	17.9	0.0	0.0	13.0	0.0	0.0	10.6	0.0	9.6	11.2	0.0	9.1
Prop In Lane	0.63		0.31	0.42		0.55	1.00		0.12	1.00		0.12
Lane Grp Cap(c), veh/h	241	0	0	753	0	0	209	0	483	256	0	504
V/C Ratio(X)	0.44	0.00	0.00	0.66	0.00	0.00	0.08	0.00	0.76	0.15	0.00	0.73
Avail Cap(c_a), veh/h	247	0	0	786	0	0	241	0	585	322	0	611
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	11.0	0.0	0.0	19.0	0.0	14.4	19.5	0.0	14.3
Incr Delay (d2), s/veh	1.3	0.0	0.0	1.9	0.0	0.0	0.2	0.0	4.6	0.3	0.0	3.4
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	0.9	0.0	0.0	3.8	0.0	0.0	0.1	0.0	3.0	0.4	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	12.9	0.0	0.0	19.1	0.0	19.1	19.8	0.0	17.7
LnGrp LOS	B	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		106			495			383			405	
Approach Delay, s/veh		13.6			12.9			19.1			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.0		26.0		20.0		26.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		17.0		21.0		17.0		21.0				
Max Q Clear Time (g_c+I1), s		12.6		19.9		13.2		15.0				
Green Ext Time (p_c), s		0.9		0.1		0.8		1.8				

Intersection Summary												
HCM 6th Ctrl Delay			16.1									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Future Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.993			0.960			0.953	
Flt Protected	0.950			0.950				0.991			0.983	
Satd. Flow (prot)	1710	1767	0	1710	1704	0	0	1712	0	0	1686	0
Flt Permitted	0.950			0.950				0.991			0.983	
Satd. Flow (perm)	1710	1767	0	1710	1704	0	0	1712	0	0	1686	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	361	22	22	483	22	17	50	28	39	33	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	383	0	22	505	0	0	95	0	0	111	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	20.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Future Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	22	361	22	22	483	22	17	50	28	39	33	39
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	17.2	27.3	11	11.2
HCM LOS	C	D	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	35%
Vol Thru, %	53%	0%	94%	0%	96%	30%
Vol Right, %	29%	0%	6%	0%	4%	35%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	20	345	20	455	100
LT Vol	15	20	0	20	0	35
Through Vol	45	0	325	0	435	30
RT Vol	25	0	20	0	20	35
Lane Flow Rate	94	22	383	22	506	111
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.171	0.039	0.62	0.038	0.806	0.2
Departure Headway (Hd)	6.519	6.35	5.819	6.205	5.736	6.468
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	547	562	617	576	632	551
Service Time	4.606	4.105	3.573	3.954	3.485	4.549
HCM Lane V/C Ratio	0.172	0.039	0.621	0.038	0.801	0.201
HCM Control Delay	11	9.4	17.7	9.2	28.1	11.2
HCM Lane LOS	B	A	C	A	D	B
HCM 95th-tile Q	0.6	0.1	4.3	0.1	8.1	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Future Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.993			0.960			0.953	
Flt Protected	0.950			0.950				0.991			0.983	
Satd. Flow (prot)	1710	1767	0	1710	1704	0	0	1712	0	0	1686	0
Flt Permitted	0.950			0.950				0.991			0.983	
Satd. Flow (perm)	1710	1767	0	1710	1704	0	0	1712	0	0	1686	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	361	22	22	483	22	17	50	28	39	33	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	383	0	22	505	0	0	95	0	0	111	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Future Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	22	361	22	22	483	22	17	50	28	39	33	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	505	0	0	383	0	0	990	965	372	993	965	494
Stage 1	-	-	-	-	-	-	416	416	-	538	538	-
Stage 2	-	-	-	-	-	-	574	549	-	455	427	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1070	-	-	1187	-	-	227	257	678	226	257	579
Stage 1	-	-	-	-	-	-	618	595	-	531	526	-
Stage 2	-	-	-	-	-	-	507	520	-	589	589	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1070	-	-	1187	-	-	184	247	678	178	247	579
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	247	-	178	247	-
Stage 1	-	-	-	-	-	-	605	583	-	520	516	-
Stage 2	-	-	-	-	-	-	434	510	-	506	577	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	24	28.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	283	1070	-	-	1187	-	-	264
HCM Lane V/C Ratio	0.334	0.021	-	-	0.019	-	-	0.421
HCM Control Delay (s)	24	8.4	-	-	8.1	-	-	28.2
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0.1	-	-	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Future Volume (vph)	20	325	20	20	435	20	15	45	25	35	30	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.993			0.946			0.919	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1710	1767	0	1710	1704	0	1710	1703	0	1710	1654	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	1767	0	1710	1704	0	1710	1703	0	1710	1654	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		5564			5965			2664			2577	
Travel Time (s)		108.4			116.2			72.7			70.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	4%	25%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	361	22	22	483	22	17	50	28	39	33	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	383	0	22	505	0	17	78	0	39	72	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Future Vol, veh/h	20	325	20	20	435	20	15	45	25	35	30	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	4	25	0	0	0	0	0	0
Mvmt Flow	22	361	22	22	483	22	17	50	28	39	33	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	505	0	0	383	0	0	990	965	372	993	965	494
Stage 1	-	-	-	-	-	-	416	416	-	538	538	-
Stage 2	-	-	-	-	-	-	574	549	-	455	427	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1070	-	-	1187	-	-	227	257	678	226	257	579
Stage 1	-	-	-	-	-	-	618	595	-	531	526	-
Stage 2	-	-	-	-	-	-	507	520	-	589	589	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1070	-	-	1187	-	-	184	247	678	178	247	579
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	247	-	178	247	-
Stage 1	-	-	-	-	-	-	605	583	-	520	516	-
Stage 2	-	-	-	-	-	-	434	510	-	506	577	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	21	22.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	184	320	1070	-	-	1187	-	-	178	357
HCM Lane V/C Ratio	0.091	0.243	0.021	-	-	0.019	-	-	0.218	0.202
HCM Control Delay (s)	26.5	19.8	8.4	-	-	8.1	-	-	30.8	17.6
HCM Lane LOS	D	C	A	-	-	A	-	-	D	C
HCM 95th %tile Q(veh)	0.3	0.9	0.1	-	-	0.1	-	-	0.8	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	315	10	5	5	290	85	5	5	80	45
Future Volume (vph)	25	10	315	10	5	5	290	85	5	5	80	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	0		0	150		0	130		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.965			0.998			0.953	
Flt Protected		0.996			0.977			0.963			0.998	
Satd. Flow (prot)	0	1555	0	0	1693	0	0	1709	0	0	1625	0
Flt Permitted		0.996			0.977			0.963			0.998	
Satd. Flow (perm)	0	1555	0	0	1693	0	0	1709	0	0	1625	0
Link Speed (mph)		35			25			35			55	
Link Distance (ft)		2344			2504			8403			5196	
Travel Time (s)		45.7			68.3			163.7			64.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	0%	1%	0%	0%	1%	1%	2%	0%	100%	2%	0%
Adj. Flow (vph)	28	11	350	11	6	6	322	94	6	6	89	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	389	0	0	23	0	0	422	0	0	145	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	5.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	389	23	422	145
Demand Flow Rate, veh/h	395	23	427	153
Vehicles Circulating, veh/h	114	451	53	342
Vehicles Exiting, veh/h	381	29	455	132
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.0	4.4	5.8	5.4
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	395	23	427	153
Cap Entry Lane, veh/h	1228	871	1307	974
Entry HV Adj Factor	0.985	1.000	0.989	0.949
Flow Entry, veh/h	389	23	422	145
Cap Entry, veh/h	1210	871	1292	924
V/C Ratio	0.322	0.026	0.327	0.157
Control Delay, s/veh	6.0	4.4	5.8	5.4
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	1

Section B – Signal Warrants

2030 INTERIM CONDITIONS
US 212 & 23rd Street SE
N Maple Street & 14th Avenue NE

2040 PLANNING HORIZON
US 212 & 23rd Street SE
N Maple Street & 14th Avenue NE
29th Street SE & 15th Avenue SE

Signal Warrants - 2030 Interim Conditions

HCS7 Warrants Report

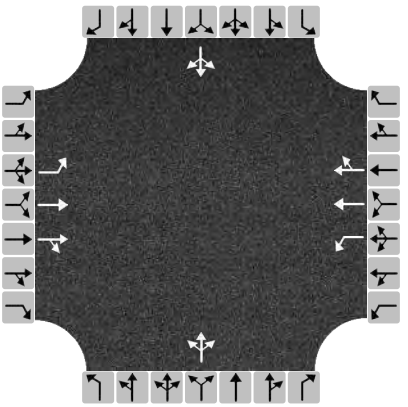
Project Information

Analyst	HDR	Date	4/8/2021
Agency	HDR	Analysis Year	2030
Jurisdiction	City of Watertown	Time Period Analyzed	2030 Interim Conditions
Project Description	Watertown Master Transportation Plan - US 212 & 23rd Street SE		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	2540		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	1	2	0	1	2	0	0	1	0	0	1	0
Lane Usage	L	TR		L	TR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	9	94	6	3	106	3	7	0	4	3	0	7
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	7

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)	4A (70%)	4B (70%)
07 - 08	955	81	1092	0	0	No	No	Yes	Yes	Yes	No	No	No	No
08 - 09	0	0	0	0	0	No	No	No	No	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	0	0	0	0	0	No	No	No	No	No	No	No	No	No
17 - 18	1735	86	1872	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	2690	167	2964	0	0	0	1	2	2	2	0	1	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS7 Warrants Report

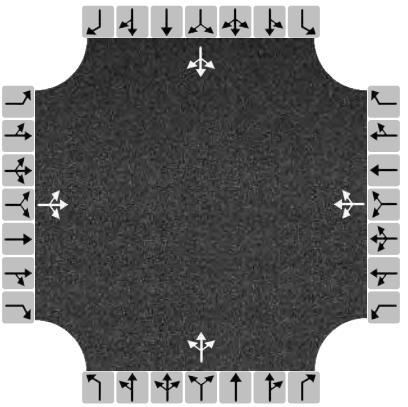
Project Information

Analyst	HDR	Date	4/8/2021
Agency	HDR	Analysis Year	2030
Jurisdiction	City of Watertown	Time Period Analyzed	2030 Interim Conditions
Project Description	Watertown Master Transportation Plan - N Maple Street & 14th Avenue N		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1055		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	5	60	2	3	56	5	1	5	3	5	5	5
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	4

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)	4A (100%)	4B (100%)
07 - 08	895	140	1110	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	0	0	0	0	0	No	No	No	No	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	0	0	0	0	0	No	No	No	No	No	No	No	No	No
17 - 18	715	50	810	0	0	No	No	No	No	No	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	1610	190	1920	0	0	0	1	1	1	1	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

Signal Warrants - 2040 Planning Horizon Conditions

HCS7 Warrants Report

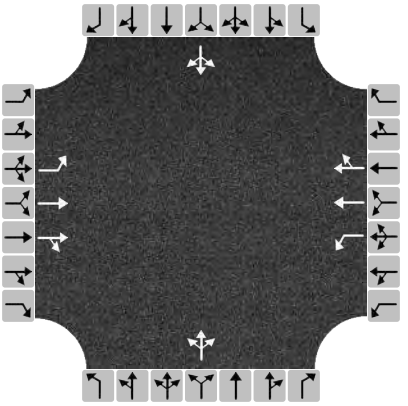
Project Information

Analyst	HDR	Date	4/8/2021
Agency	HDR	Analysis Year	2040
Jurisdiction	City of Watertown	Time Period Analyzed	2040 Planning Horizon Conditions
Project Description	Watertown Master Transportation Plan - US 212 & 23rd Street SE		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	2540		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	1	2	0	1	2	0	0	1	0	0	1	0
Lane Usage	L	TR		L	TR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	10	105	7	4	123	4	8	0	5	4	0	7
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	4

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)	4A (70%)	4B (70%)
07 - 08	1100	92	1259	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	0	0	0	0	0	No	No	No	No	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	0	0	0	0	0	No	No	No	No	No	No	No	No	No
17 - 18	1965	112	2139	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	3065	204	3398	0	0	1	2	2	2	2	0	2	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS7 Warrants Report

