DRAFT 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*.

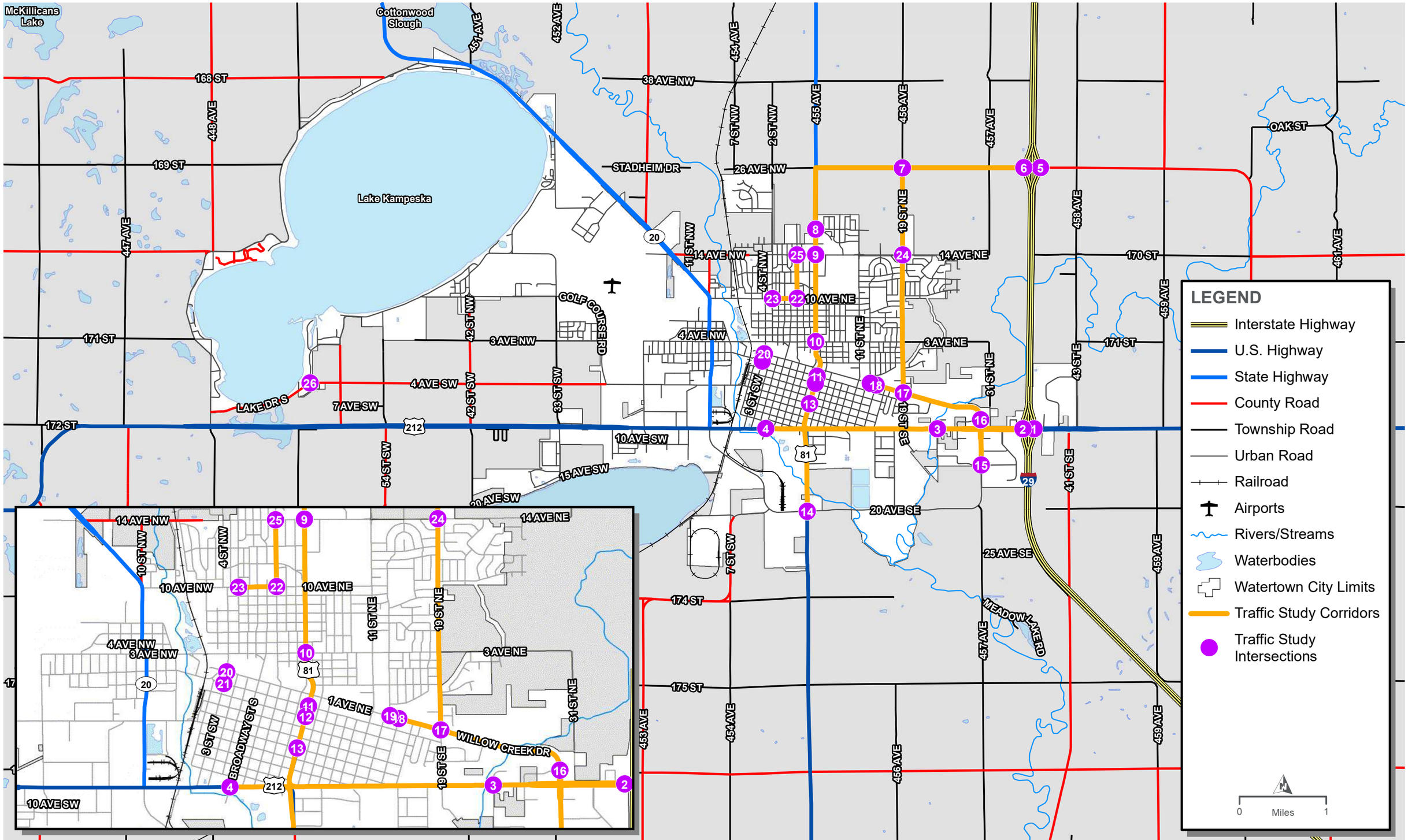
Scenario Development

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

HDR

FIGURE 1

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**)

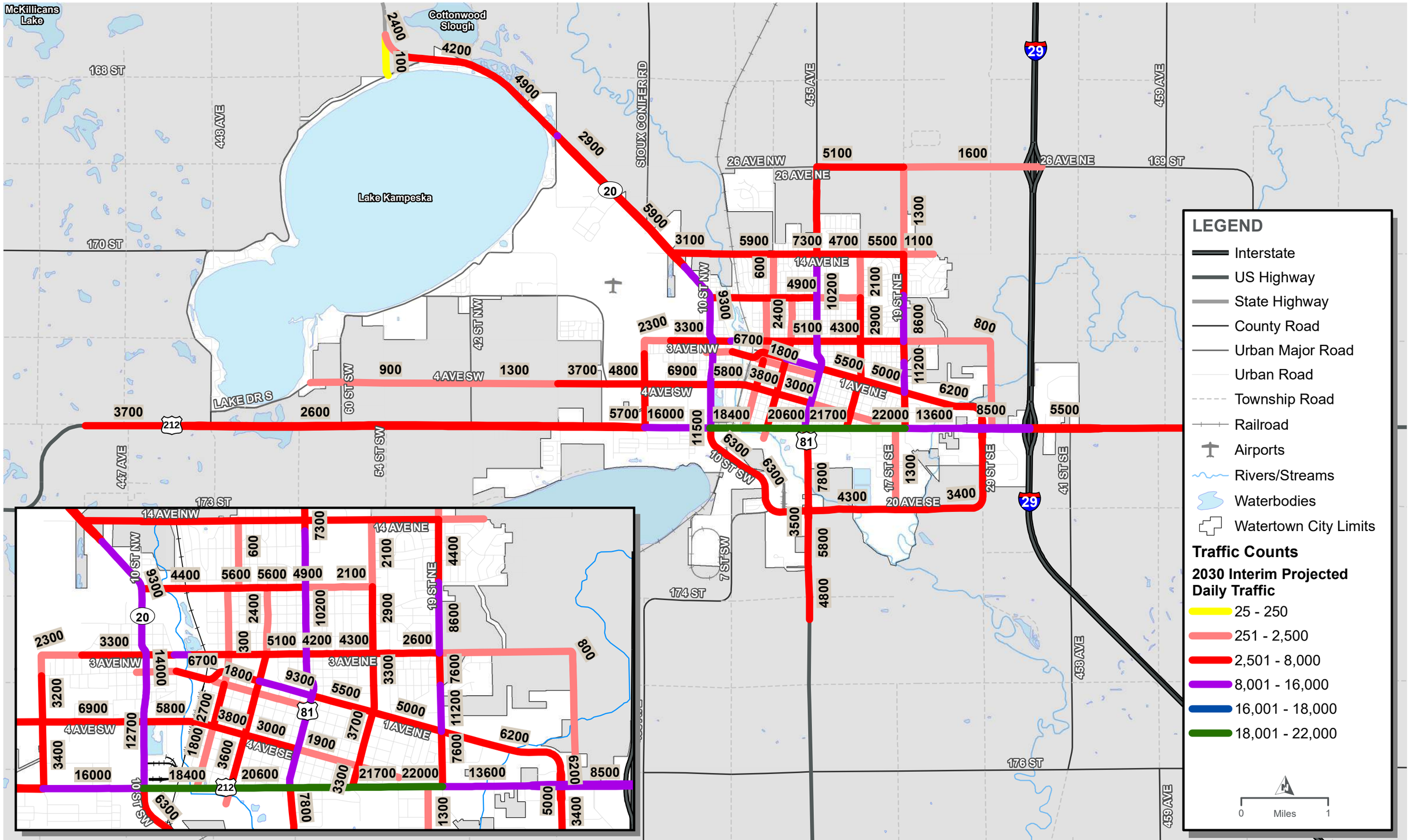
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 6**)

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**)

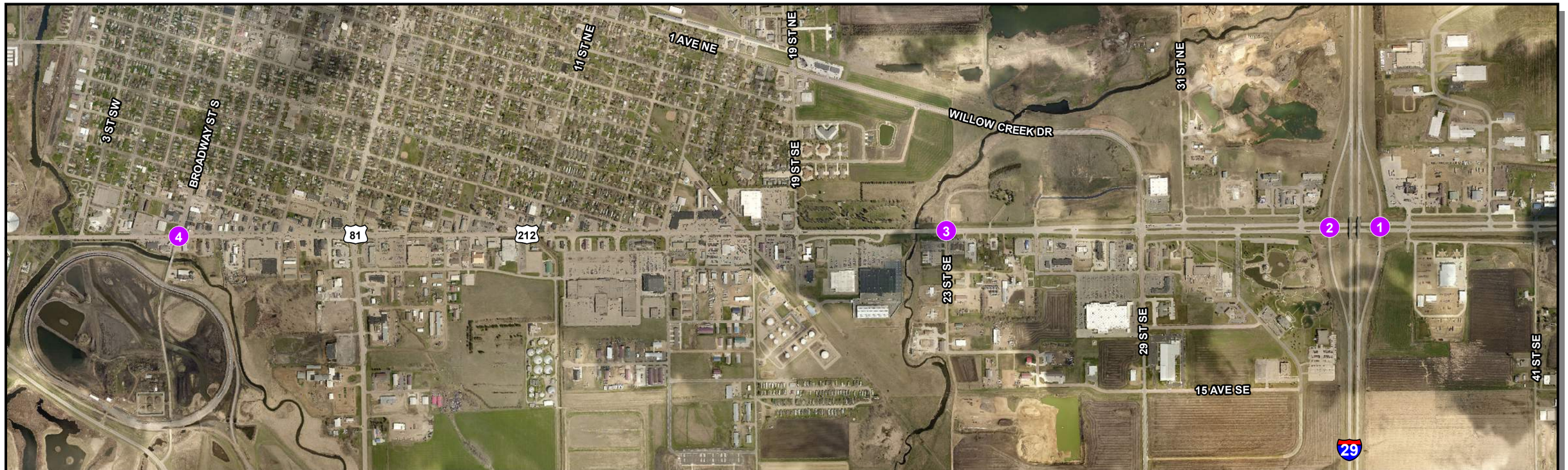
10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 9**)

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

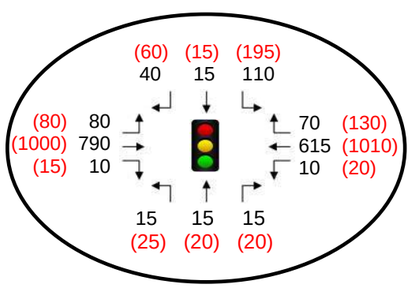


2030 INTERIM PROJECTED DAILY TRAFFIC VOLUMES

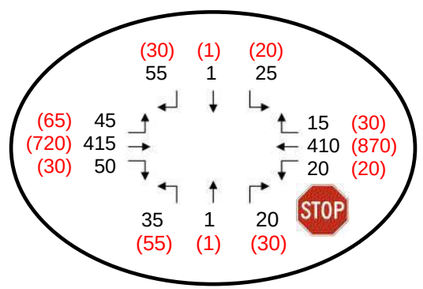
FIGURE 2



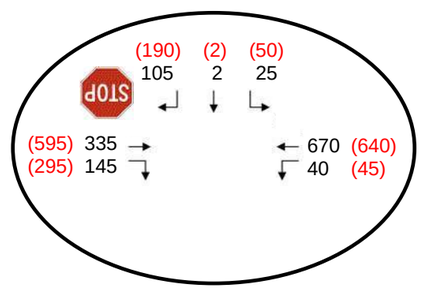
4. US 212 & Broadway Street S



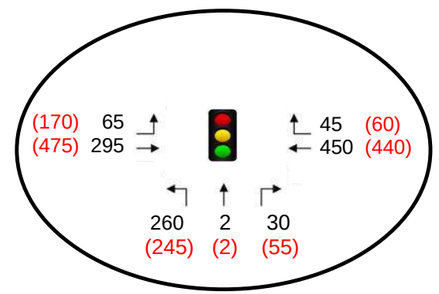
3. US 212 & 23rd Street SE



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

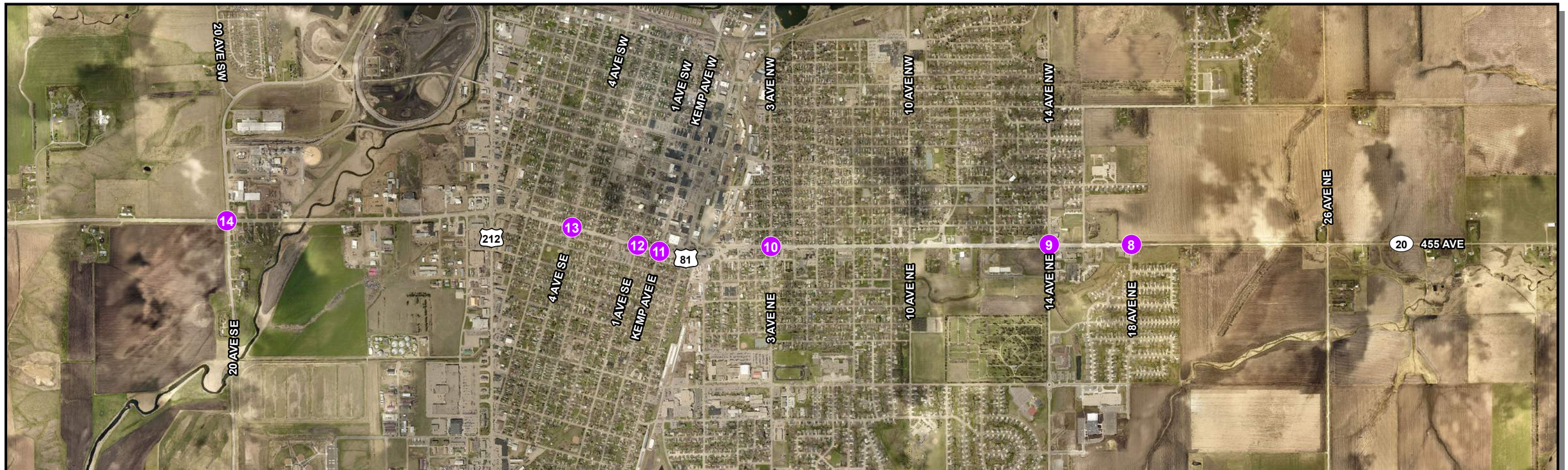
Notes:
* Volumes reflect September design season.

0 Miles 0.2

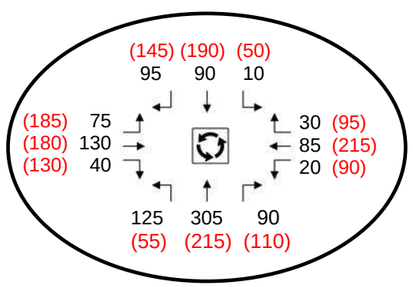
HDR

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

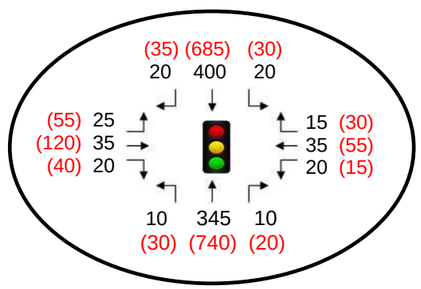
FIGURE 3



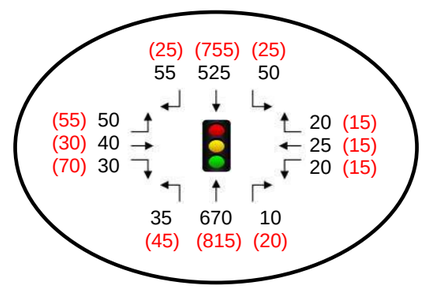
14. US 81 & 20th Ave SE



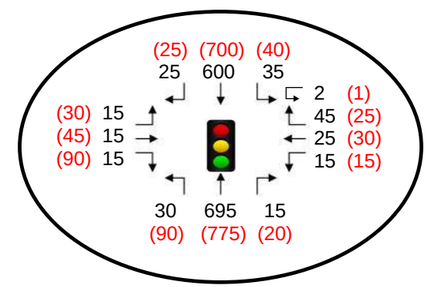
13. US 81 & 4th Avenue SE



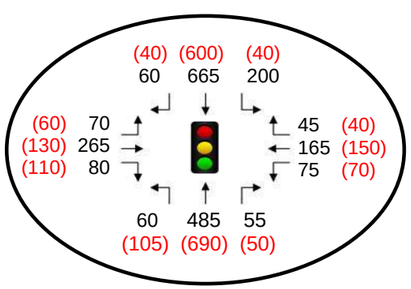
12. US 81 & 1st Avenue SE



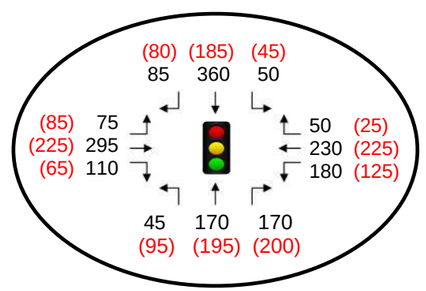
11. US 81 & E Kemp Avenue



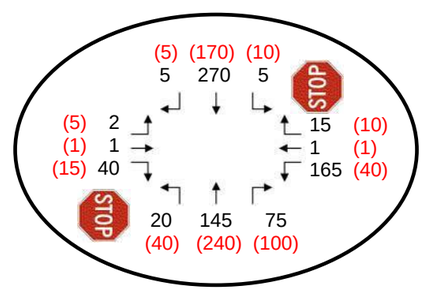
10. US 81 & 3rd Avenue NE



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:

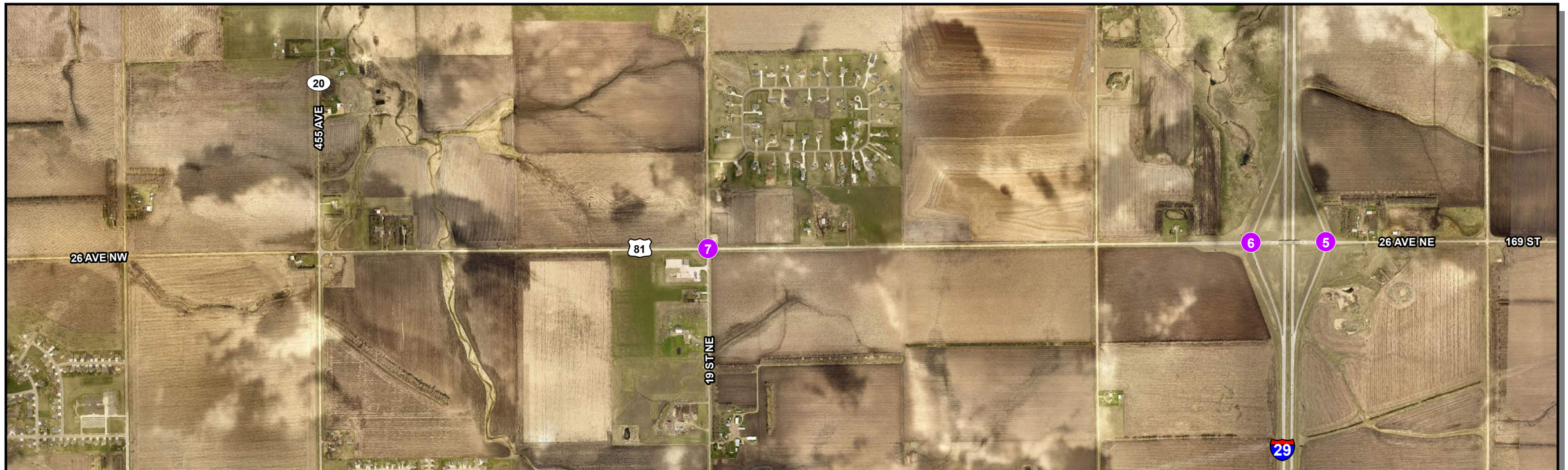
* Volumes reflect September design season.
** US 81 (5th Street E) corridor turning movements are shown with the same northbound orientation as previous figures.

0 Miles 0.35

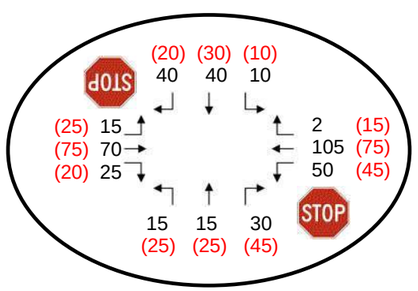
HDR

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

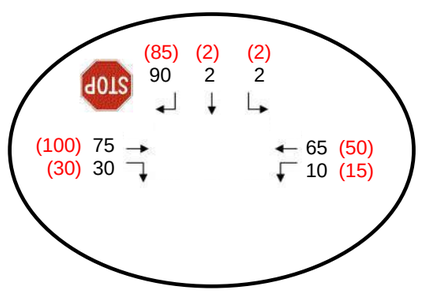
FIGURE 4



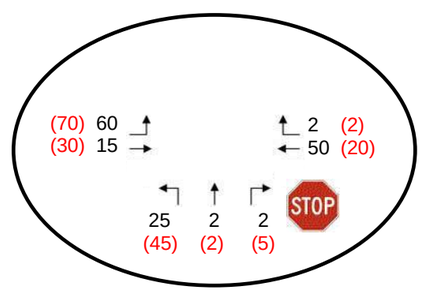
7. US 81 & 19th Street NE (456th Avenue)



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 Control

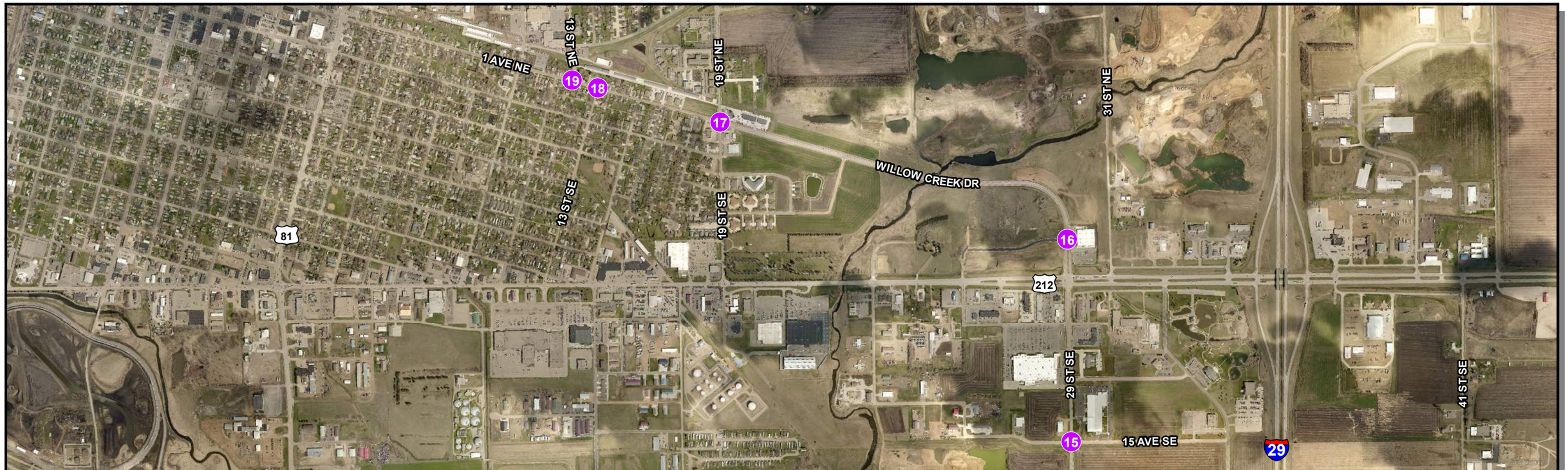
Notes:
* Volumes reflect September design season.

0 Miles 0.25

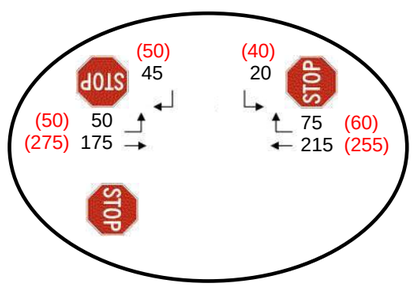
HDR

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

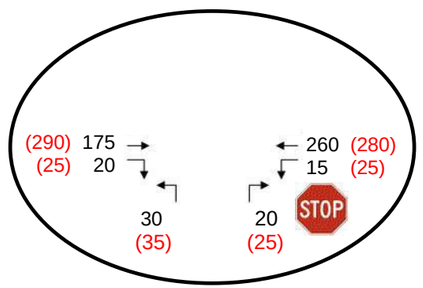
FIGURE 5



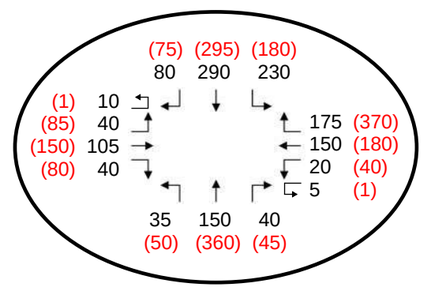
19. 1st Avenue NE & 13th Street NE (NB)



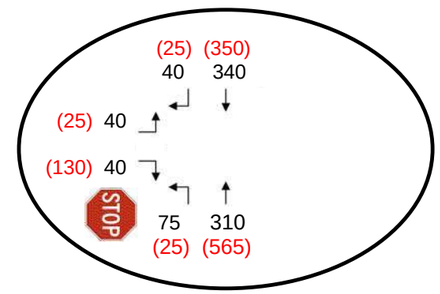
18. 1st Avenue NE & 13th Street NE (SB)



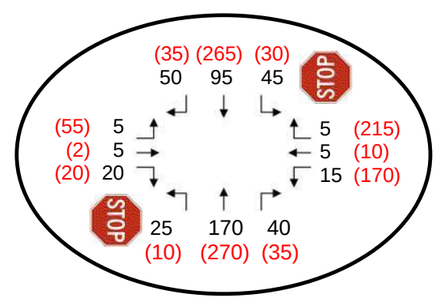
17. 1st Avenue NE & 19th Street NE



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 Control

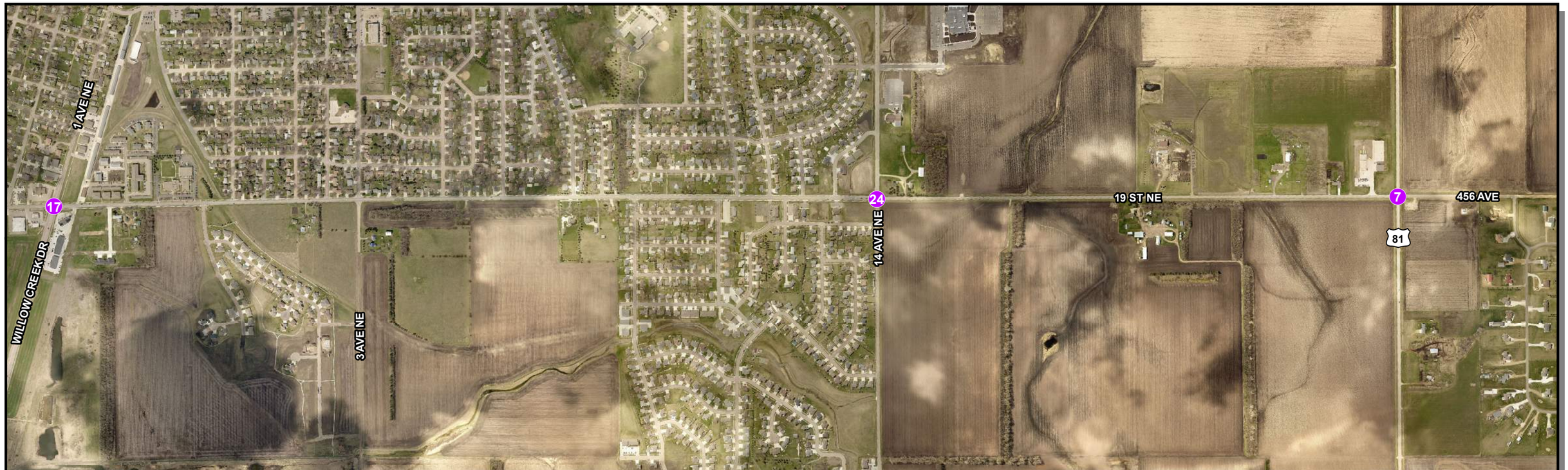
Notes:
* Volumes reflect September design season.