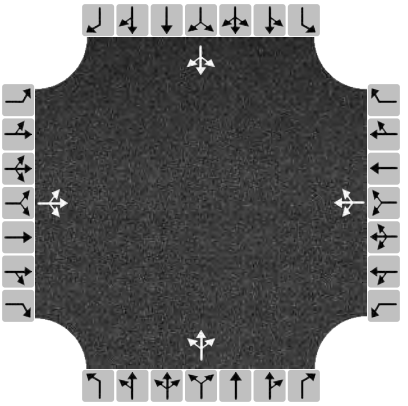
Project Information

Analyst	HDR	Date	4/8/2021
Agency	HDR	Analysis Year	2040
Jurisdiction	City of Watertown	Time Period Analyzed	2040 Planning Horizon Conditions
Project Description	Watertown Master Transportation Plan - N Maple Street & 14th Avenue N		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	1055		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	7	69	3	4	64	6	2	7	4	7	7	7
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	4

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)	4A (100%)	4B (100%)
07 - 08	1030	165	1285	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	0	0	0	0	0	No	No	No	No	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	0	0	0	0	0	No	No	No	No	No	No	No	No	No
17 - 18	840	100	1025	0	0	No	No	Yes	Yes	No	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	1870	265	2310	0	0	1	1	2	2	1	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS7 Warrants Report

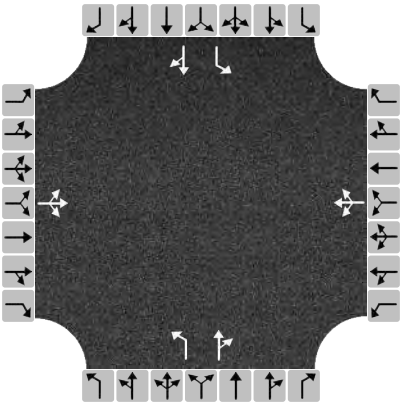
Project Information

Analyst	HDR	Date	4/8/2021
Agency	HDR	Analysis Year	2040
Jurisdiction	City of Watertown	Time Period Analyzed	2040 Planning Horizon Conditions
Project Description	Watertown Master Transportation Plan - 29th Street SE & 15th Avenue SE		

General

Major Street Direction	North-South	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	40	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	1	1	0	1	1	0
Lane Usage		LTR			LTR		L	TR		L	TR	
Vehicle Volumes Averages (veh/h)	5	1	4	17	2	21	3	39	7	7	32	7
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	4

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)	4A (100%)	4B (100%)
07 - 08	470	45	560	0	0	No	No	No	No	No	No	No	No	No
08 - 09	0	0	0	0	0	No	No	No	No	No	No	No	No	No
09 - 10	0	0	0	0	0	No	No	No	No	No	No	No	No	No
10 - 11	0	0	0	0	0	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	0	0	0	0	0	No	No	No	No	No	No	No	No	No
15 - 16	0	0	0	0	0	No	No	No	No	No	No	No	No	No
16 - 17	0	0	0	0	0	No	No	No	No	No	No	No	No	No
17 - 18	710	445	1250	0	0	Yes	Yes	No	No	Yes	No	Yes	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	1180	490	1810	0	0	1	1	0	0	1	0	1	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

Appendix E

Recommended MTP Projects

MTP Project Selection

Roadway and bicycle and pedestrian projects recommended for construction in the MTP where identified based on their ability to address one or more operational or safety needs. Projects were analyzed through qualitative and quantitative means, including data analysis and public feedback, to further refine the proposed project lists presented in the Standards Development and Future Conditions sections of the plan to a series of recommended projects the city should highly consider in the future.

Recommended Roadway Projects

Recommended roadway projects were designated as such due to their ability to alleviate existing and future operations and safety issues. Through the application of scenario modeling discussed in the Future Conditions sections of the plan, further operations and safety issues can be anticipated and planned for. As such, the recommended roadway projects list was organized into the following time bands:

- **Short-term**—2020-2025
- **Mid-term**—2026-2035
- **Long-term**—2036-2040

The table below presents the recommended projects by time band.

Time Frame	Project ID	Project Description	Cost (2020 $)	Cost (YOE $)
Short-Term (2020 - 2025)	13	US 212 & 19th Street SE Intersection	$75,000	$80,000
	14	N Maple Street & 3rd Ave NE Intersection	$10,000	$10,000
	23	11th Street East – 1st Avenue NE to 3rd Avenue NE	$900,000	$970,000
Total			**$985,000**	**$1,060,000**
Mid-Term (2026-2035)	1	N Maple Street & 14th Ave North Intersection	$10,000	$10,000
	3	US 212 & 23rd Street SE Intersection	$800,000	$1,090,000
	5	US 81 & 19th Street NE (456th Avenue) Intersection	$1,000,000	$1,360,000
	6	US 81 & I-29 SB Exit 180 RTI	$500,000	$680,000
	11	SD 20 & Airport Drive Intersection	$1,500,000	$2,050,000
	16	14th Avenue North – 2nd Street NW to N Maple Street	$1,500,000	$2,050,000
	17	Kemp Avenue – Kampeska Boulevard to 3rd Street W	$2,000,000	$2,730,000
	23	11th Street East – 1st Avenue NE to 3rd Avenue NE	$900,000	$1,230,000
Total			**$8,210,000**	**$11,200,000**
Long-Term (2036-2040)	2	US 212 & I-29 SB Exit 177 RTI	$800,000	$1,360,000
	4	29th Street SE & 15th Avenue SE Intersection	$800,000	$1,360,000
	7	US 81 & I-29 NB Exit 180 RTI	$250,000	$430,000
	8	US 81 & 18th Avenue NE Intersection	$10,000	$20,000
	9	19th Street NE & 14th Avenue NE Intersection	$1,500,000	$2,550,000
	15	10th Avenue North- 3rd Street NW to N Maple Street	$1,750,000	$2,980,000
	18	Broadway Street – 4th Avenue SW to Kemp Avenue	$1,650,000	$2,810,000
	20	20th Avenue South – Broadway Street S to Larabee Road	$1,000,000	$1,700,000
	21	19th Street East – 1st Avenue NE to Arrow Avenue	$800,000	$1,360,000
	24	3rd Avenue North – US 81 to 11th Street NE	$1,600,000	$2,720,000
Total			**$10,160,000**	**$17,300,000**

Recommended Bicycle and Pedestrian Projects

Proposed bicycle and pedestrian projects were evaluated for their potential to address the most pressing needs facing the multimodal system in Watertown. The resulting evaluation assigned priority to the proposed projects—those identified as high priority were included in the recommended project list.

Priority was determined based on the type and location of the project. Projects that connect the existing bicycle and pedestrian network, improve safety, or provide on-street facilities are considered high priority, while construction of new trail was considered lower priority. Any project that could constructed along with a recommended roadway project also received high priority. The table below contains the complete list of prioritized projects.

ID	Location	Proposed Improvement	Type	Cost (2020 $)	Priority
5	11th St NE & 3rd Ave NE	Upgrade signal to have pedestrian count-down; make ADA accessible on west side	Crossing Improvement	$40,000	High
11	N Broadway & 14th Ave NW	Continental Crosswalks; make south side ADA Accessible, infill sidewalk gaps	Crossing Improvement	$42,000	High
14	N Broadway & 10th Ave NW	Conduct multiway stop sign engineering study; make north side ADA Accessible; continental crosswalks; infill sidewalk gaps	Crossing Improvement	$42,000	High
17	N Broadway & 1st Ave NW	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts	Crossing Improvement	$4,000	High
18	N Broadway & E Kemp Ave	Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts	Crossing Improvement	$4,000	High
19	N Broadway & 1st Ave SW	Continental crosswalks; Add Detectable Warning Surface on all curb cuts	Crossing Improvement	$4,000	High
24	N Broadway & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	Crossing Improvement	$80,000	High
25	3rd Ave NE & 6th St NE	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts	Crossing Improvement	$2,000	High
26	3rd Ave NE & 8th St NE	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	High
38	E Kemp Ave & 4th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	High
51	11th St NE between 3rd Ave NE & Arrow Ave NE	Mid-block crossing connecting Watertown Sr High School and Lake Area Technical College - need further study to determine exact location; continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs	Midblock Crossing	$83,000	High

52	11th St NE between Arrow Ave NE & 1st Ave NE	Mid-block crossing connecting overflow parking and Lake Area Technical College, continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs	Midblock Crossing	$83,000	**High**
53	4th Ave SE between 2nd St SE & 3rd St SE	Mid-block crossing connecting parking lot and Roosevelt Elementary School; continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs	Midblock Crossing	$83,000	**High**
60	14th Ave NE & 19th St E	Controlled Crossing	Trail Crossing Improvement	$3,000	**High**
71	Airport Dr & SD-20	Controlled Crossing	Trail Crossing Improvement	$4,000	**High**
108	W Kemp Ave & Kampeska Blvd	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**High**
110	W Kemp Ave east of 6th St NW	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**High**
115	Broadway, 10th Ave to 7th Ave	Bike boulevard	Bike Boulevard	$125,000	**High**
116	Broadway, 3rd Ave NE to 3rd Ave SE	Sharrows	Sharrows	$74,250	**High**
117	Broadway, 3rd Ave SE to 9th Ave SE / US 212	Buffered bike lane	Buffered Bike Lane	$0	**High**
118	11th Street E, 14th Ave NE to 9th Ave SE / US 212	Conventional bike lane	Conventional Bike Lane	$270,000	**High**
119	19th Street SE, 14th St NE to 9th Ave SE / US 212	Buffered bike lane	Buffered Bike Lane	$370,000	**High**
120	E Kemp Ave, 21st St NW to 19t St SE	Bike boulevard	Bike Boulevard	$750,000	**High**
122	3rd Ave NW, 21st NW to 19th St NE	Buffered bike lane	Buffered Bike Lane	$135,000	**High**
3	11th St NE & 6th Ave NE	Conduct multiway stop sign engineering study; square up intersection; continental crosswalks; continue crosswalks through parking lot	Crossing Improvement	$2,000	**Medium**
4	11th St NE & 5th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Medium**

20	N Broadway & 4th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on all curb cuts	Crossing Improvement	$4,000	**Medium**
33	W Kemp Ave & 2nd St SW	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Medium**
34	W Kemp Ave & 1st St SW	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Medium**
35	E Kemp Ave & N Maple	Upgrade signal to have pedestrian count-down; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Medium**
37	E Kemp Ave & 3rd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Medium**
45	19th St SE & 13th Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks	Crossing Improvement	$2,000	**Medium**
46	4th Ave SE & S Maple	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Medium**
47	4th Ave SE & 2nd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks	Crossing Improvement	$2,000	**Medium**
54	N Broadway & S Kempeska Blvd	Uncontrolled Crossing	Trail Crossing Improvement	$1,000	**Medium**
55	3rd Ave NW near 1st Ave NW	Uncontrolled Crossing	Trail Crossing Improvement	$100,000	**Medium**
56	3rd Ave NE near 22nd St E	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**
57	33rd St SE near US-212	Uncontrolled Crossing	Trail Crossing Improvement	$0	**Medium**
59	14th Ave NE & 20th St NE	Controlled Crossing	Trail Crossing Improvement	$23,000	**Medium**
61	14th Ave NW & 4th St NW	Uncontrolled Crossing	Trail Crossing Improvement	$23,000	**Medium**

62	14th Ave NW & 6th St	Uncontrolled Crossing	Trail Crossing Improvement	$3,500	**Medium**
63	7th St NW south of 14th Ave NW	Uncontrolled Crossing	Trail Crossing Improvement	$0	**Medium**
64	10th Ave NW near 7th St NW	Uncontrolled Crossing	Trail Crossing Improvement	$100,000	**Medium**
65	10th Ave NW east of 9th St NW	Uncontrolled Crossing	Trail Crossing Improvement	$100,000	**Medium**
66	SD-20 Slip Ramp south of 10th St NW	Uncontrolled Crossing	Trail Crossing Improvement	$3,500	**Medium**
67	10th St NW & SD-20	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
68	14th Ave NW & SD-20	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**
70	Sioux Conifer Rd & SD-20	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**
72	SD-20 & S Lake Dr	Uncontrolled Crossing	Trail Crossing Improvement	$320,000	**Medium**
73	Forsberg Park & SD-20	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
74	SD-20 & N Lake Dr/451st Ave	Uncontrolled Crossing	Trail Crossing Improvement	$301,000	**Medium**
75	SD-139 east of SD-20 connection	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
76	SD-139 & N Lake Dr	Uncontrolled Crossing	Trail Crossing Improvement	$3,500	**Medium**
77	SD-139 & 458th Ave	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**
78	SD-139 & County Rd 8 2/10	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**