0 Miles 0.2

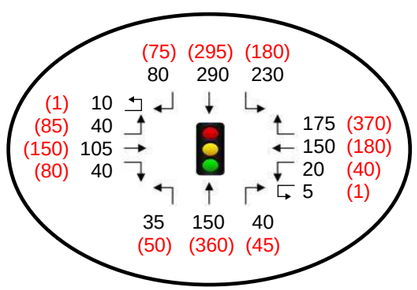
HDR

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

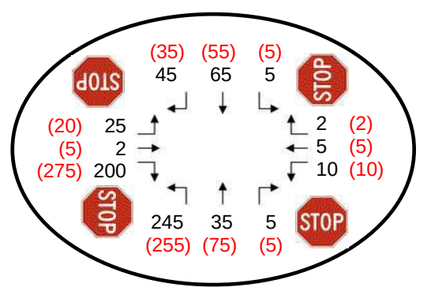
FIGURE 6



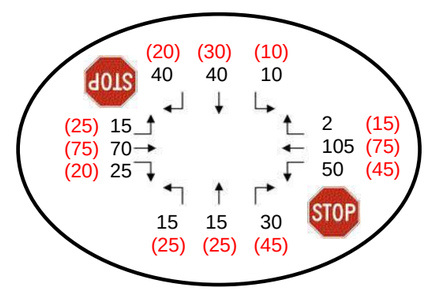
17. 1st Avenue NE & 19th Street NE



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.

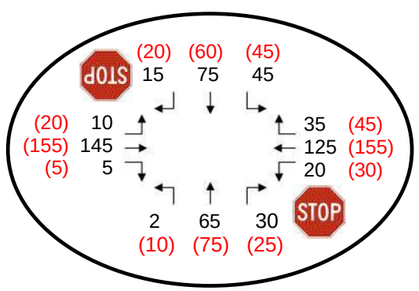
0 Miles 0.3

HDR

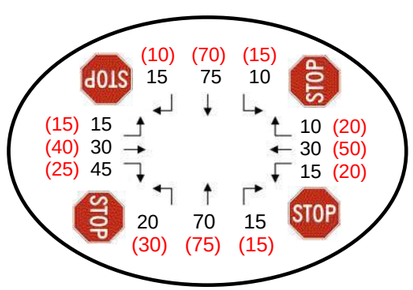
2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

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

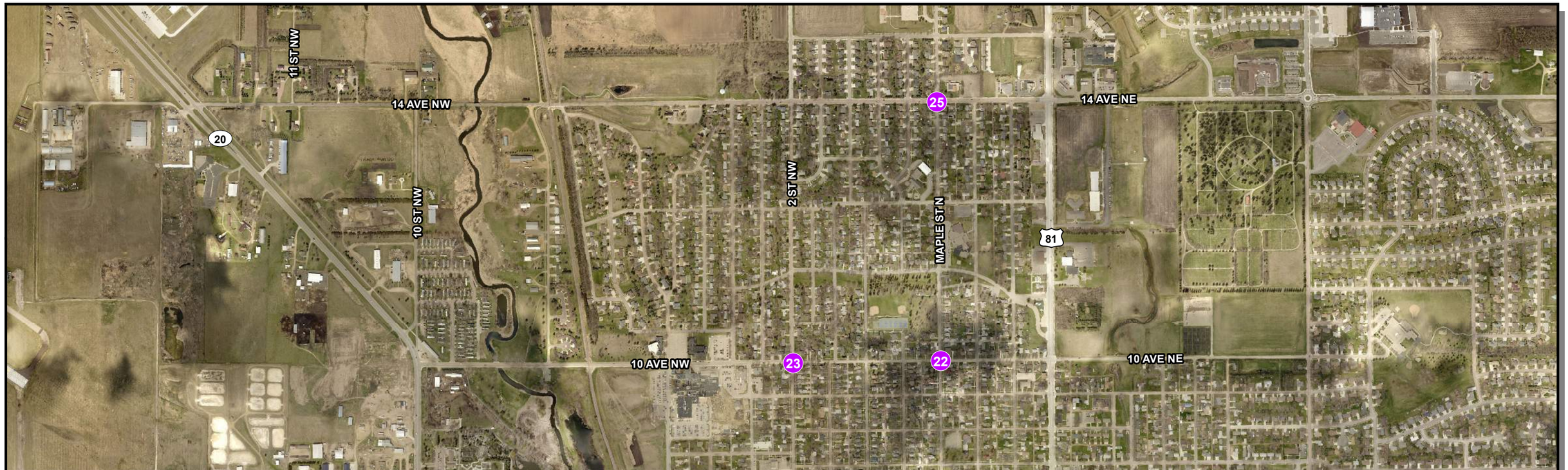
Notes:
* Volumes reflect September design season.

0 Miles 0.05

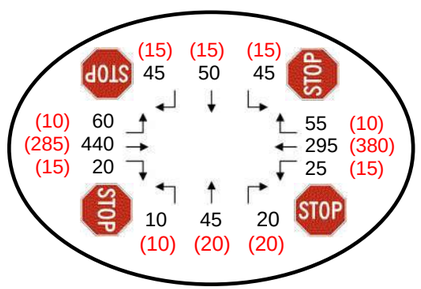
HDR

2030 INTERIM PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
3RD STREET NW CORRIDOR

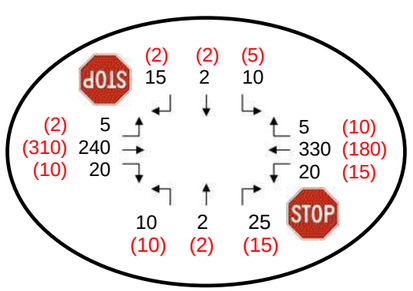
FIGURE 8



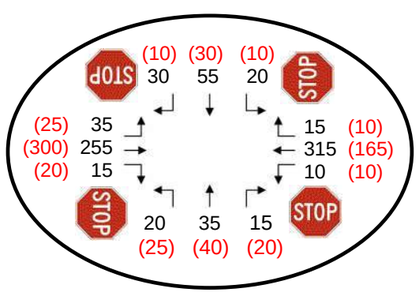
25. N Maple Street & 14th Avenue N



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

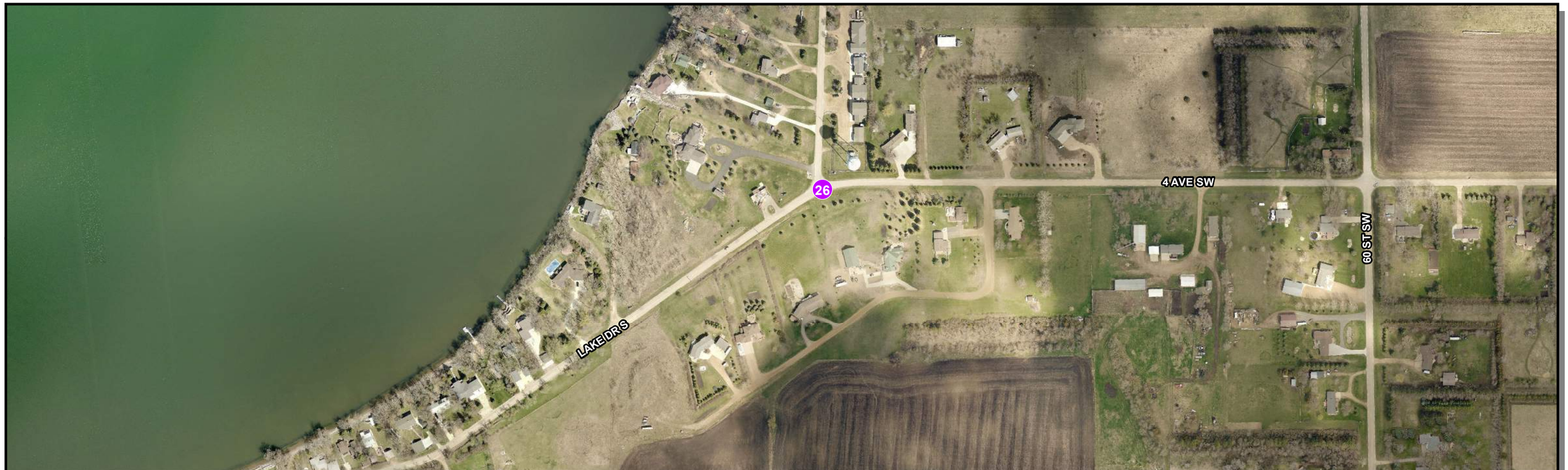
Notes:
* Volumes reflect September design season.

0 Miles 0.15

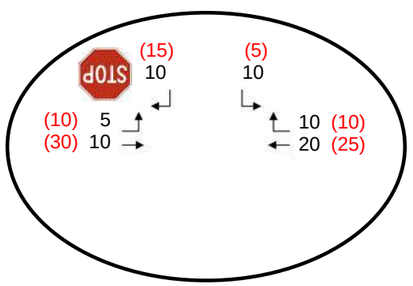
HDR

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

HDR

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**)

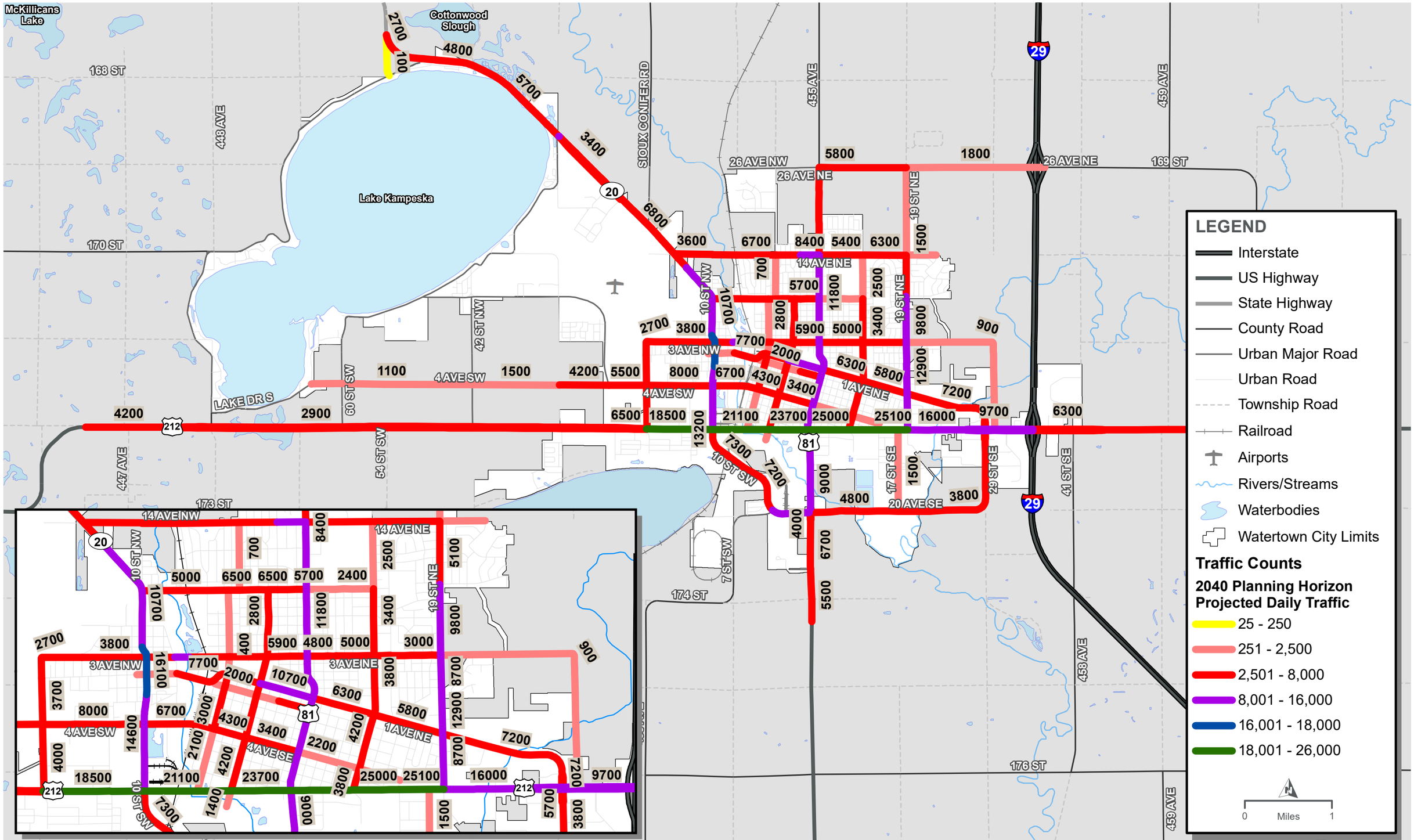
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 15**)

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**)

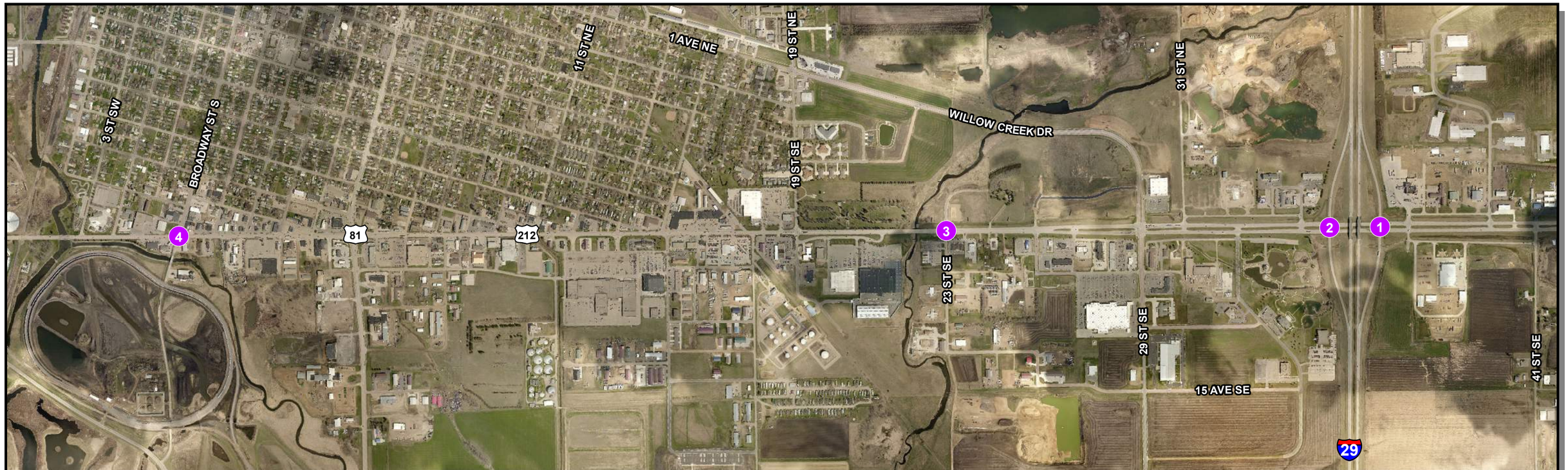
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 19**)