79	SD-139 & 449th Ave	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**
80	SD-139 & 169th Ave	Controlled Crossing	Trail Crossing Improvement	$3,000	**Medium**
82	Codington Memorial Park & Campground	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
84	S Lake Dr & Prairie Hills Dr	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
85	S Lake Dr north of Prairie Hills Dr	Uncontrolled Crossing	Trail Crossing Improvement	$60,000	**Medium**
87	Co Rd 17 5/10 & Prairie Winds Golf Club	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
88	CO Rd 12 3/10 & 43rd St NW	Controlled Crossing	Trail Crossing Improvement	$0	**Medium**
89	CO Rd 12 3/10 west of 43rd St NW	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
92	S Lake Dr & Jackson Park (south entrance)	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
93	Jackson Park (south)	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**
94	S Lake Dr & Jackson Park (north entrance)	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**
95	Jackson Park (north)	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
96	S Lake Drive west of Casino Speedway	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**
97	Stokes-Thomas Lake City Park & S Lake Dr	Uncontrolled Crossing	Trail Crossing Improvement	$1,000	**Medium**
99	5th Ave NW & Co Rd 12 3/10	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**

100	3rd Ave NW & Co Rd 12 3/10	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
101	Co Rd 12 3/10 & 4th Ave SW	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
104	4th Ave SW & 19th St SW	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
105	4th Ave SW & 14th Ave SW	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
106	4th Ave SW west of S Kampeska Blvd	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Medium**
107	4th Ave SW & S Kampeska Blvd	Controlled Crossing	Trail Crossing Improvement	$3,500	**Medium**
109	Kampeska Blvd north of W Kemp Ave	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Medium**
111	1st Ave NW & 3rd St NW	Uncontrolled Crossing	Trail Crossing Improvement	$5,000	**Medium**
112	Codington County Hwy Shop & SD-20	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
113	Fireside Camper & SD-20	Controlled Crossing	Trail Crossing Improvement	$4,000	**Medium**
121	4th Ave SE, 4th St SW to 14th St SE	Conventional bike lane	Conventional Bike Lane	$135,000	**Medium**
1	11th St NE & 10th Ave NE	Continental Crosswalks	Crossing Improvement	$2,000	**Low**
2	11th St NE & 7th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Low**
6	11th St NE & E Kemp Ave	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Crossing Improvement	$42,000	**Low**
7	11st St NE & 2nd Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Crossing Improvement	$42,000	**Low**

8	11st St NE & 3rd Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Crossing Improvement	$42,000	**Low**
9	11st St NE & 4th Ave SE	Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps	Crossing Improvement	$42,000	**Low**
10	11st St NE & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	Crossing Improvement	$40,000	**Low**
12	N Broadway & 12th Ave NE	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps	Crossing Improvement	$2,000	**Low**
13	N Broadway & N Highland Blvd	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps	Crossing Improvement	$2,000	**Low**
15	N Broadway & 3rd Ave NW	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Low**
16	N Broadway & Carpenter Pl	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on east sidewalks	Crossing Improvement	$4,000	**Low**
21	N Broadway & 5th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on SW curb cuts	Crossing Improvement	$4,000	**Low**
22	N Broadway & 6th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on NW curb cuts	Crossing Improvement	$4,000	**Low**
23	N Broadway & 8th Ave SW	Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts	Crossing Improvement	$2,000	**Low**
27	3rd Ave NE & 9th St NE	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps	Crossing Improvement	$4,000	**Low**
28	3rd Ave NE & 13th St NE	Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps	Crossing Improvement	$4,000	**Low**
29	W Kemp Ave & 15th St NW	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Low**
30	W Kemp Ave & 13th St NW	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Low**

31	W Kemp Ave & 12th St NW	Conduct multiway stop sign engineering study; continental crosswalks	Crossing Improvement	$2,000	**Low**
32	W Kemp Ave & 3rd St SW	Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Low**
36	E Kemp Ave & 2nd St SE	Upgrade signal to have pedestrian count-down; Continental Crosswalks	Crossing Improvement	$2,000	**Low**
39	19th St SE & US-212	Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps	Crossing Improvement	$80,000	**Low**
40	19th St SE & E Kemp Ave	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on west side	Crossing Improvement	$4,000	**Low**
41	19th St SE & 1st Ave NE/ Willow Creek Dr	Continental Crosswalks	Crossing Improvement	$2,000	**Low**
42	19th St SE & 3rd Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on NW	Crossing Improvement	$4,000	**Low**
43	19th St SE & 10th Ave NE	Conduct multiway stop sign engineering study; Continental Crosswalks	Crossing Improvement	$2,000	**Low**
44	19th St SE & 12th Ave NE	Conduct multiway stop sign engineering study	Crossing Improvement	$0	**Low**
48	4th Ave SE & 3rd St SE	Conduct multiway stop sign engineering study; Continental Crosswalks	Crossing Improvement	$2,000	**Low**
49	4th Ave SE & 6th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Low**
50	4th Ave SE & 7th St SE	Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface	Crossing Improvement	$4,000	**Low**
58	14th Ave & 22nd St E	Controlled Crossing	Trail Crossing Improvement	$23,000	**Low**
69	26th Ave NW & SD-20	Controlled Crossing	Trail Crossing Improvement	$3,000	**Low**
81	SD-139 east of Sunset Dr	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Low**

83	Pompeska Dr & S Lake Dr	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Low**
86	Co Rd 17 5/10 & 54th St W	Controlled Crossing	Trail Crossing Improvement	$3,000	**Low**
90	42nd St NW & County Rd 12 3/10	Controlled Crossing	Trail Crossing Improvement	$3,000	**Low**
91	42nd St NW Slip Ramp	Uncontrolled Crossing	Trail Crossing Improvement	$3,000	**Low**
98	Co Rd 12 3/10 & 33rd St NW	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Low**
102	4th Ave SW & Co Rd 14A	Controlled Crossing	Trail Crossing Improvement	$5,000	**Low**
103	21st St NW & W Kemp Ave	Uncontrolled Crossing	Trail Crossing Improvement	$4,000	**Low**
114	System wide	Trail Expansion	Trail Expansion	$17,251,000	**Low**

Appendix F

Public Involvement

Public Meeting No. 1 Online Meeting Summary

January 2nd – 31st, 2021

Watertown Area Master Transportation Plan Update

SDDOT/City of Watertown

February 15, 2021

Table of Contents

Public Meeting # 1 Overview

Meeting Details

Date: January 2nd – January 31st, 2021

Location: Online Meeting Hosted at www.watertownmtp.com

Overview: Because of continued restrictions placed upon public gatherings associated with the COVID-19 pandemic, it was required that an online meeting format be used for Public Meeting No. 1 instead of the traditional in-person format. The online meeting and survey were open for review and public comment from Saturday, January 2nd through Sunday, January 31st, 2021.

Advertisements: Watertown Public Opinion (1/2/21 and 1/16/21) and Coteau Shopper (1/10/21 and 1/24/21), project website, SDDOT press release and website, City website, and City Facebook post.

On-line meeting information: The project team hosted an online public meeting for the Watertown Area Master Transportation Plan (MTP) to present an overview of the project and gather feedback from the public and stakeholders. In general, meeting information focused on roadway, bicycle and pedestrian, transit and air issues/needs.

Attendance: Based on the information received from project website traffic, the following data was collected:

- Page views total: 233
- Unique Page views: 200
- Average time on page: 4:20
- Total users: 246
- Top visitor locations:
    - Watertown
    - Sioux Falls
    - Mitchell
    - Brookings
    - Aberdeen

Project Website

https://www.watertownmtp.com/storymap.html

The online public meeting guided the attendees through a seven step process, including:

1. Welcome & Overview
2. Safety Analysis & Interactive Mapping Activity
3. Traffic Analysis & Interactive Mapping Activity
4. Origin-Destination (O-D) Analysis
5. Bike and Pedestrian Elements & Interactive Mapping Activity
6. Conclusion, Next Steps, & Comments
7. Online Survey

The interactive mapping activities allowed participants to place suggested improvements or strategies at a desired location where the participant believed there were deficiencies or limitations on the current transportation system. The online survey allowed participants to rank the importance of a specific type of improvement or strategy in addressing system shortfalls. Participants also were able to make general comments with regards to the presented materials or with regards to the project as-a-whole.

The online meeting has been archived on the project website for continued viewing of materials at the following link: https://watertownmtp.com/storymap.html

Results

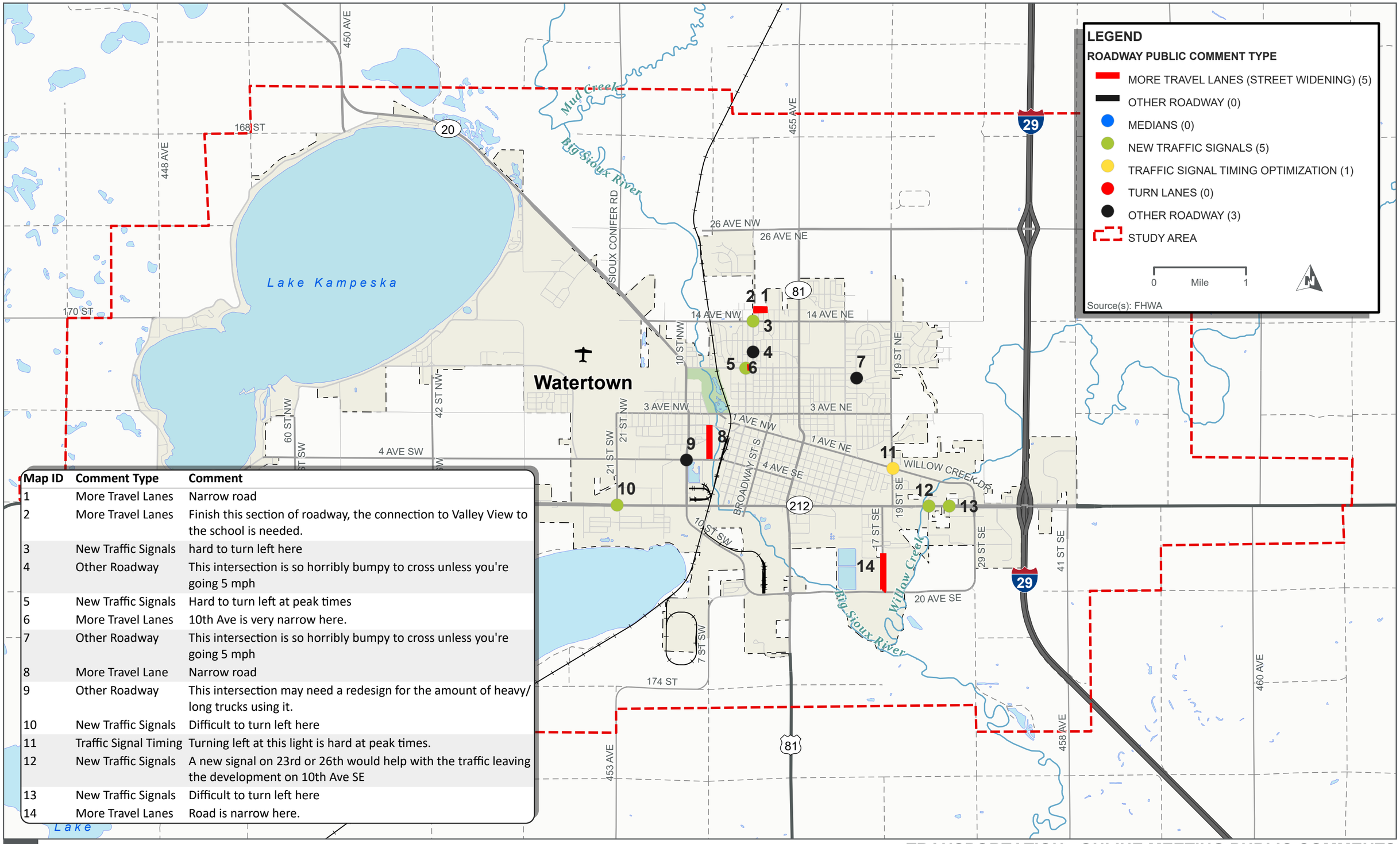
Roadway Needs Activity

While we wish we could implement every single project idea right away, unfortunately it isn't possible for Watertown to do so with fiscal constraints. The meeting attendees were asked to identify locations where they believe improvements are needed on the transportation network.

Solutions to address traffic issues included:

- More Travel Lanes (Street Widening)
- New Traffic Signals
- Traffic Signal Timing Optimization/Coordination
- Turn Lanes
- Medians/Access Control

The comments and targeted location of participant identified issues/recommendations are noted on the attached map.



Map ID	Comment Type	Comment
1	More Travel Lanes	Narrow road
2	More Travel Lanes	Finish this section of roadway, the connection to Valley View to the school is needed.
3	New Traffic Signals	hard to turn left here
4	Other Roadway	This intersection is so horribly bumpy to cross unless you're going 5 mph
5	New Traffic Signals	Hard to turn left at peak times
6	More Travel Lanes	10th Ave is very narrow here.
7	Other Roadway	This intersection is so horribly bumpy to cross unless you're going 5 mph
8	More Travel Lane	Narrow road
9	Other Roadway	This intersection may need a redesign for the amount of heavy/ long trucks using it.
10	New Traffic Signals	Difficult to turn left here
11	Traffic Signal Timing	Turning left at this light is hard at peak times.
12	New Traffic Signals	A new signal on 23rd or 26th would help with the traffic leaving the development on 10th Ave SE
13	New Traffic Signals	Difficult to turn left here
14	More Travel Lanes	Road is narrow here.

TRANSPORTATION - ONLINE MEETING PUBLIC COMMENTS

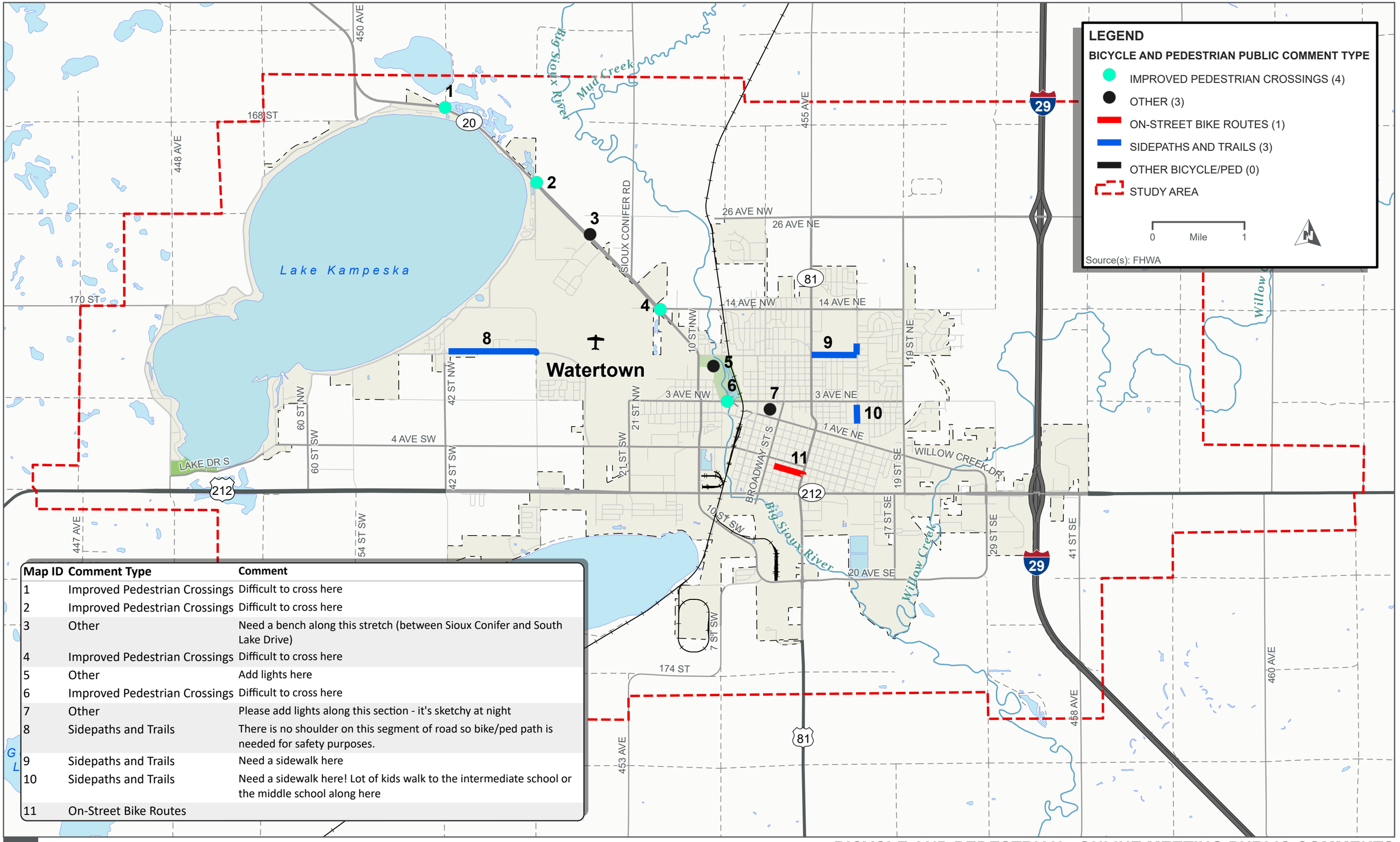
Bike and Pedestrian Needs Activity

To help identify and prioritize bicycle and pedestrian improvements, the meeting attendees were asked to identify the kinds of and locations of improvements that are most important to them.

The improvement types included:

- Improved Pedestrian Crossings
- On-street bike routes
- Sidepaths and Trails
- Other

The comments and targeted location of participant identified issues/recommendations are noted on the attached map.



Map ID	Comment Type	Comment
1	Improved Pedestrian Crossings	Difficult to cross here
2	Improved Pedestrian Crossings	Difficult to cross here
3	Other	Need a bench along this stretch (between Sioux Conifer and South Lake Drive)
4	Improved Pedestrian Crossings	Difficult to cross here
5	Other	Add lights here
6	Improved Pedestrian Crossings	Difficult to cross here
7	Other	Please add lights along this section - it's sketchy at night
8	Sidepaths and Trails	There is no shoulder on this segment of road so bike/ped path is needed for safety purposes.
9	Sidepaths and Trails	Need a sidewalk here
10	Sidepaths and Trails	Need a sidewalk here! Lot of kids walk to the intermediate school or the middle school along here
11	On-Street Bike Routes	

BICYCLE AND PEDESTRIAN - ONLINE MEETING PUBLIC COMMENTS

Online Survey

The online survey included a total of 17 questions regarding the existing transportation system, bike/pedestrian system, transit system, air service, budget priorities, and respondent demographics.

A total of 29 surveys were received. Survey questions and results are as follows:

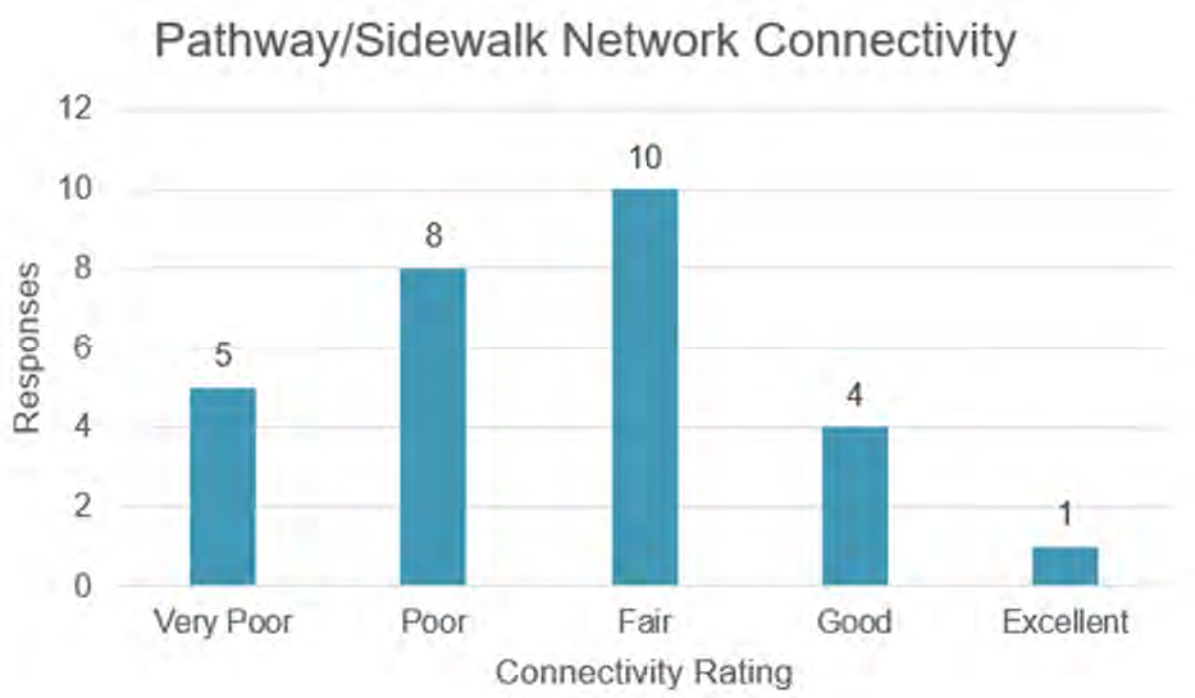
Q1. How would you rate the overall condition of streets/road in Watertown?

Q2. How would you rate the overall connectivity of the street/road network in Watertown?

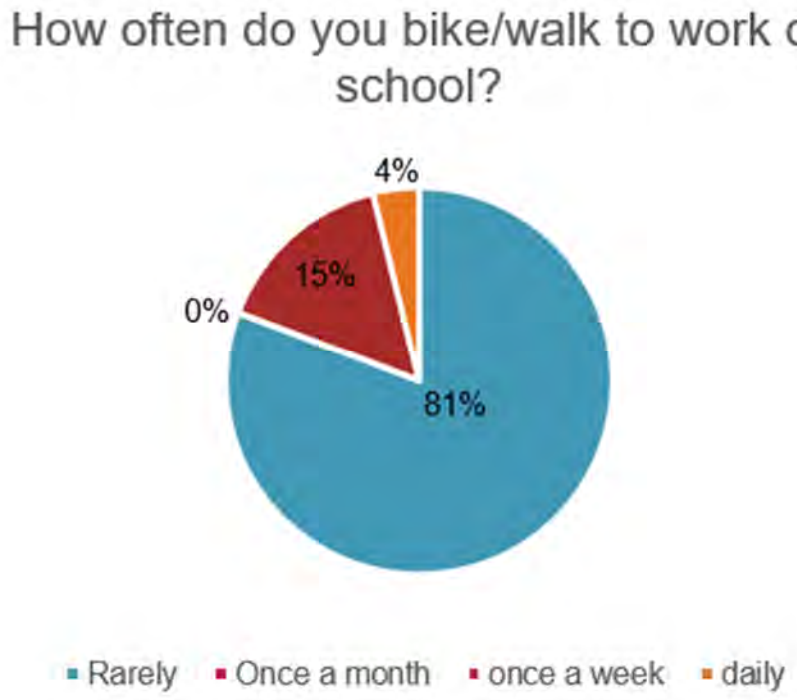
Q3. What improvements/needs do you feel are necessary to enhance the street/road network in Watertown (select top 3)?

Q4. What areas of driver safety are you most concerned about in Watertown (select up to 3)?

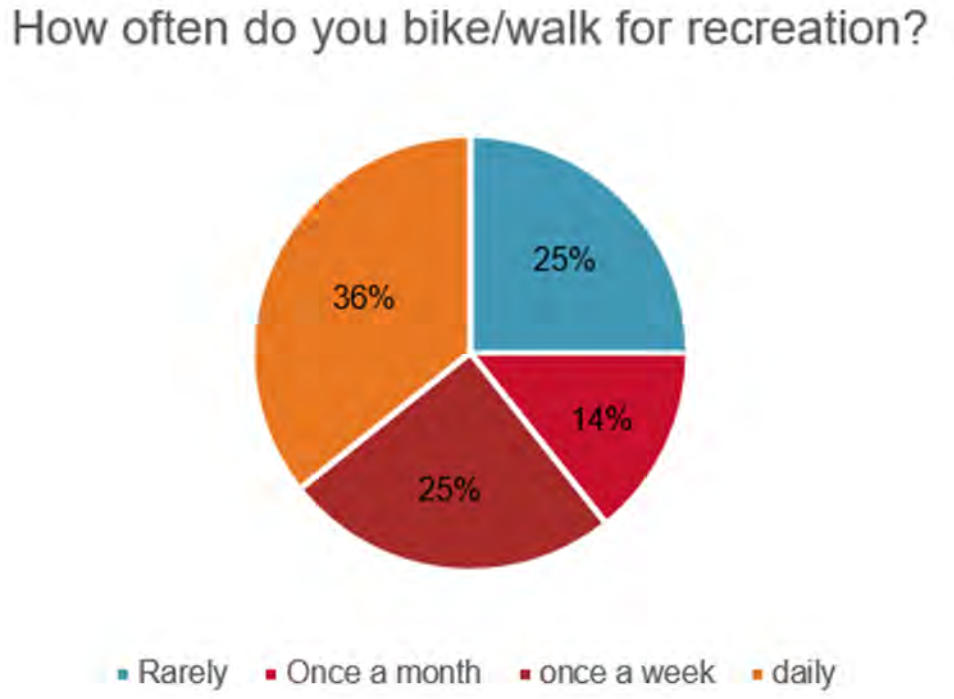
Q5. How would you rate the quality of the pathway/sidewalk network in Watertown?