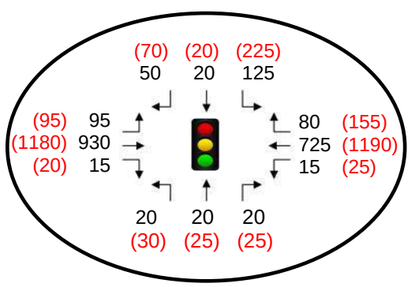
2040 PLANNING HORIZON PROJECTED DAILY TRAFFIC VOLUMES

HDR

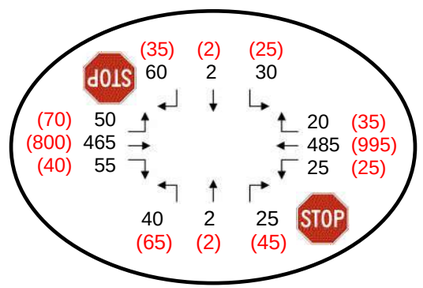
FIGURE 11



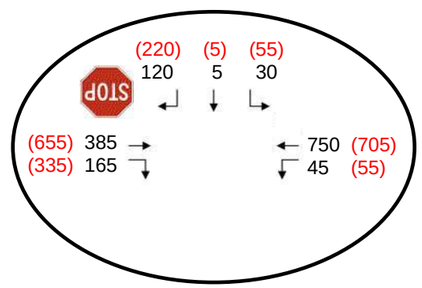
4. US 212 & Broadway Street S



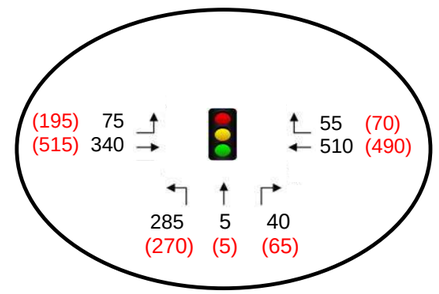
3. US 212 & 23rd Street SE



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

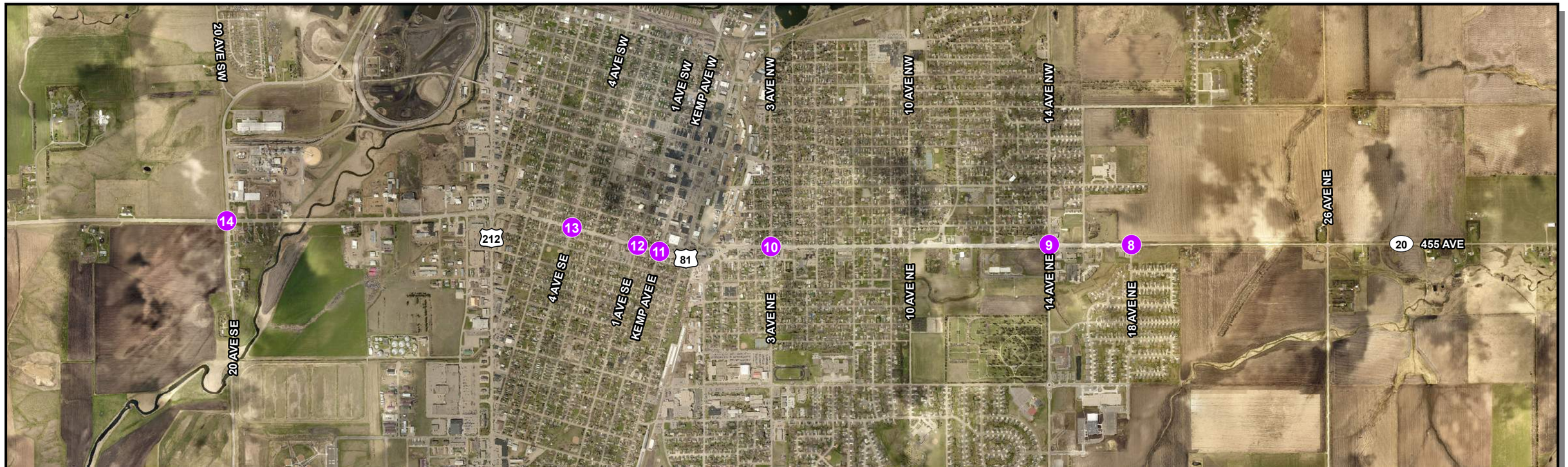
Notes:
* Volumes reflect September design season.

0 Miles 0.2

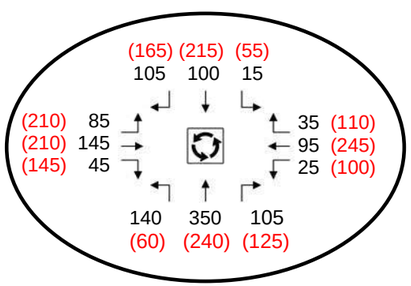
HDR

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

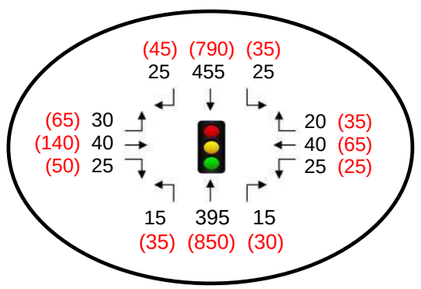
FIGURE 12



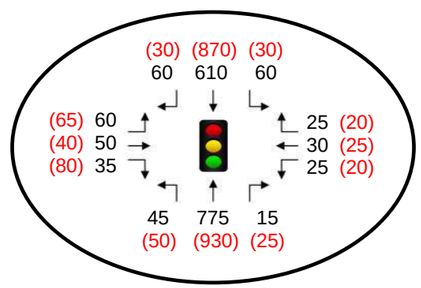
14. US 81 & 20th Ave SE



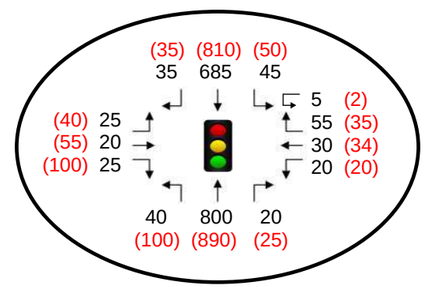
13. US 81 & 4th Avenue SE



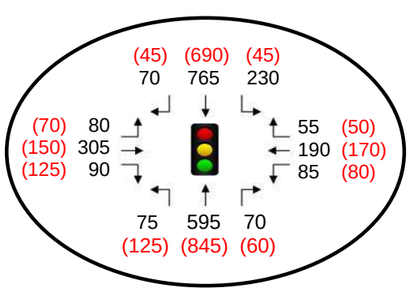
12. US 81 & 1st Avenue SE



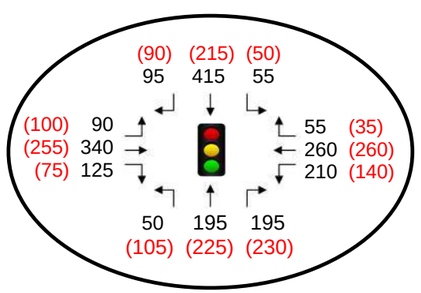
11. US 81 & E Kemp Avenue



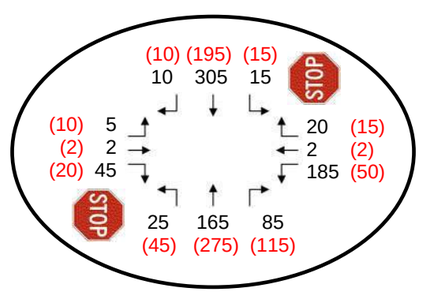
10. US 81 & 3rd Avenue NE



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:

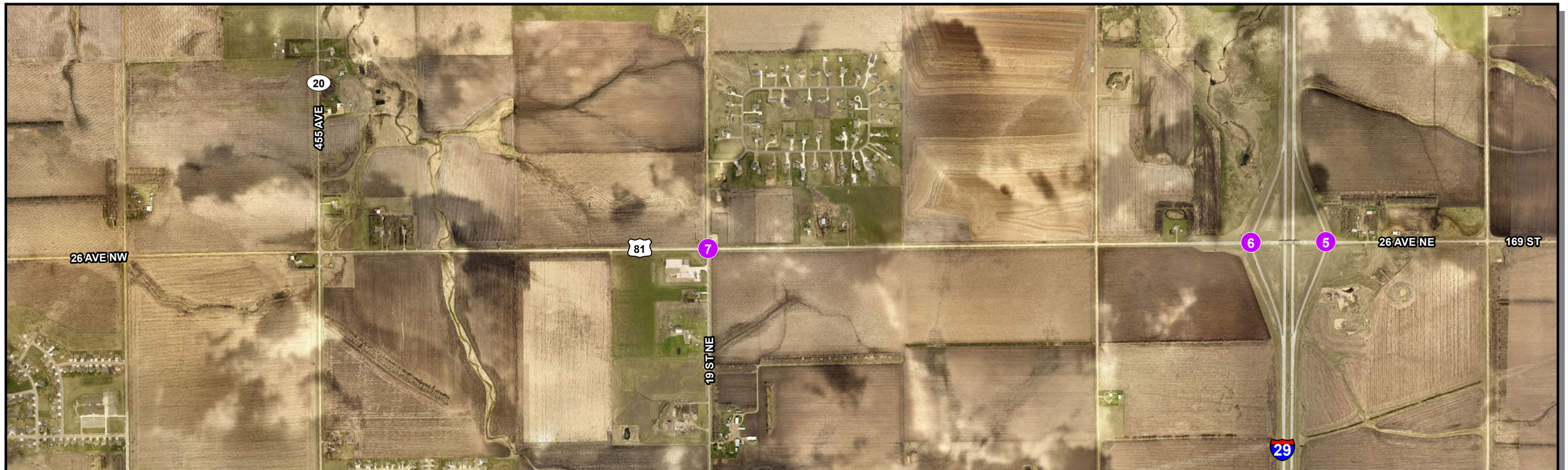
* Volumes reflect September design season.
** US 81 (5th Street E) corridor turning movements are shown with the same northbound orientation as previous figures.

0 Miles 0.35

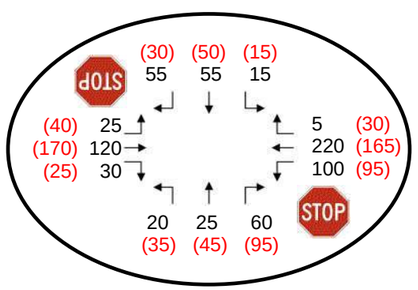
HDR

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

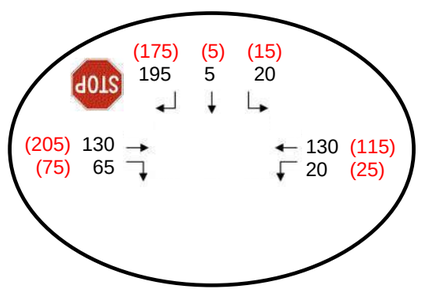
FIGURE 13



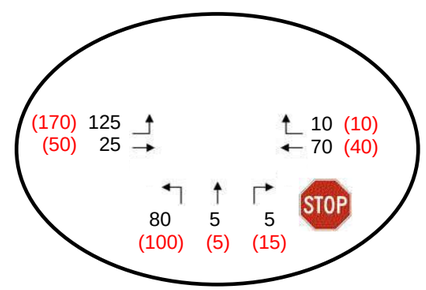
7. US 81 & 19th Street NE (456th Avenue)



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 Control

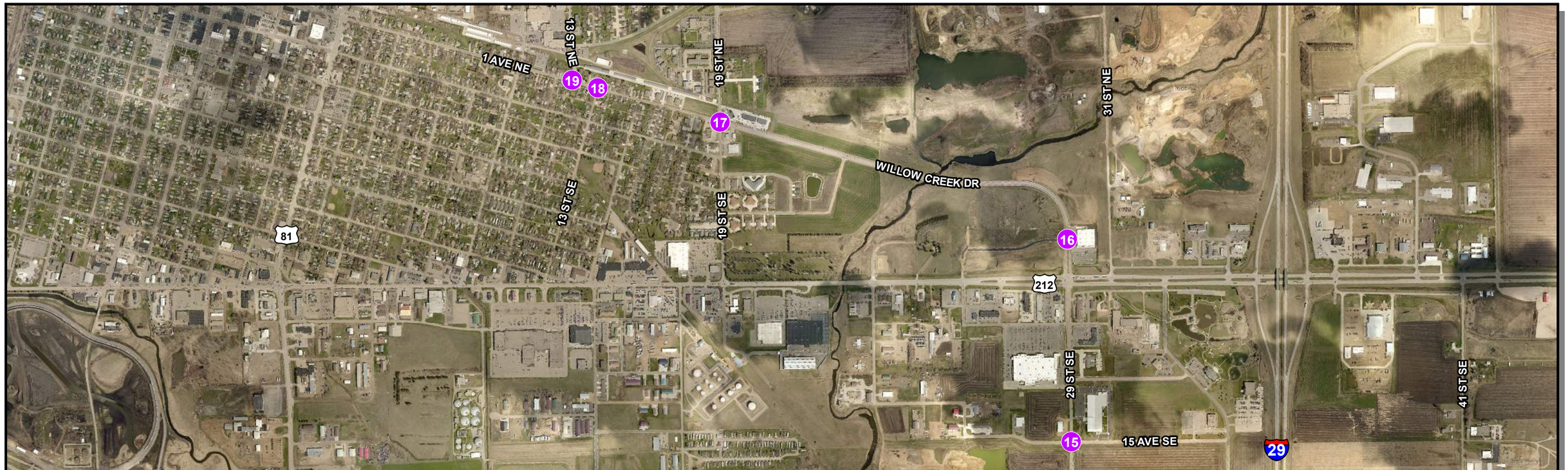
Notes:
* Volumes reflect September design season.

0 Miles 0.25

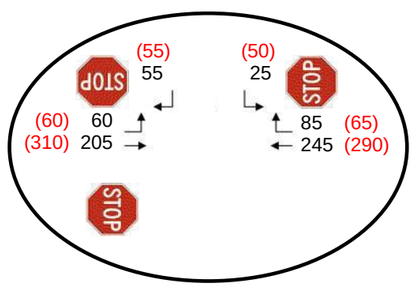
HDR

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
US 81 (26TH AVENUE NE) CORRIDOR

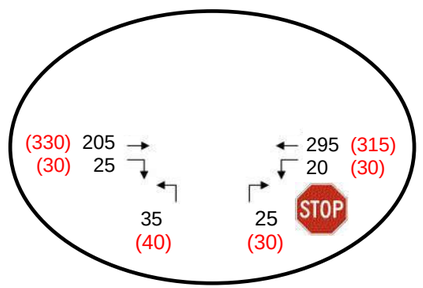
FIGURE 14



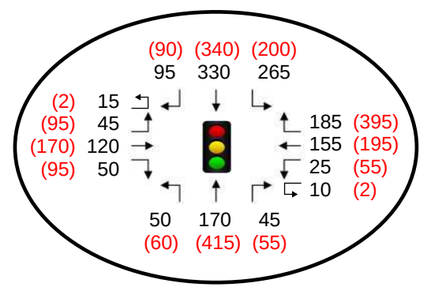
19. 1st Avenue NE & 13th Street NE (NB)



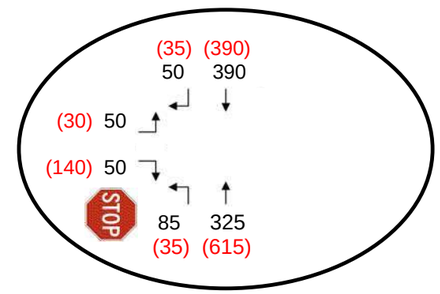
18. 1st Avenue NE & 13th Street NE (SB)



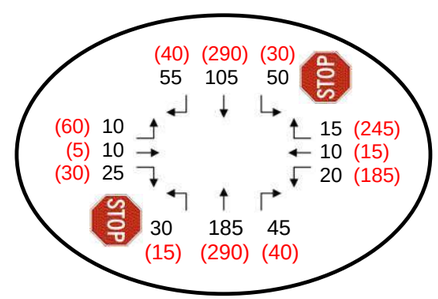
17. 1st Avenue NE & 19th Street NE



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 Control

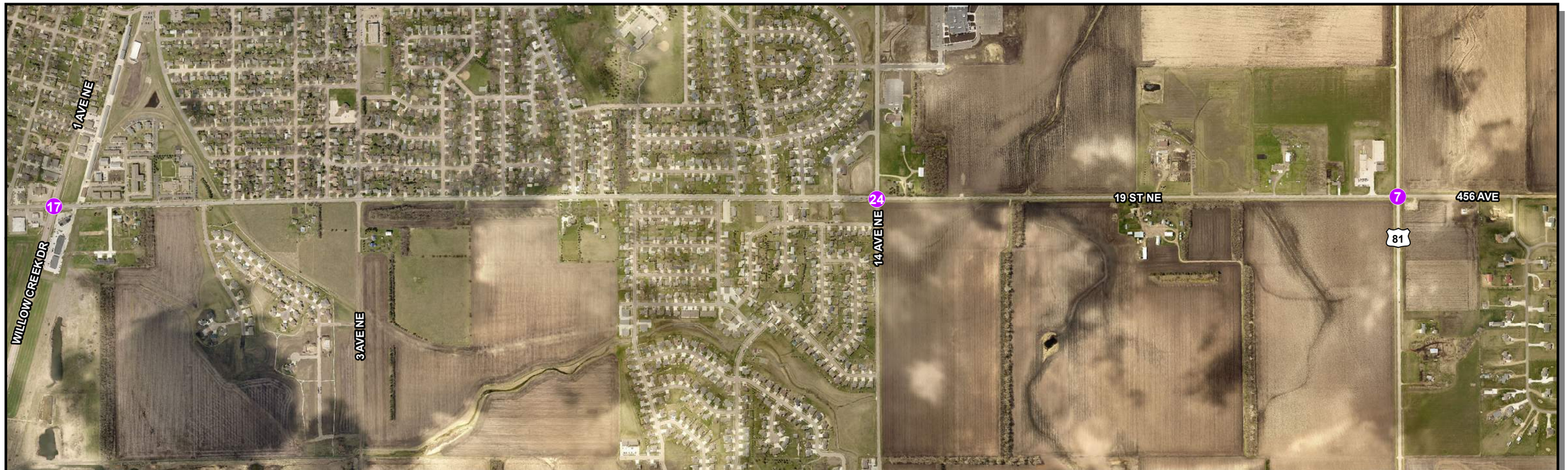
Notes:
* Volumes reflect September design season.

0 Miles 0.2

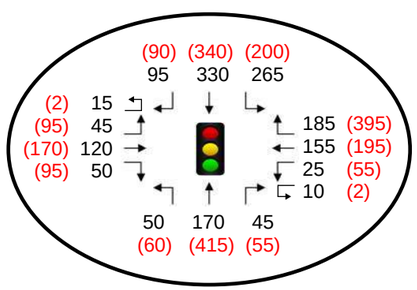
HDR

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

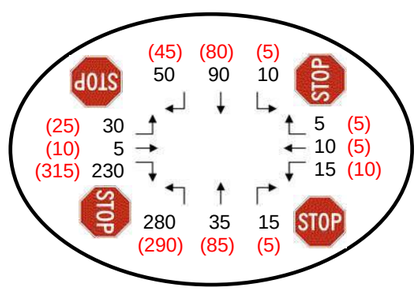
FIGURE 15



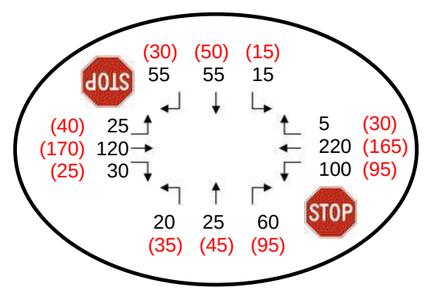
17. 1st Avenue NE & 19th Street NE



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

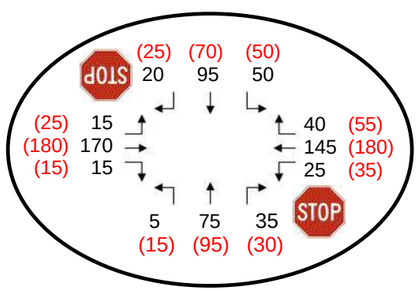
Notes:
* Volumes reflect September design season.
** 19th Street NE corridor turning movements are shown with the same northbound orientation as previous figures.

0 Miles 0.3

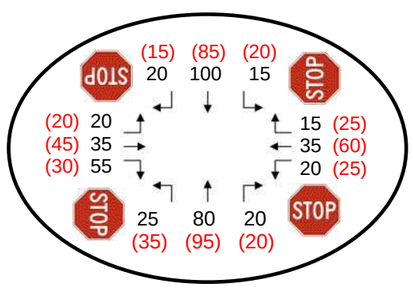
2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

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

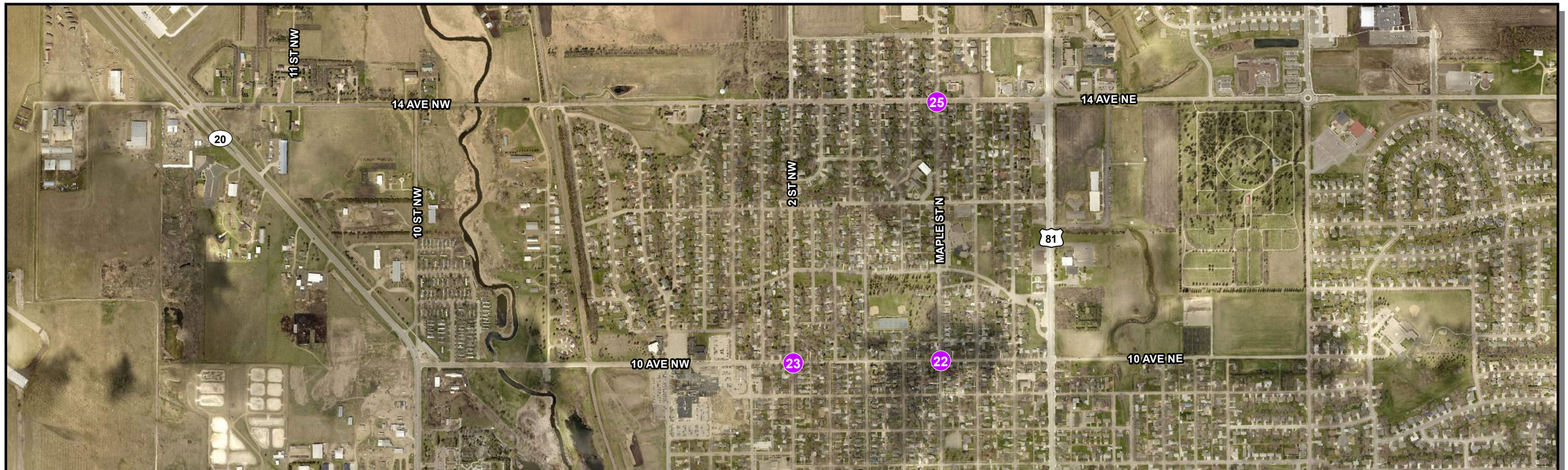
Roundabout

Notes:
* Volumes reflect September design season.

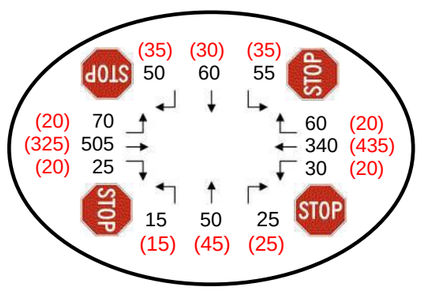
0 Miles 0.05

2040 PLANNING HORIZON PEAK HOUR TRAFFIC VOLUMES (NO-BUILD CONDITIONS)
3RD STREET NW CORRIDOR

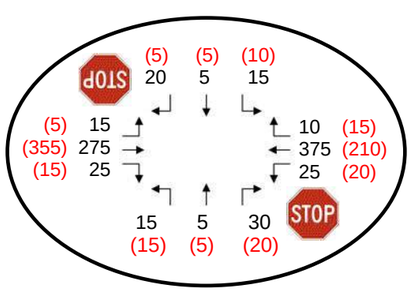
FIGURE 17



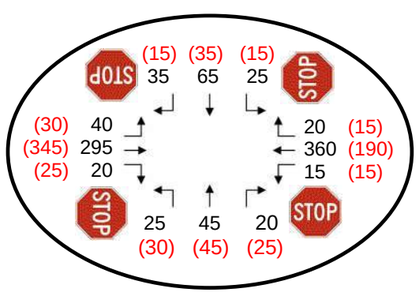
25. N Maple Street & 14th Avenue N



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

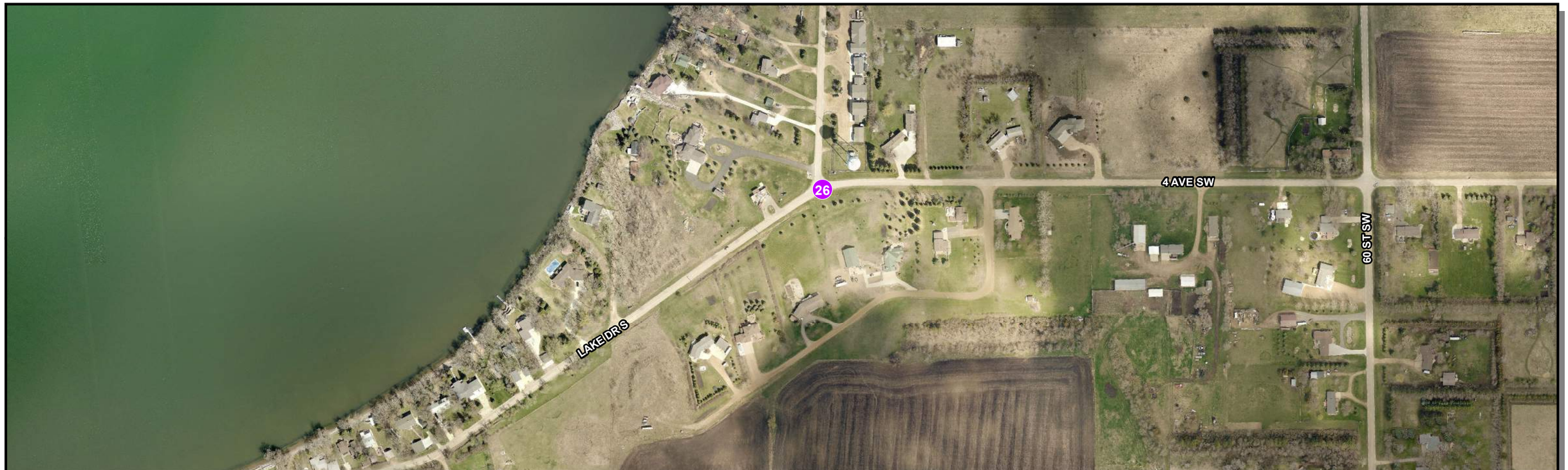
Notes:
* Volumes reflect September design season.