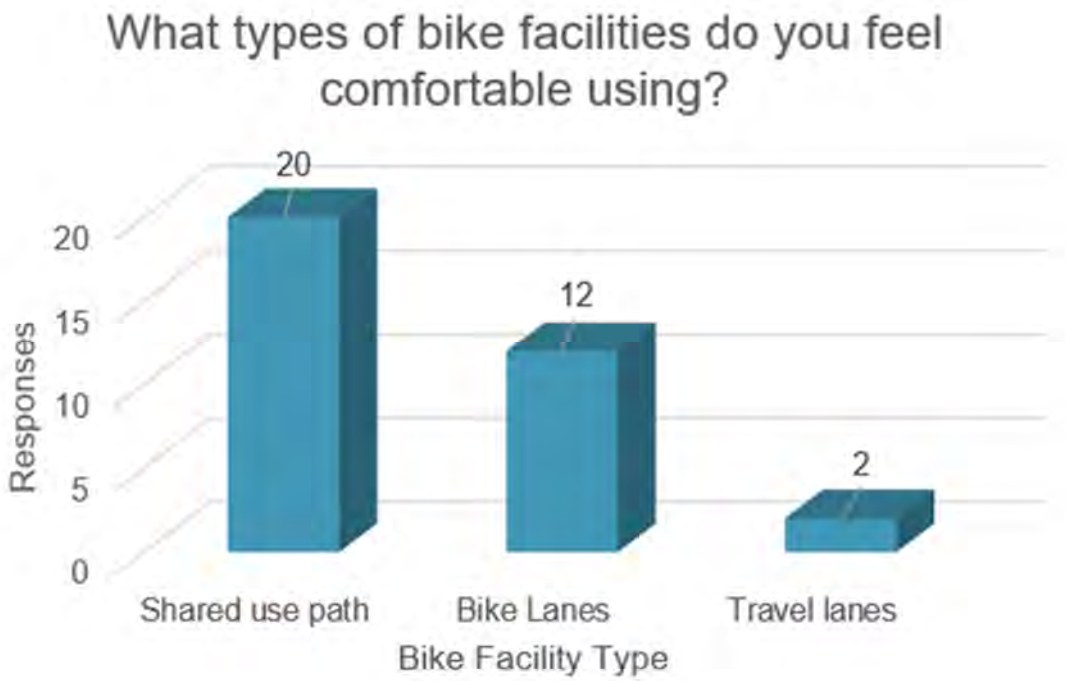
Q6. How often do you: A. – Bike or walk to work or school, B. – Bike or walk to shop, eat, or run errands, C. – Bike or walk for exercise/recreation?



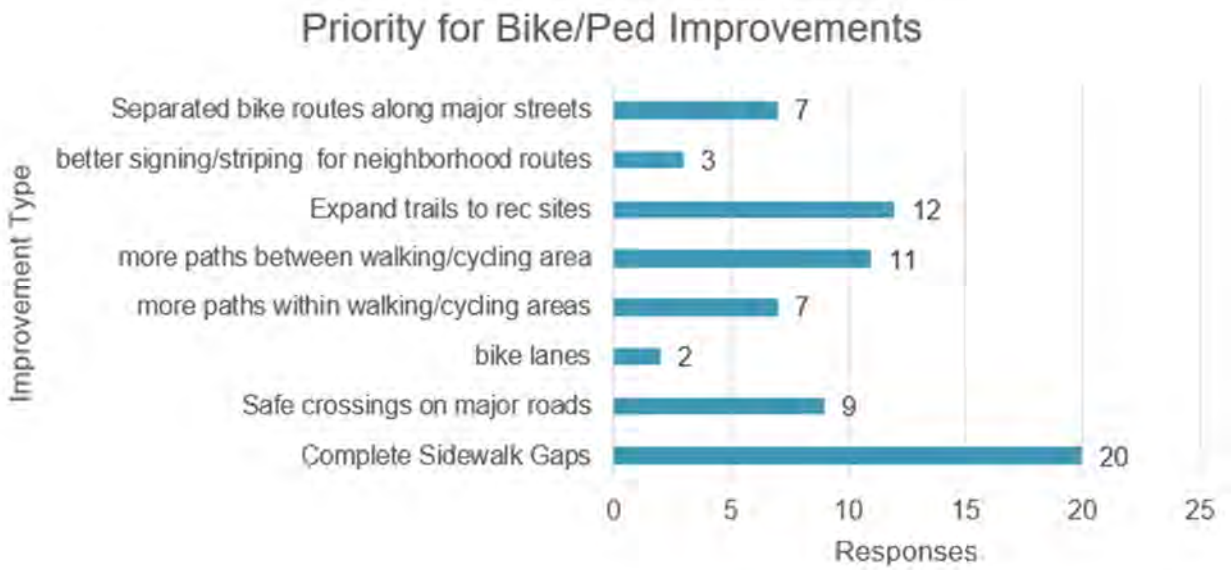

How often do you bike/walk to shop, eat, or run errands?
0%
22%
15%
63%
Rarely
Once a month
once a week
daily


How often do you bike/walk for recreation?
25%
36%
14%
25%
Rarely
Once a month
once a week
daily

Q7. Which type of bike path facilities do you feel comfortable using (select all that apply)?

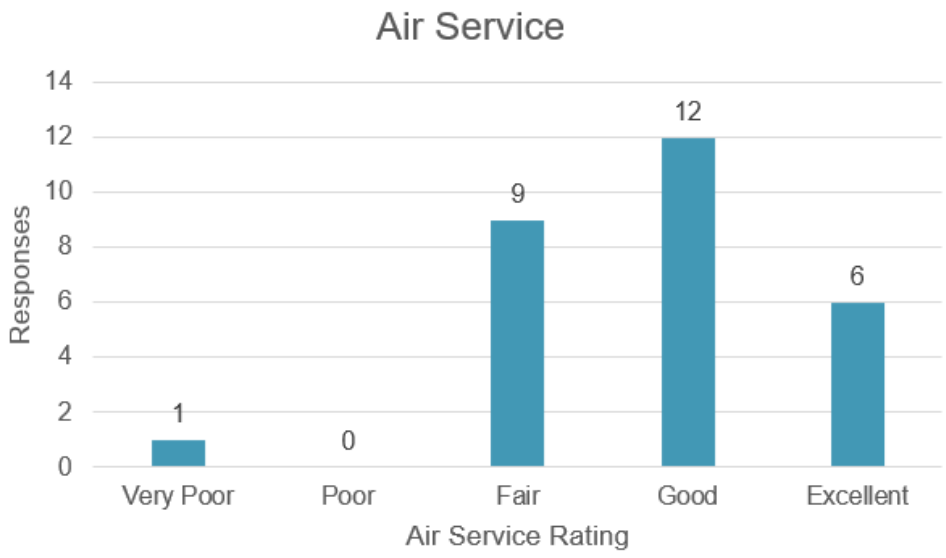


Q8. Which of the following approaches do you believe would most improve the bicycle and pedestrian network (select up to 3)?



Q9. How would you rate the transit services provided in Watertown?

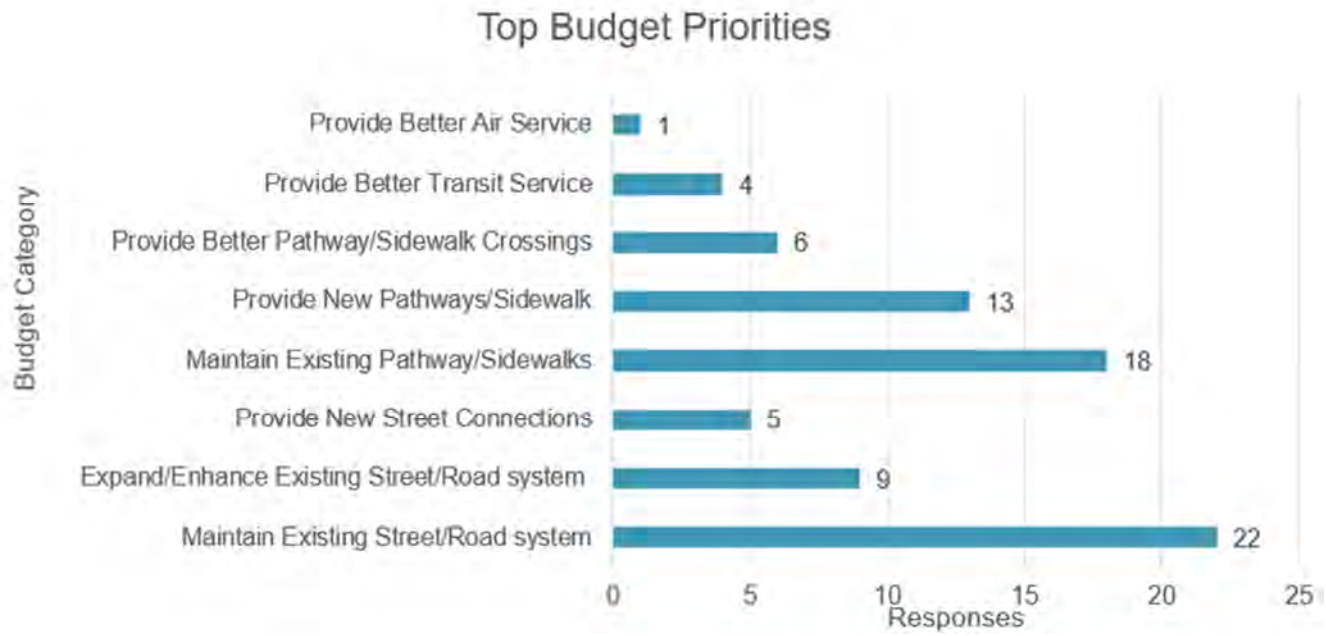
Q10. How would you rate the air travel services provided in Watertown?



Q11. What would improve your satisfaction with transit/and or air services offered in Watertown?

- More transit availability.
- Air service directly to Phoenix.
- Transit routes that would not need to be called in for reservation service.
- I would offer more taxi service within city limits. Or even a bus transit service that does not require a reservation ahead of time. Perhaps between the Downtown district, the mall, Walmart, Rec. Center, etc.
- I wish there were more sidewalks. Like between the high school and 212 there are practically no sidewalks an lots of traffic especially when kids are walking to or from school. Also along 212 and along 19th ave, no sidewalks or hardly any. These are high traffic areas and not everyone has a car or just wants to make a healthier travel choice. Let's making walking/riding bikes safer for everyone. I'm sure there are other areas that I don't know about that need the same consideration.
- If you are building a new airport you must feel there is a need for more flights since you have 2 loading ramps. I don't feel two ramps are needed and a lot of tax money is being wasted at the airport.
- Cheaper flights; more flight times
- I don't fly – so hard to answer that.
- If transit were able to run more frequently and not have to give 24 hours notice prior to a ride.

Q12. What do you believe are the top budget priorities for transportation improvements in Watertown (select up to 3)?

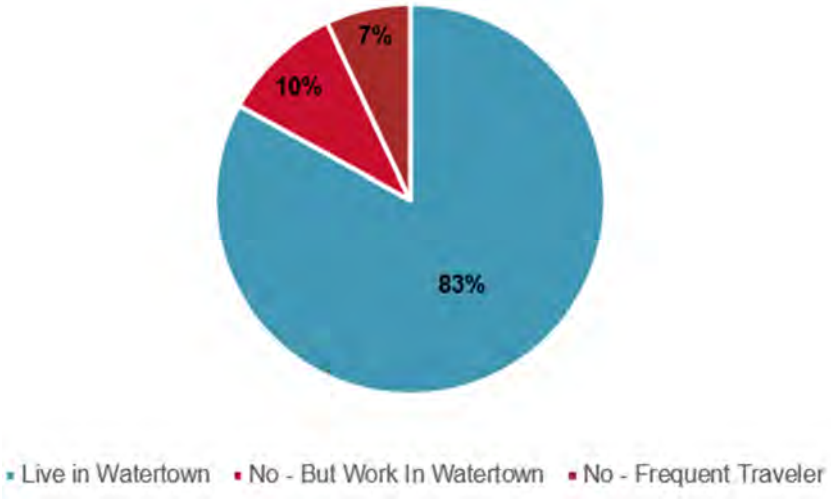


Q13. Overall what do you think are the most pressing transportation issues/needs for Watertown?