0 Miles 0.15

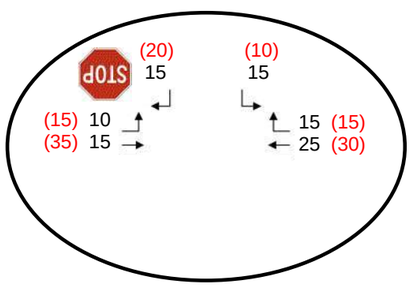
HDR

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.

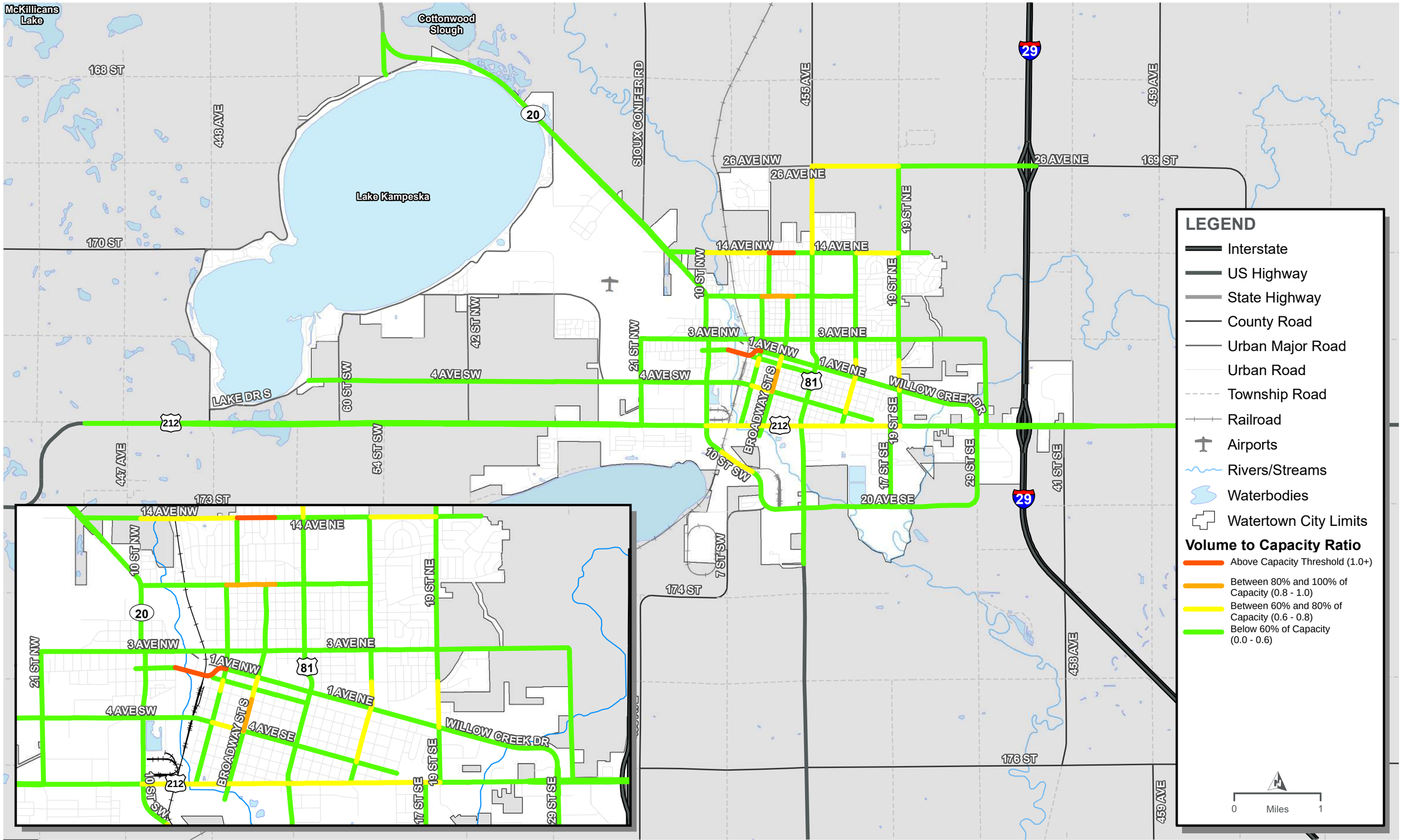
1 Construction/Reconstruction projects are designed based on a typical 20 year ADT project beyond the anticipated year of project construction.

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.

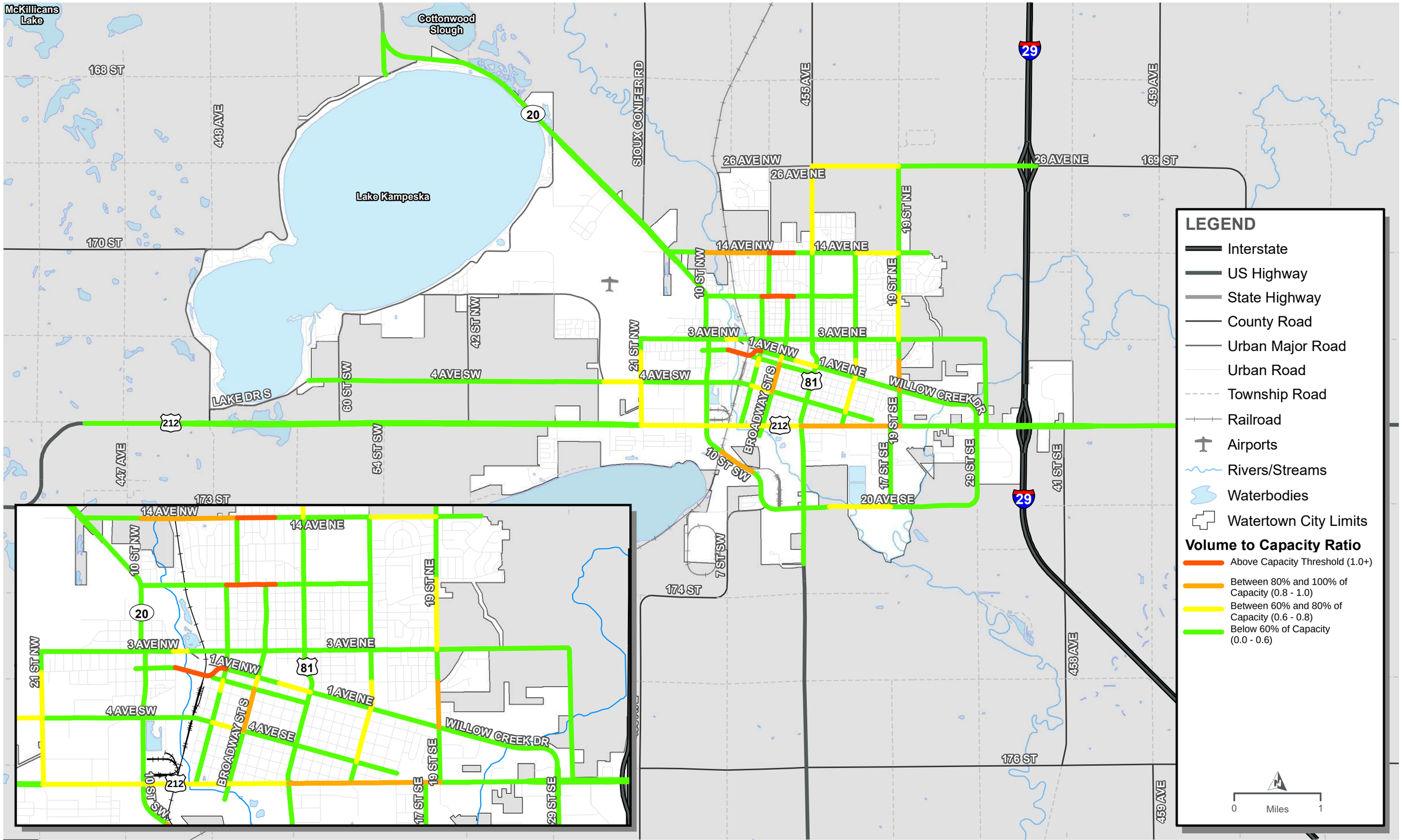
4 Medians should be used.

[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**)

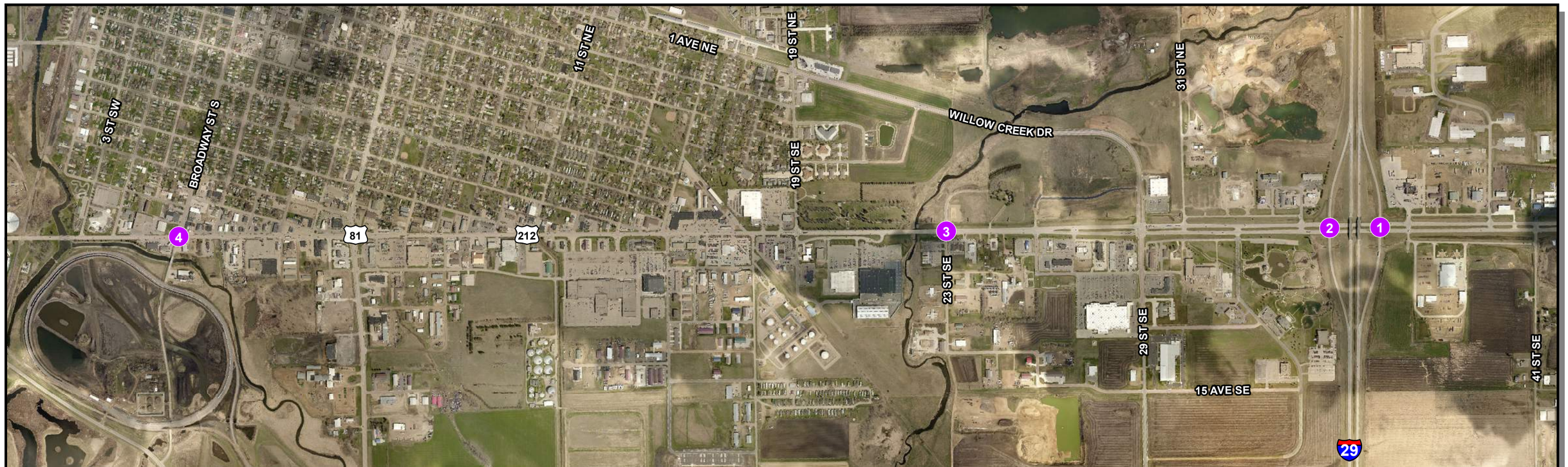
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 25**)

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

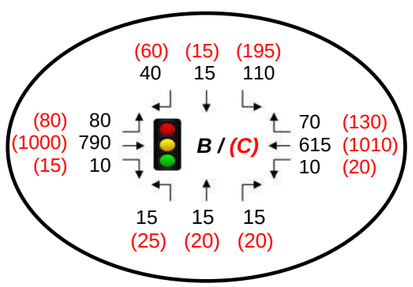
3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 27**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 28**)

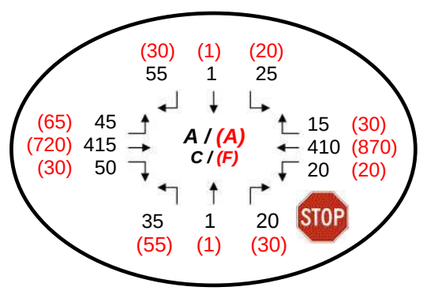
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 29**)



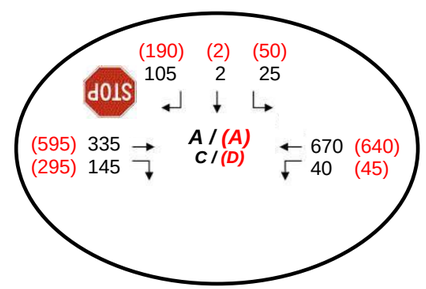
4. US 212 & Broadway Street S



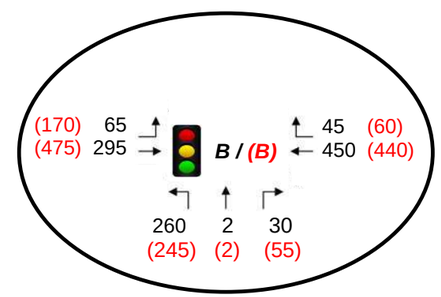
3. US 212 & 23rd Street SE



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

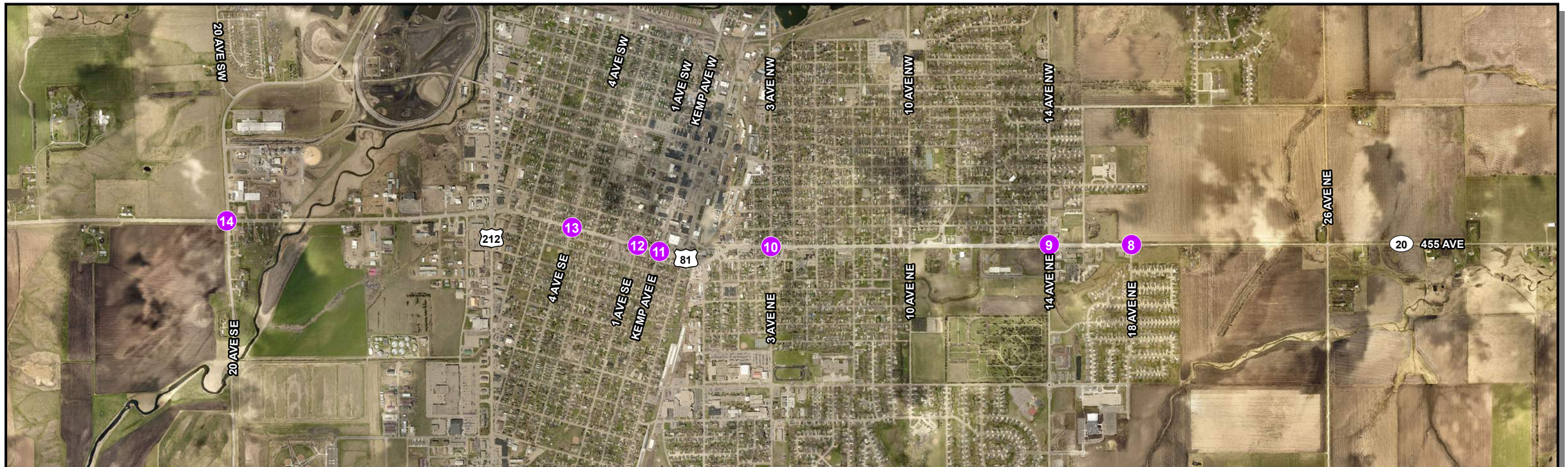
Roundabout

0 Miles 0.2

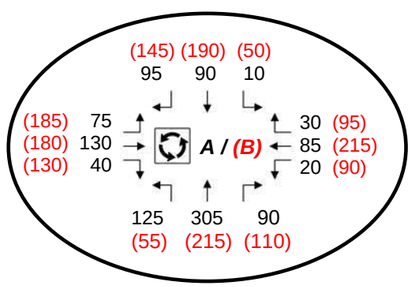
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

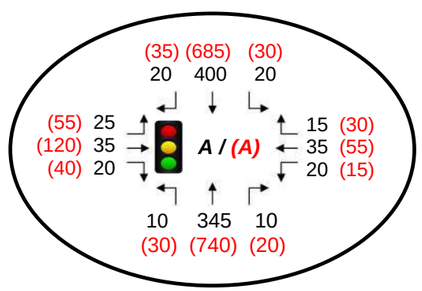
FIGURE 20



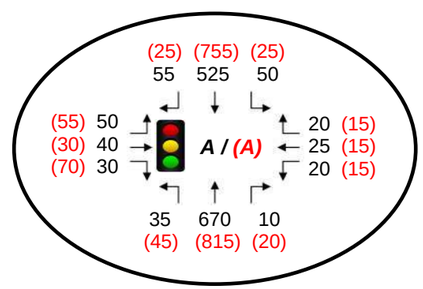
14. US 81 & 20th Ave SE



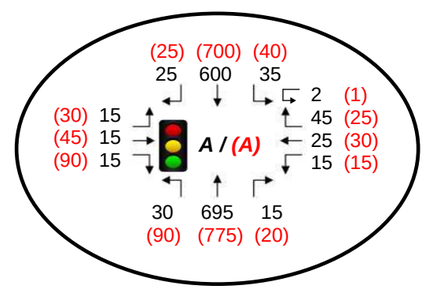
13. US 81 & 4th Avenue SE



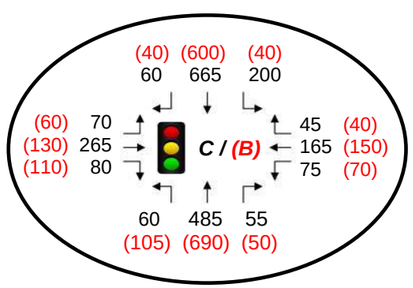
12. US 81 & 1st Avenue SE



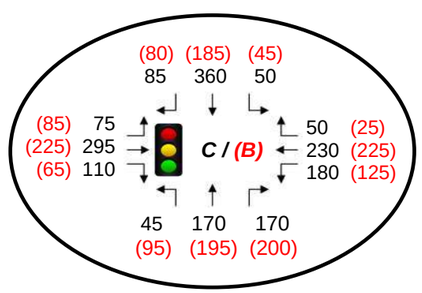
11. US 81 & E Kemp Avenue



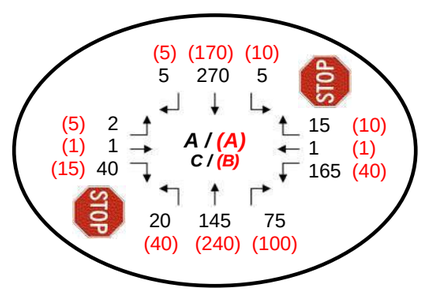
10. US 81 & 3rd Avenue NE



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 Stop Control

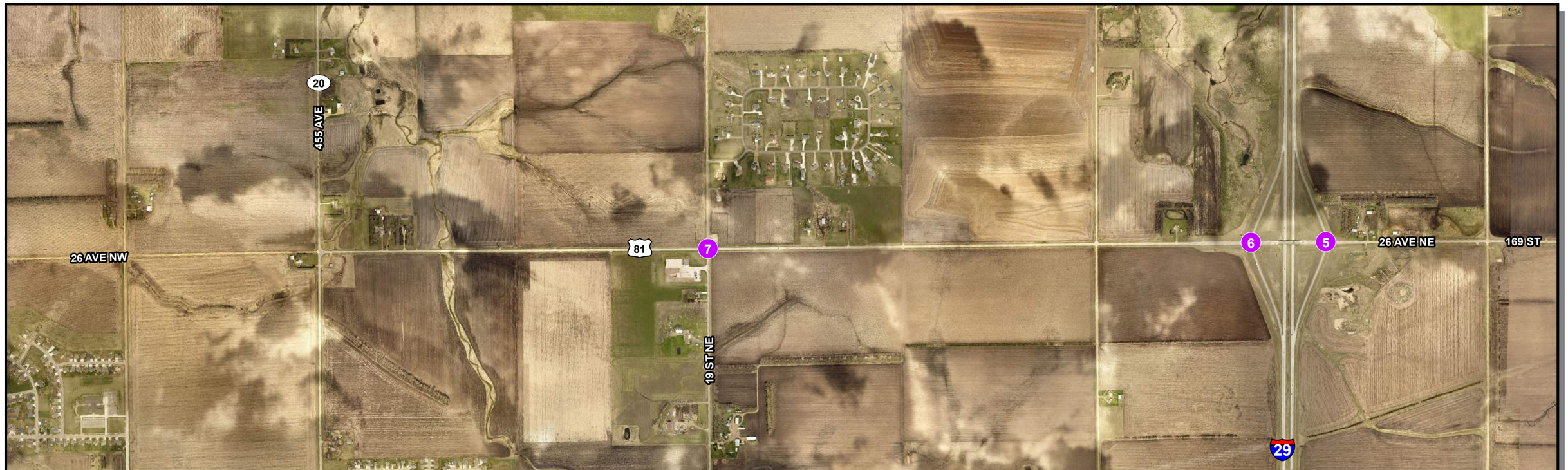
Roundabout Control

0 Miles 0.35

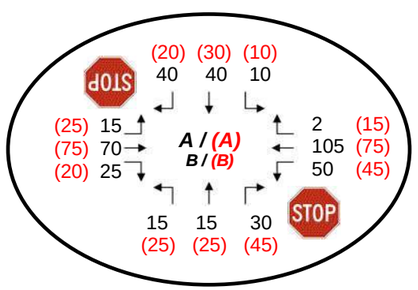
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

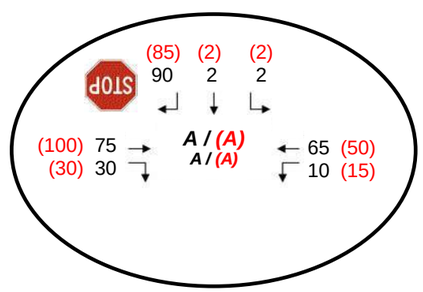
FIGURE 21



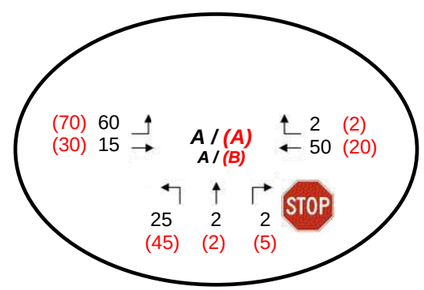
7. US 81 & 19th Street NE (456th Avenue)



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 Control

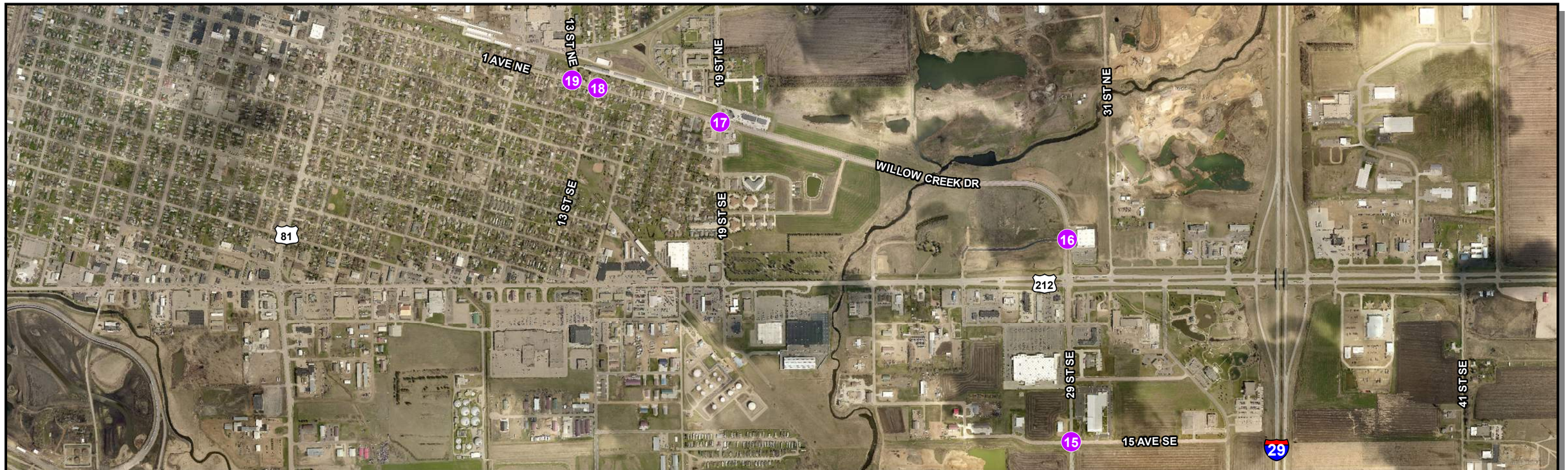
Roundabout Control

0 Miles 0.25

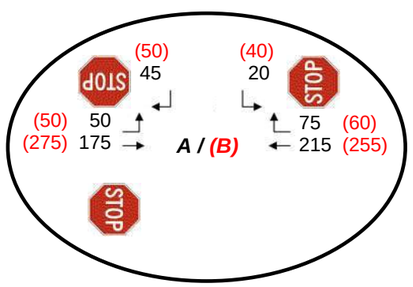
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD)
US 81 (26TH AVENUE NE) CORRIDOR

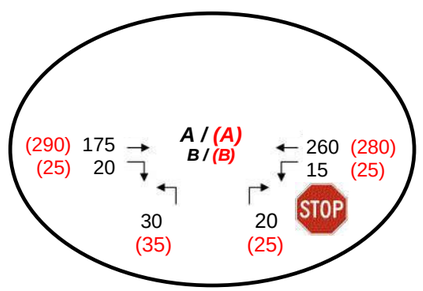
FIGURE 22



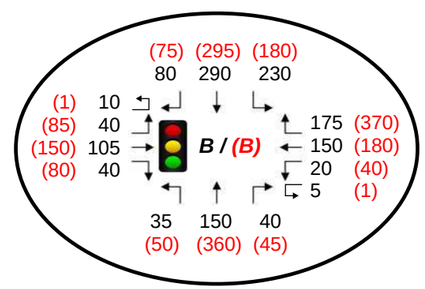
19. 1st Avenue NE & 13th Street NE (NB)



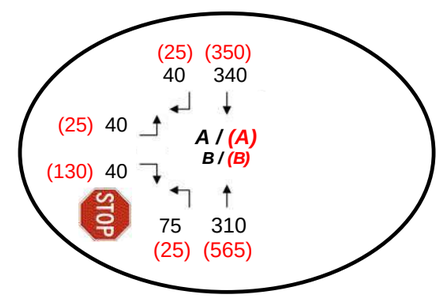
18. 1st Avenue NE & 13th Street NE (SB)