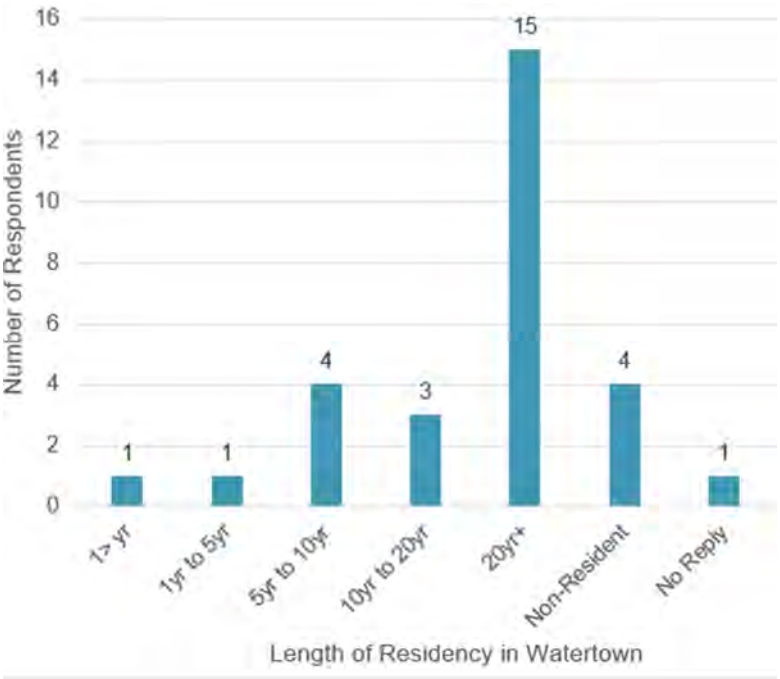
- More bike/walking paths/trails
- Addressing Sidewalk Gaps and Condition
- Sidewalks
- Widen Hwy 20 Intersection at Municipal Utilities Building, Better Transit with fixed routes, New Interchange I29 north of Terex
- More outdoor Recreation
- Fix what we have then look at expansion
- There needs to be significant investment in US212 from SD20 to east of Interstate 29, including traffic calming techniques, synchronized traffic signals, access consolidations and closures, and pedestrian side paths. One key location that I would recommend improving is consolidating 31st Street SE and 35th Street Circle SE to a common access point at the newly constructed signal at 33rd Street SE, streamlining access to business north of US212 and increasing intersection spacing between the frontage road network and the southbound Interstate 29 ramps. Another location of focus is the stretch of US212 from US81 to 19th Street SE, which could include access closures and consolidations, streamlined traffic signals, a wider center-turn lane, and sidewalks on both sides of the road; many of these solutions would require right-of-way acquisition.
- We need more turning lanes and/or turn signals on the major highways. Such as a left turning light signal at Hwy. 20 & 4th SW, right turning signal at Hwy 20 & 212. It might be nice to have a street light at Hwy 20 & 10th NW.
- See previous comment.
- Making a left turn on the residential streets – 10th street, 3rd street, Hwy 81 by the Cowboy is just about impossible during school and morning commute. We need a specific turn light and a turn lane.
- You have many residential areas with no sidewalks or curb and gutter. Some aren't even paved. Every street should be paved with sidewalks and curb and gutter, if residents can't pay, put it on the taxes. Sidewalks should be mandatory in school zones
- I am primarily concerned with the lack of walkability in Watertown. For the most part, it's fairly easy to get across town in 10 -15 minutes as there seems to be enough "artery" roads. However, I see tons of kids walking home from school along busy roads (and not against traffic) where there are no sidewalks (11 ST SE) and it scares the sheep out of me. I think there is also a dire need for a pedestrian crossing at the bridge over Willow Creek on 212 by TSC. I've seen pedestrians cross it in thick traffic and that's also terrifying to witness. I think there are a lot of amenities in Watertown in terms of retail, food, and entertainment, but they aren't accessible to those without cars or who want to reduce car use. Also, there really needs to be a traffic signal at the Trav's intersection. Lots of left-turners taking risks turning on to 212!
- All residential areas should have sidewalks. Too many don't. I'm sorry if residents cant afford it. Prorate in taxes. Especially in a 6 block radius around all schools.

- Bike paths to/around lake Kampeska are in very poor shape…major cracks, subterranean holes/caving in because if water issues, grass/weed growth in the cracks, etc. Need more maintenance and re-builds of the existing paths.

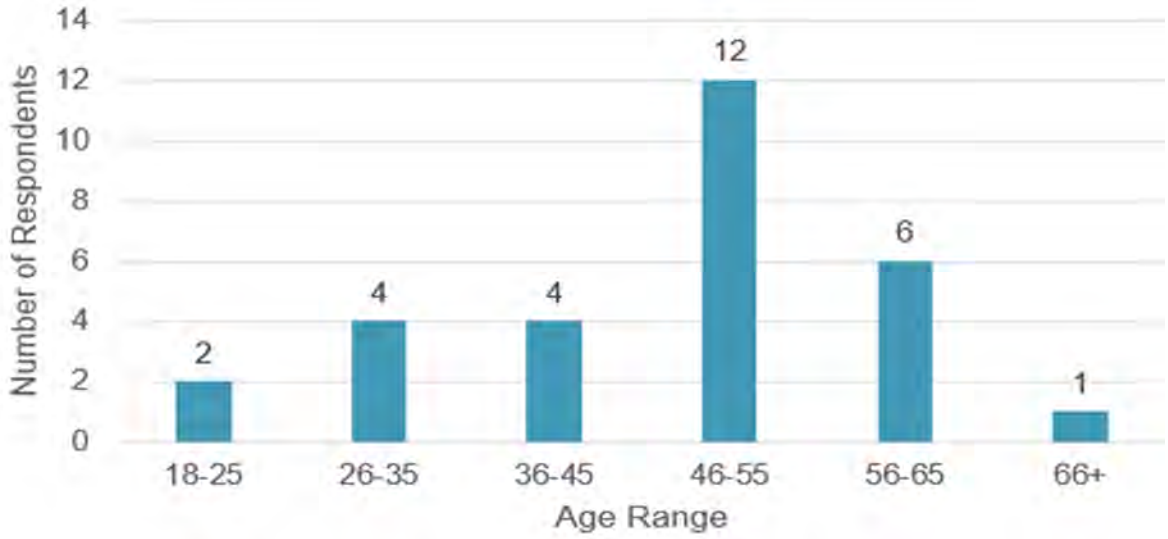
Q14. Which best describes you?



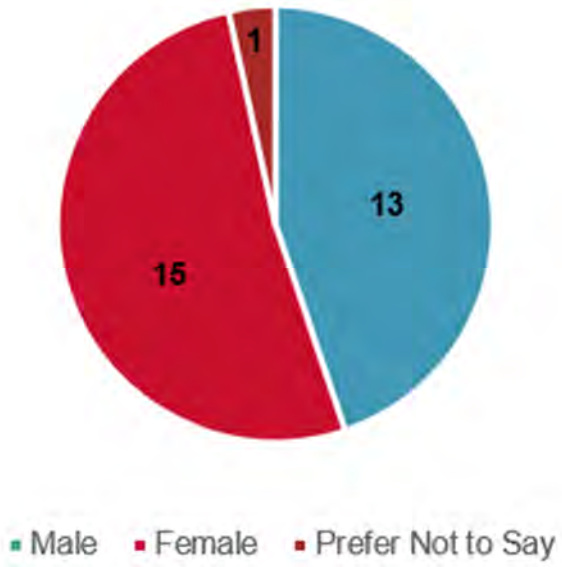
Q15. If you live in Watertown, how long have you lived here?



Q16. What is your age?



Q17. What is your gender?



Public Meeting # 2 Overview

Meeting Details

Date: May 1st – May 31st, 2021

Location: Online Meeting Hosted at www.watertownmtp.com

Overview: Because of continued restrictions placed upon public gatherings associated with the COVID-19 pandemic, it was required that an online meeting format be used for Public Meeting No. 2 instead of the traditional in-person format. The online meeting was open for review and public comment from Saturday, May 1st through Monday, May 31st, 2021.

Advertisements: Watertown Public Opinion (5/1/21 and 5/15/21) and Coteau Shopper (5/9/21 and 5/23/21), project website, SDDOT press release and website, City website, and City Facebook post.

On-line meeting information: The project team hosted an online public meeting for the Watertown Area Master Transportation Plan (MTP) to present the findings of the analysis completed for the future conditions, standards development, and the draft recommendations provided for the future transportation network. The meeting also provided an opportunity to gather feedback from the public and stakeholders. In general, meeting information focused on future roadway improvements, bicycle and pedestrian improvements, and components of standards development related to the major street plan, development related issues, and transportation design standards.

Attendance: Based on the information received from project website traffic during the month of May, 2021, the following data was collected:

- Page views total: 472
- Unique Page views: 410
- Average time on page: 1:02
- Peak date: May 17th (day of Watertown Public Works Committee Presentation)
- Visitor referral sources:
    - Facebook
    - Dot.sd.gov
    - Watertownsd.us
- Devices:
    - Desktop: 49%
    - Mobile: 47%
    - Tablet: 4%

- Top visitor locations:
  - Watertown
  - Aberdeen
  - Sioux Falls
  - Pierre
- Online Meeting Page views: 36
- Average Meeting Visit Length: 14:16
- Peak dates:
  - May 3 – 5
  - May 28

Project Website & Meeting Content

https://www.watertownmtp.com/onlinemeeting/

The online public meeting guided the attendees through a five-step process, including:

1. Welcome & Overview
2. Public Meeting No. 1 Review
3. Future Conditions Analysis
4. Standards Development
5. Conclusion, Comments, and Questions

Each of the topics noted contained a short presentation video which provided an overview of the analysis completed and the draft recommendations associated with the specific analysis topic.

The online meeting has been archived on the project website for continued viewing of materials at the following link:

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Written & Verbal Comments

Two comments were received during the online meeting, one through the comment link provided and a second provided via a citizen who called the project team and provided verbal comments. The comments provided were as follows:

Written comments

- Name: Mark P Rodvold
- Submission Date: May 28, 2021 1:26 PM
- Comments:
  - 1) Consider recommending method(s) to link MTP to 3-5 year Improvement Program WITHIN MTP document.
  - 2) Consider recommending Records Management process WITHIN MTP for signs, signals, Pavement Markings via MUTCD (Summer intern?)

- 3) On SD20, interconnect signals @ Kemp and 3rd Avenue North to improve traffic flow (State/local project)
- 4) Consider locating JUST 1 or 2 specific access points to southern bypass (design parameters?)
- 5) No large-lot rail access industrial site(s) shown, consider inquiry to local development office to modify MTP.

Verbal Comments

- Name: Carol Pieper
- Submission Date: May 10, 2021
- Comments:
  - Concerned with dynamic engine brakes being used by interstate and ramp truck traffic.
  - Requested signage for I-29/Ramps to preclude use of dynamic engine brakes.

Additional Public Presentations

Watertown Public Works, Finance, & Safety Committee

A presentation to the City of Watertown Public Works, Finance, and Safety Committee was provided at 4:00 p.m. on Monday, May 17th, 2021 at the Watertown City Hall Council Chambers. The presentation was streamed online and broadcast through the City's public access system. The presentation provided an overview of the project including the existing conditions analysis, the safety analysis, the origin-destination analysis, the future conditions analysis and recommendations, and the standards development analysis and recommendations. Members of the Public Works Committee had the opportunity to ask questions about the work completed to date and provide input into the study.

Topics of discussion/questions from the committee included a request to provide multiple options for physical buffers/barriers for bike lanes, the inclusion of a future southern interchange in the major street plan, a concern presented regarding the speed limits/speeding on US212 near 21st Street West, and possible additional in-person public involvement. Responses to the discussion items/questions were addressed as follows:

- Options/examples for physical barriers for bike lanes can be provided in the Draft Report
- Recommendations for interim steps/milestones towards a future southern interchange will be provided such that when growth/development dictates a need the City can be prepared with necessary information
- A speed study was not conducted as part of the MTP, however there were no specific crash trends with regard to speed identified in the US212 corridor in the vicinity of 21st Street West
- The online public involvement was a result of the COVID-19 restrictions during the study, however it was noted that online meetings appeared to be very well attended

A link to the Public Works, Finance, and Safety Committee video is provided for reference: https://www.youtube.com/watch?v=Jnkd2oBVEZ8 .

Public Meeting No. 2 Online Meeting Summary

May 1st – 31st, 2021

Watertown Area Master Transportation Plan Update

SDDOT/City of Watertown

June 3, 2021

Table of Contents

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Appendix G

Methods and Assumptions

METHODS & ASSUMPTIONS

FOR THE
WATERTOWN AREA MASTER TRANSPORTATION PLAN UPDATE

PREPARED BY HDR ENGINEERING

FOR THE

THE SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

IN CONJUNCTION WITH

THE CITY OF WATERTOWN, SOUTH DAKOTA

AND THE FEDERAL HIGHWAY ADMINISTRATION

April 2020

This Methods and Assumptions Document was developed in preparation for the Methods and Assumptions Meeting held as part of the project kick-off meeting with representatives from the South Dakota Department of Transportation (SDDOT), City of Watertown, and the Federal Highway Administration (FHWA). This document is intended to serve as a historical record of the study process and methodologies, dates, and decisions made by the study team representatives for the **Watertown Area Master Transportation Plan Update**.

Stakeholder Acceptance Page

The undersigned parties concur with the Methods and Assumptions for the Watertown Area Master Transportation Plan Update as presented in this document.

SDDOT:

_____
Signature

_____
Title

_____
Date

FHWA:

The South Dakota Division of FHWA has relinquished oversight of this study to SDDOT.

Notes:

(1) Participation on the Study Advisory Team and/or signing of this document does not constitute approval of the Watertown Area Transportation Plan Update Final Report or conclusions.

(2) All members of the Study Advisory Team will accept this document as a guide and reference as the study progresses through the various stages of development. If there are any agreed upon changes to the assumptions in this document a revision will be created, endorsed and signed by all the signatories.

1. Introduction and Project Description

Background Information

The South Dakota Department of Transportation (SDDOT) in conjunction with the City of Watertown, and the Federal Highway Administration (FHWA) has contracted with HDR Engineering, Inc. (HDR) to perform a master transportation planning study for the City of Watertown and adjacent portions of Codington County.

Watertown was founded in 1879 as a rail terminus when Chicago & Northwestern Railroad part of a line it had constructed to Lake Kampeska. During the 1880s, Watertown prospered as a transportation hub after the railroads were extended farther west.

In the mid-20th Century, Interstate 29 was constructed through eastern South Dakota. The route included a slight bend to bring the interstate closer to Watertown. The interstate's construction has been a major economic benefit to Watertown. Watertown is served by the Interstate System (I-29), National Highway/Principal Arterial System (US Highways 212 and 81), State of South Dakota Minor Arterial System (SD20), and a local road network.

The community of Watertown is one that demonstrates commitment to preserving and enhancing a unique, diverse and outstanding quality of life. Watertown values and appreciates its past and looks forward to a full and prosperous future. Traffic levels and patterns are anticipated to change over time as the City continues to grow. In 2005, the SDDOT and City of Watertown teamed to develop the Watertown Area Transportation Plan, which established baseline conditions and has guided transportation improvements since. The SDDOT and the City of Watertown recognized the need to update the baseline conditions and plan for future transportation improvements for the area.

The study is expected to fulfill the following objectives:

1. Complete a list of transportation issues and needs facing the Watertown Area.
2. Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic level of service expectations under both the current and predicted future traffic conditions while promoting a livable community that will enhance the economic and social well-being of Watertown residents.
3. Create final products for use by the City of Watertown and the SDDOT which will provide guidance to implement recommended improvements and react to future development plans within the area.
4. Involve and engage the public in the development of the plan.

Location and Study Area

The City of Watertown is located in northeastern South Dakota and area of study includes the City of Watertown and immediately adjacent areas of Codington County as depicted in **Figure 1**.

Area of Study:

The study area encompasses the area surrounding the City of Watertown, South Dakota indicated by the red boundary line in the map below

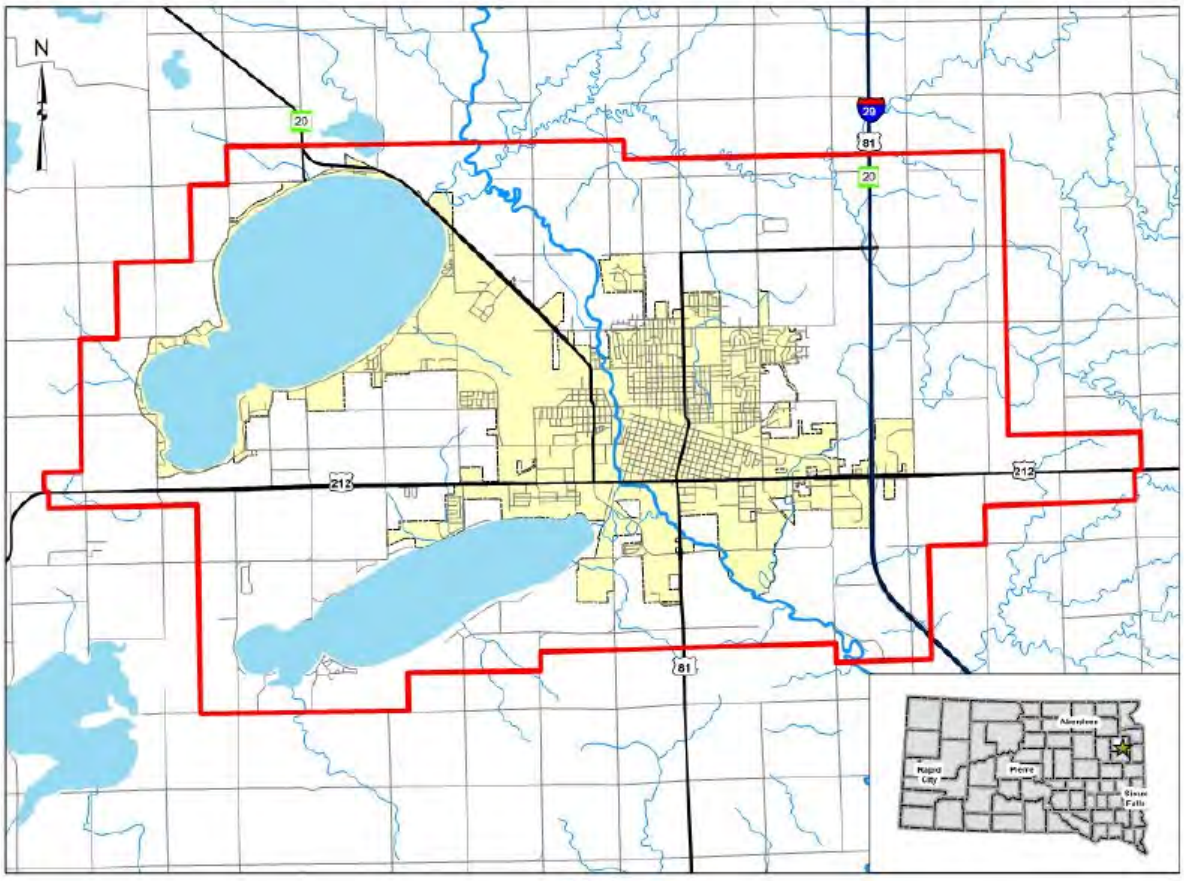

Figure 1: Study Area
(Obtained from RFP)

Need for Study

The last Master Transportation Plan was completed in 2005 and has guided transportation improvements for the past 15 year period. Watertown has successfully implemented several projects identified in the 2005 plan and completed a pavement management study in 2017. Additionally, Watertown is finalizing updates to the Comprehensive Plan and has seen gradual, steady growth for several decades. An update to the Master Transportation Plan is now necessary to determine how the projects that have been implemented have altered traffic patterns, how the transportation network has handled growth since 2005, and how future anticipated growth will impact the network. Watertown is also interested in reviewing transportation related development standards and needs associated with new development.

The plan will also review and update the truck route network, emergency services routes, and the bicycle and pedestrian plan.

Study Schedule

Date	Task/Event
February 11, 2020	Notice to Proceed
April 3, 2020	Kick-off Meeting
August 2020	Safety Review Memo
September 2020	Traffic Data Collection
November 2020	Existing Conditions Review
November 2020	Public Meeting No. 1
March 2021	Future Needs Analysis
April 2021	Public Meeting No. 2
May 2021	Draft Report
June 2021	Final Report/Study Completion

Facilities Affected by Study

The facilities affected by this project include the transportation network and systems identified in the study area as depicted in **Figure 1**.

Previous Studies

The following previous studies will be reviewed during this study:

- 2005 Watertown Area Transportation Plan: https://dot.sd.gov/media/documents/WatertownTransportationPlanFinalReportWEB.pdf
- 2007 Update to Watertown Comprehensive Land Use Plan (or 2018 Draft)
- 2017 Watertown Pavement Management Study
- 2014 Codington County Master Transportation Plan: https://dot.sd.gov/media/documents/FinalCodingtonCountyMasterPlan20140807.pdf
- 2002 Sidewalk Plan
- 2012 Trails Master Plan
- US 212 Study
- 2010/2020 Decennial Interstate Studies
- 2020 Watertown Comprehensive Plan (Adopted 4/6/20)

Study Advisory Team Members

Participant	Agency
Steve Gramm	SDDOT – Project Development
Jeff Brink	SDDOT – Watertown Area
Jeff Brosz	SDDOT - Trans. Inv. Management
Paul Nikolas	SDDOT – Road Design
Sarah Caron	Watertown Mayor
Michael Heuer	Watertown City Council
Reid Holien	Watertown City Council
Don Roby	Watertown City Council
Rob Beynon	Watertown Streets
Brandi Hanten	Watertown Planning
Bert Magstadt	Watertown Utilities
TBD	Watertown Engineering
Heath Voneye	Watertown Public Works
Rick Hartley	Codington County Highway
Todd Kays	1st District
Chris Schilken	Watertown Development Company

2. Analysis Years/Periods

The Study will evaluate transportation needs to the year 2040 planning horizon, with a baseline year 2020. An interim 10 year forecast and analysis of key routes and intersections will be developed. Time bands for project implementation are assumed - Short-Term (2020-2025), Mid-Term (2026-2035), Long-Term (2036-2040).

3. Data Collection

Data collection needs for the study will be provided by the City of Watertown, 1st District, and SDDOT and are identified as follows:

- GIS Data including:
  - daily traffic volumes
  - major street plan
  - sidewalk inventory (existing and proposed)
  - transit routes and stops
  - existing and proposed bicycle facilities (bike lanes, paved shoulders, cycle tracks/separated bikeways, trails, side paths, signed routes, shared lane marking, crossing features such as RRFBs, pedestrian signals, etc.)
  - traffic signals
  - existing functional classifications
  - street inventory including existing lanes and posted speeds
  - pavement conditions

  - existing and future land uses
  - on-street parking locations and widths
  - key community destinations (schools, college/university, parks, civic/cultural destinations, recreational destinations, activity centers, community centers, hospitals, etc.)
- Historical CIP/TIP documents
- Traffic data, including volume counts, crash data
- Current CIPs and budgets for jurisdictions
- Recent and on-going studies at the City/Regional/State Level
- Traffic Turning Movement Counts will be conducted by the consultant at the 10 identified locations (**Figure 2**) and up to 4 additional locations determined by the SAT. All traffic data will be collected using standard traffic data collection techniques, which may consist of digital count boards, and/or video cameras at intersections. Counts will be collected on a weekday (Tues./Wed./Thurs.) while schools are in session.

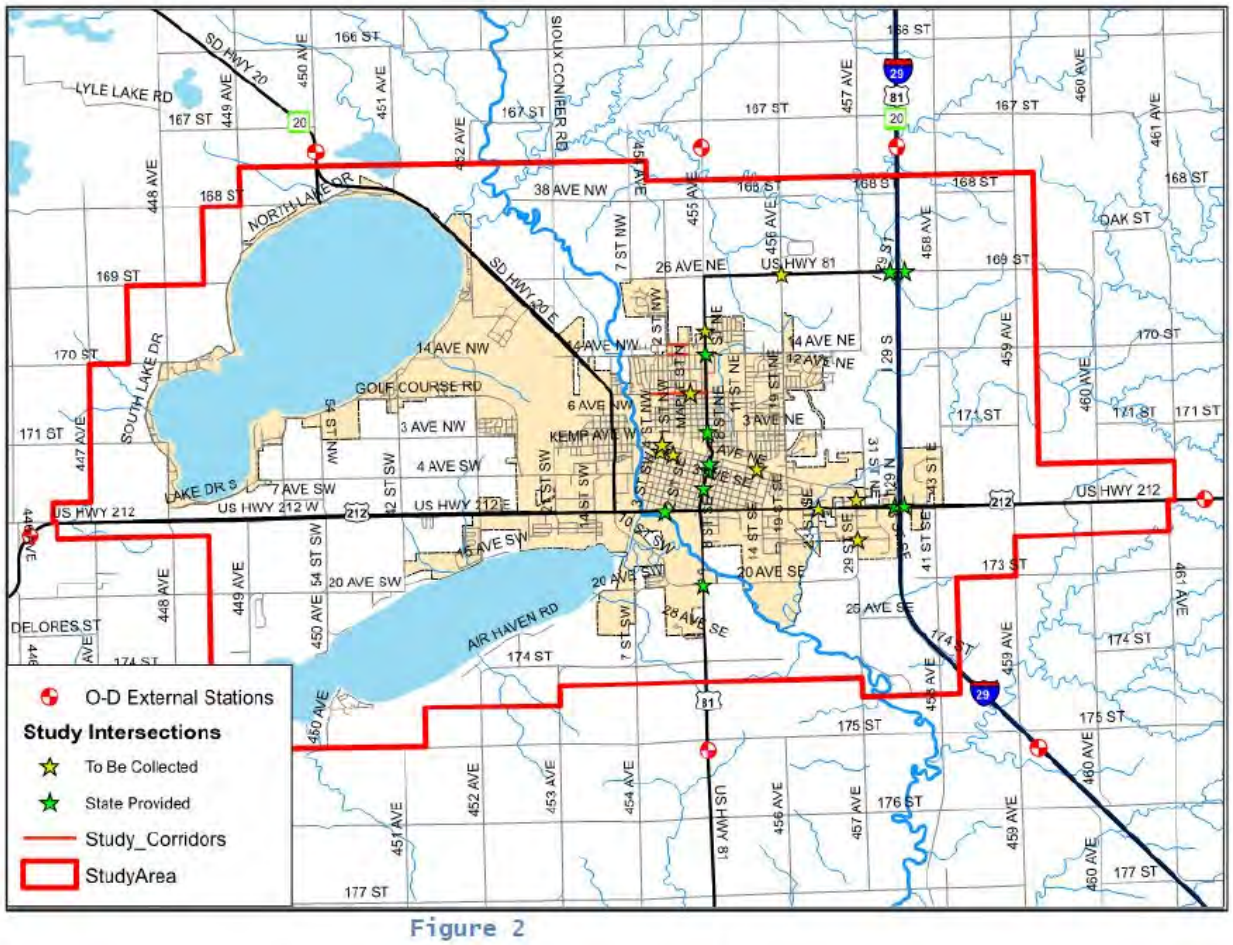

Figure 2

Origin-Destination Data

Origin-Destination (O-D) data will be provided by Streetlight Data. The main purpose of Streetlight data are to reveal observed travel patterns throughout the community. When combined with existing traffic counts in the study area, the Streetlight data can indicate the relative amount of through traffic on a corridor.

The geographic limit is limited to the study area. We propose using the Streetlight data to identify entry and exit points through the study area. Up to 50 unique zones are permitted within the study area. The "entry-exit" gates will be as noted in **Figure 2**. The identified entry-exit gates will be used to identify major O-D patterns through the study area.

If the SAT is interested in any additional specific corridor trends, up to 50 gates can be used in total with the Streetlight data subscription. If the study team thinks there is a benefit, middle filter zones can be used to identify "from to through" patterns so that Streetlight reports the levels of origins and destinations that pass through a particular "middle" street zone. In transportation planning this is called a "select link analysis". If applied, these middle filter zones will count towards the total 50 zones available for analysis. In addition to the O-D functions, additional available metrics that may be used are:

- Zone activity analysis
- Trip attributes (trip duration, length, speed, and circuitry)
- Traveler attributes
- Visitor home-work analysis
- Vehicle mode of travel
- Commercial weight classes
- Segment analysis
- Traffic diagnostics

While Streetlight Data attempts to estimate AADT, this study will not use O-D data to estimate AADT or ADT.

Multiple years of data may be combined to increase sample sizes, starting with the most recent year of available data. It is assumed the data will be reported and used in daily terms. O-D results and other desired metrics to meet study goals will be reviewed with the SAT for reasonableness.

4. Traffic Operations Analysis

Daily counts and forecasts will be used to provide highway volume to capacity assessment on a corridor segment basis using available daily counts (typically from the SDDOT-provided daily count volumes). Capacity thresholds will be based on SDDOT Road Design Manual Exhibit 15-10.

Analysis of existing and proposed intersection and corridor operations will be conducted at key intersections or select corridors as identified by the SAT. These analyses will use the current version of Synchro/SimTraffic. All analysis measures will be reported using HCM 6th Edition

methodology output. In situations where HCM methodology does not support the analysis conditions, alternate methodology or tools may be used. Any deviations will be documented.

Guidance provided in the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways 2009 Edition will be used in the evaluation of traffic signal warrants and multi-way stop applications. This analysis may be supplemented with guidance from the Institute of Transportation Engineers (ITE) and SDDOT.

Specific operational variables are listed in the following:

- Peak Hour Factor (PHF) – use peak hour factors developed from turning movement counts. PHFs may be different for AM and PM peak hours based upon count data collected.
- Saturation Flow Rate – SDDOT Design Manual (Page 30, Chapter 15) indicates the use of up to 1,900 vph ideal saturation flow rate in urban and suburban areas and up to 1,700 vph in rural areas.
    - 1,800 vph will be used in all locations within the Watertown City limits.
    - 1,700 vph will be used for all other locations.
- Right Turn on Red percentage – right turn on red percentage will be based on sampling of actual operations, otherwise assumed zero (default HCM6 value).
- Heaviest Lane Volume (Lane Utilization) – Default HCS7 Streets module values used for arterial intersections, except where uncommon lane utilization is documented during field review.
- Heavy Vehicle Percentage – Based on field collected data.
- Phase Change Intervals – Vehicle clearance times will be based on existing timings for existing conditions analysis. Vehicle clearance times for future conditions will be calculated using MUTCD, NCHRP, and ITE methods.
- Pedestrian clearance times will be based on existing timings for existing conditions analysis. Pedestrian clearance times for future conditions analysis will be calculated per ITE methods.
- Speeds – Based on approach speed limits.
- Terrain – Flat.
- HCM6 Urban Artertial Analysis – Arterial and collector streets within City limits.
- HCM6 Highway Class (county minor arterials and collectors within study area) – Class III if analyzed as Two-Lane Highway.

5. Traffic Forecasting and Volume Development

Multiple sources of data are available throughout Watertown and Codington County to develop traffic forecasts, including:

- Historical Daily Traffic Counts – historical daily counts throughout Watertown and Codington County collected as part of SDDOT and local traffic data collection programs
- Other Historical Daily and Hourly Traffic Counts – historical daily and hourly counts at select intersections and segments, often collected for specific projects or studies
- SDDOT-developed growth factors for the area

The following ADT forecast methodology will be applied for this study:

- Two methods will be compared for reasonableness
    - Calculate annual traffic change from historical daily traffic counts

        - Review county-wide growth rates provided by the SDDOT
    - Findings and conclusions regarding which method is used will be documented

Other historical daily and hourly traffic counts provided by the SDDOT and City of Watertown will be reviewed for reasonableness and incorporated as needed.

Any counts collected prior to 2020 to be used as part of this study will be factored forward to year 2020.

For study corridors, AM and PM peak hour traffic volumes will be balanced across study intersections to create coherent volume networks for the current year and 2040 planning horizon. The volume networks will represent a design season volume set using seasonal factors provided by the SDDOT.

6. Safety

The SDDOT will provide crash data for the complete years of 2015-2019. This data will be used to identify and evaluate crash trends or common crash characteristics for the 5-year timeframe. This study will provide a high level planning review of intersection and segment crash rates within Watertown and compare to statewide averages if available.

7. Selection of Measures of Effectiveness (MOE)

The effectiveness of traffic operations in the study area will be based on the appropriate HCM6 level of service (LOS) measurement with the following goals:

- Signalized Intersections:
    - Rural area minimum allowable LOS – LOS B
    - Urban area minimum allowable LOS – LOS C
        - Individual movements allowed to operate at LOS E or better.
- Roundabouts:
    - Minimum allowable LOS – LOS C
- Two-Way Stop-Controlled Intersections:
    - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
    - Urban area minimum allowable LOS – LOS C (weighted average intersection approach)
- County highway corridors will be evaluated county-wide in terms of 2-lane highway capacity based on SDDOT Road Design Manual Exhibit 15-10.

Urban area analysis is applicable for facilities within Watertown City limits.

Volume to capacity ratios that exceed 1.0 will result in LOS F.
Queue storage ratios that exceed 1.0 will result in LOS F.

Table 15-9 in SDDOT Road Design Manual will be used as a planning-level guide in determining the future number of lanes on a corridor.

8. Multimodal Analysis

An intercity travel summary, including summary reviews of intercity bus/transit, commercial air, freight and rail crossings will be completed. The Bike and Pedestrian Plan will be reviewed and proposed projects from the prior plan will be evaluated to determine if they should be maintained as-is or be modified or removed. Modified or additional projects will be based on evaluation of existing and proposed bike/ped networks, identified network gaps, connections to facilities and destinations, and public input with a specific focus on low-stress facilities and streets.

9. Implementation/Financial Plan

The project implementation plan will be developed in the following time-bands: Short-Term (2020-2025), Mid-Term (2026-2035), Long-Term (2036-2040).

It is assumed that planning-level estimates of operations and maintenance costs, and a reasonable list of reconstruction and major rehab projects, and associated cost estimates, will be provided by each responsible jurisdiction.

Construction cost estimates will be calculated in base year dollars (2020), but will be inflated to Year of Expenditure (YOE) dollars. Similarly, revenues will be inflated to YOE Revenues. The inflation rates will be agreed upon by the SAT.

10. Deviations/Justifications

There are no known deviations/justifications at this time. Any modifications to study methodologies or assumptions will be addressed through an amendment to this document.

11. Conclusion

All sections contained in this document will guide the development of the Master Transportation Plan update.

12. Appendices

The appendix includes the following:

A. Methods and Assumptions Meeting Minutes

APPENDIX

MEETING MINUTES

Project:	Watertown Area Master Transportation Plan Update
Subject:	Methods and Assumptions Meeting
Date:	Friday, April 03, 2020 (10:45 am to 11:30 am Central)
Location:	Web Videoconference
Attendees:	

Steve Gramm – SDDOT – Project Development
~~Jeff Brink – SDDOT - Watertown Area~~
~~Jeff Brosz – SDDOT - Trans. Inv. Mgmt.~~
~~Paul Nikolas – SDDOT – Road Design~~

– Heath VonEye – City of Watertown – ~~Public Works~~
~~Colin Paulsen – City of Watertown - Engineering~~
Brandi Hanten – City of Watertown – Planning
Rob Beynon – City of Watertown – Streets
~~Bert Magstadt – City of Watertown - Utilities~~
~~Sarah Caron – City of Watertown - Mayor~~
~~Don Roby – City of Watertown – City Council~~
~~Michael Heuer – City of Watertown – City Council~~
~~Reid Holien – City of Watertown – City Council~~

~~Chris Schilken – Watertown Development Company~~
~~Rick Hartley – Codington County - Highway~~
~~Todd Kays – 1st District~~

Dustin Hamilton – HDR – Project Manager
Stacia Slowey – HDR – MTP Lead
Jon Wiegand – HDR – Traffic Multi-Modal QC

Watertown Area MTP Update – M&A Meeting

1. M&A document review and discussion.
   HDR presented the DRAFT M&A document to the SAT and the following discussion items with regard to the DRAFT document were had:
   a. FHWA has relinquished oversight of this study to SDDOT and it is typical for the participating community not to sign the M&A document. As such, Steve Gramm will be the sole signatory on the M&A document.
   b. The Study Schedule will be updated by HDR as a result of the project starting later than anticipate as well as impacts to traffic data collection resulting from the COVID-19 pandemic. A Work Order Extension will be executed upon review of updated schedule.
   c. Additional PREVIOUS STUDIES to note include:
      i. 2002 Sidewalk Plan
      ii. 2012 Trails Master Plan
      iii. US 212 Study
      iv. 2010/2020 Decennial Interstate Studies
      v. 2020 Watertown Comprehensive Plan (Adopted 4/6/20)
   d. Colin Paulsen will no longer be a member of the SAT and a replacement is anticipated to be identified by the City in May of 2020.
   e. Discussion about the PHF to be used was had as in recent prior studies of communities of a similar size, there was a noted difference between the AM and PM PHFs. As such it was determined to base PHFs on the collected TMCs noting that the AM/PM PHFs may be different.
   f. It was discussed if there were specific intersections where left turn volumes currently queue beyond available storage. There were a couple areas where this circumstance may be present, as such, an additional MOE was added for queue storage ratios exceeding 1.0 will result in LOS F.
   g. No other changes to the DRAFT M&A Document were requested.