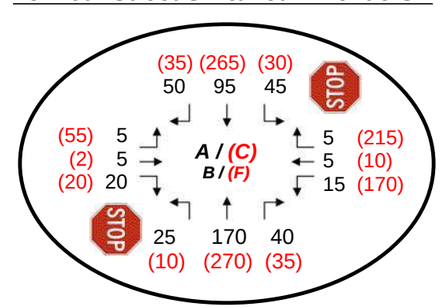
17. 1st Avenue NE & 19th Street NE



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 Control

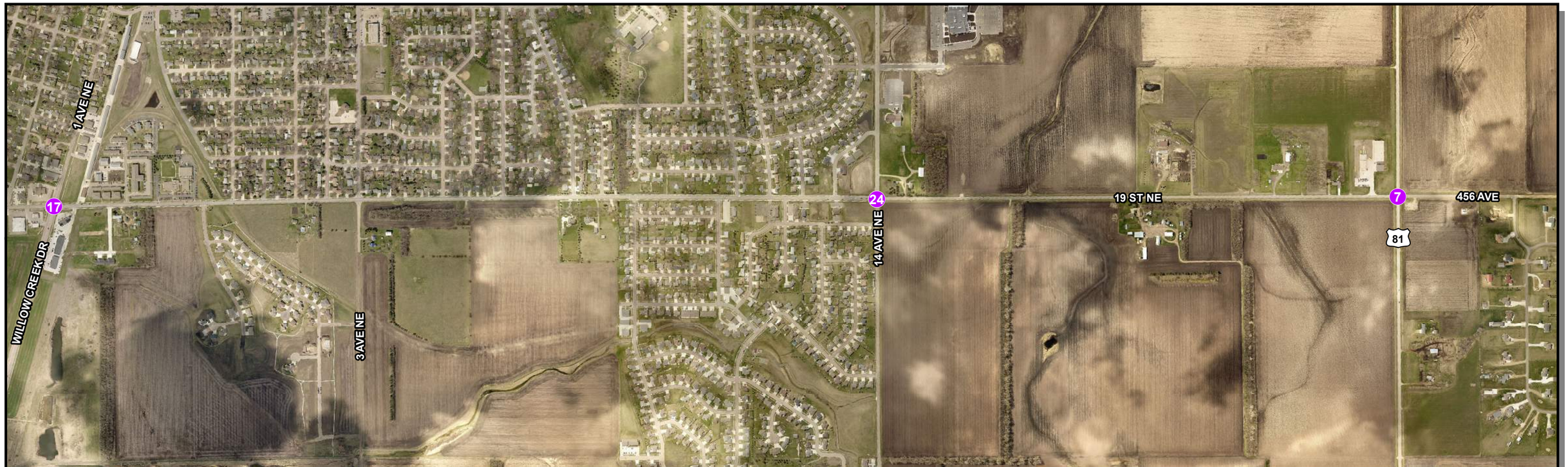
Roundabout Control

0 Miles 0.2

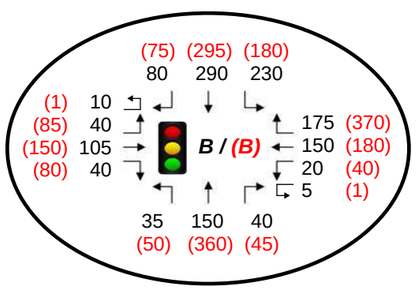
HDR

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

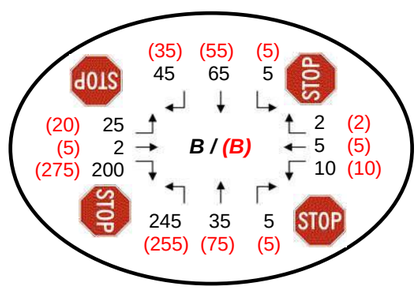
FIGURE 23



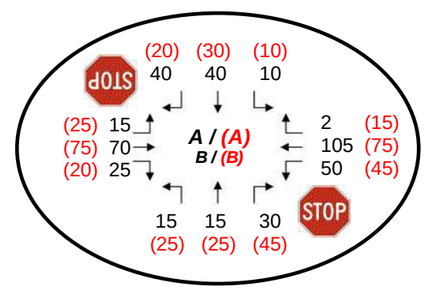
17. 1st Avenue NE & 19th Street NE



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 Stop Control

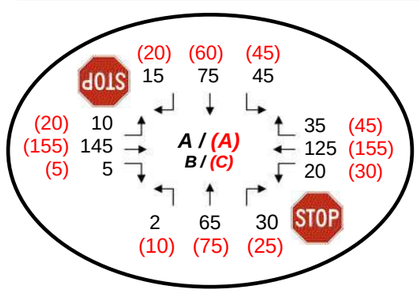
Roundabout

0 Miles 0.3

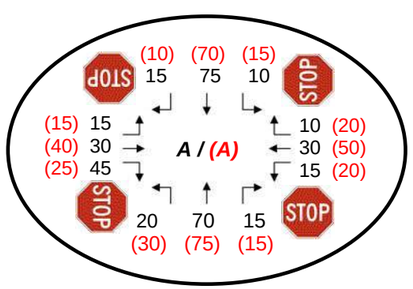
2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

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

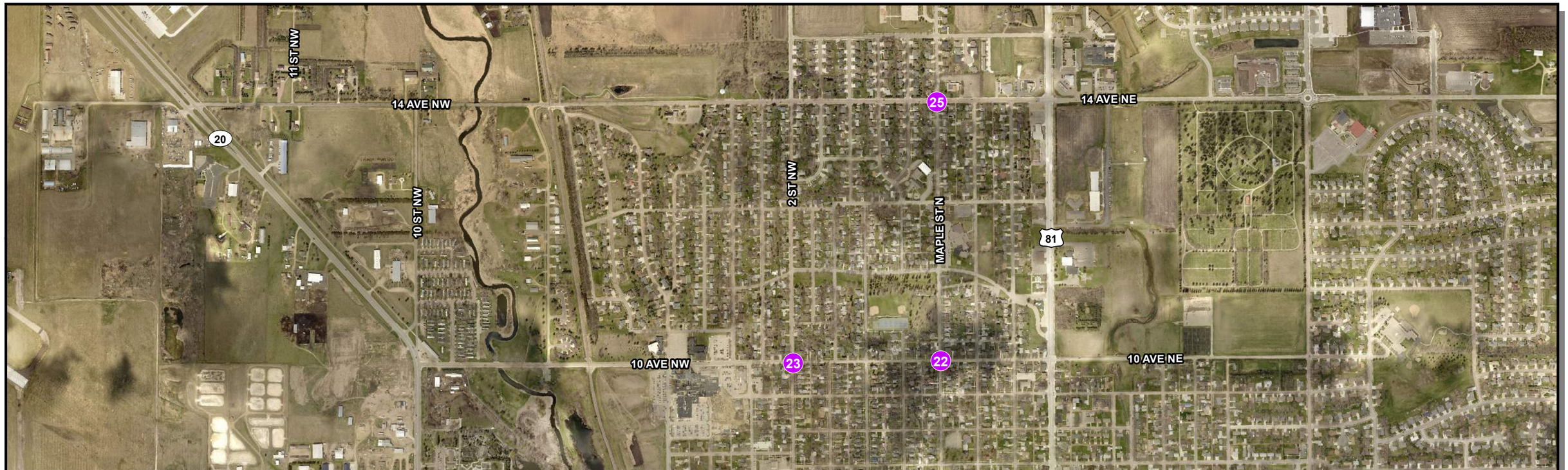
Stop Control

Roundabout

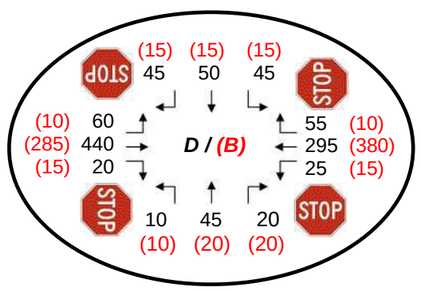
0 Miles 0.05

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
3RD STREET NW CORRIDOR

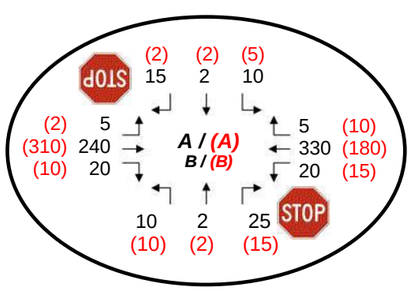
FIGURE 25



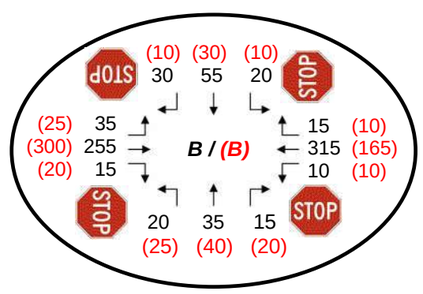
25. N Maple Street & 14th Avenue N



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

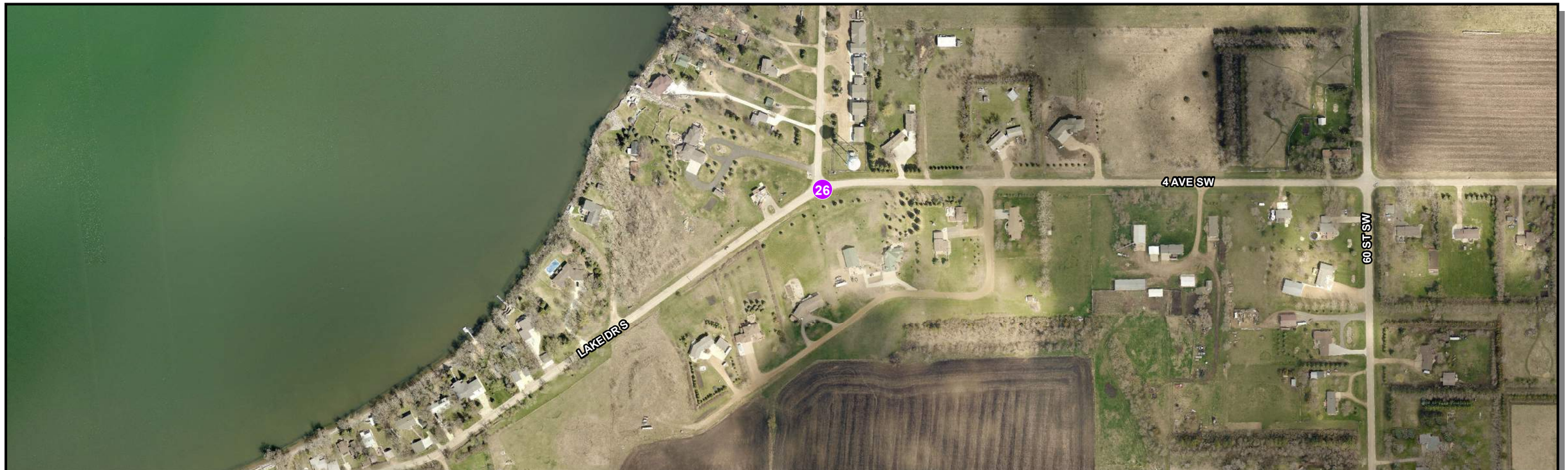
Roundabout

0 Miles 0.15

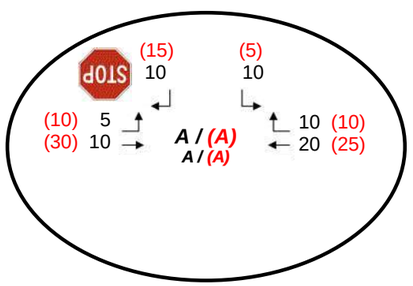
HDR

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**)

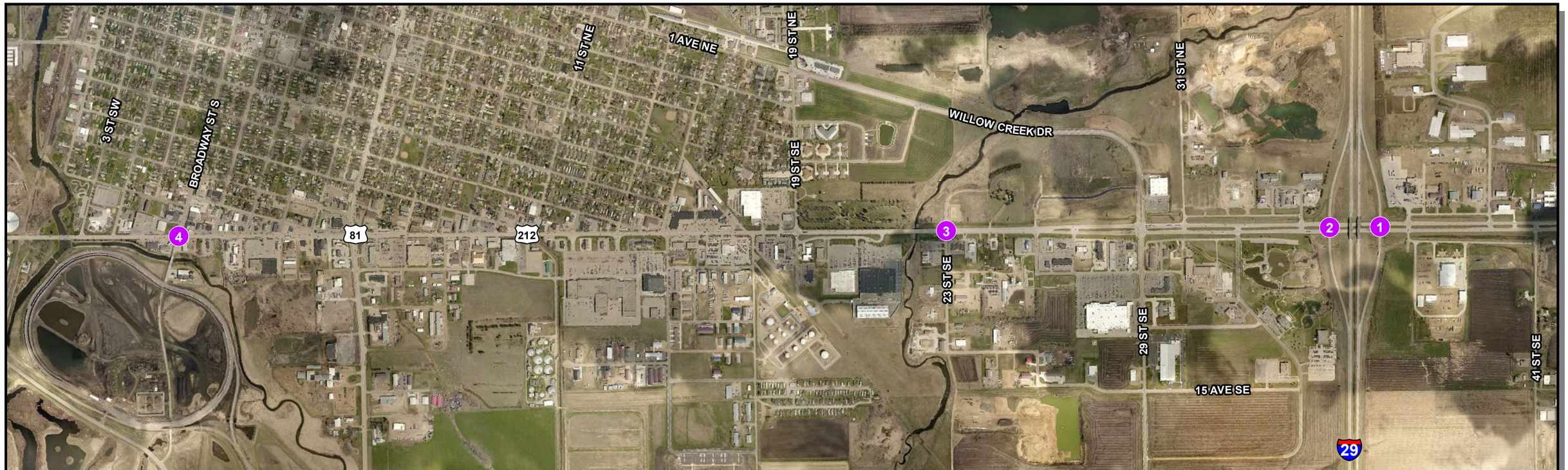
1st Avenue NE/Willow Creek Drive (29th Street SE) – from US 212 to 13th Street NE (**Figure 33**)

19th Street (456th Avenue) – from 1st Avenue NE to US 81 (26th Avenue NE) (**Figure 34**)

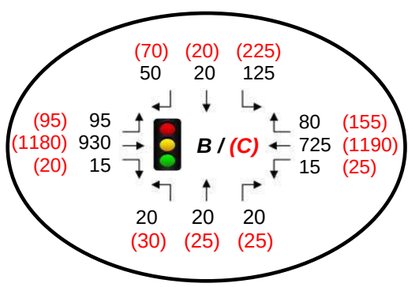
3rd Street NW – from W Kemp Avenue to 1st Avenue NW (**Figure 35**)

10th Avenue NW – from 2nd Street W to N Maple Street
N Maple Street – from 10th Avenue N to 14th Avenue N (**Figure 36**)

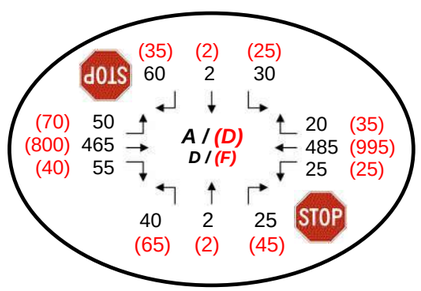
South Lake Drive and 4th Avenue SW – Isolated Intersection (**Figure 37**)



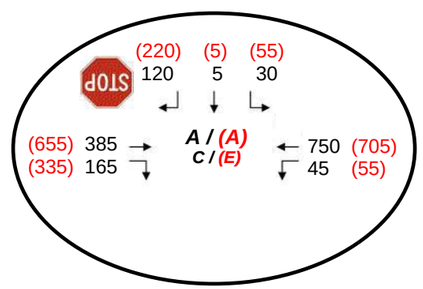
4. US 212 & Broadway Street S



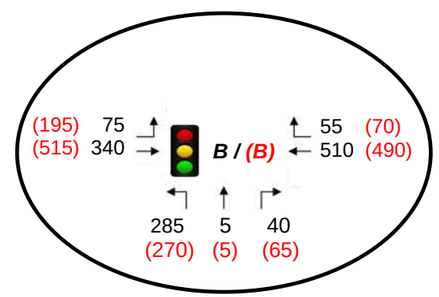
3. US 212 & 23rd Street SE



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

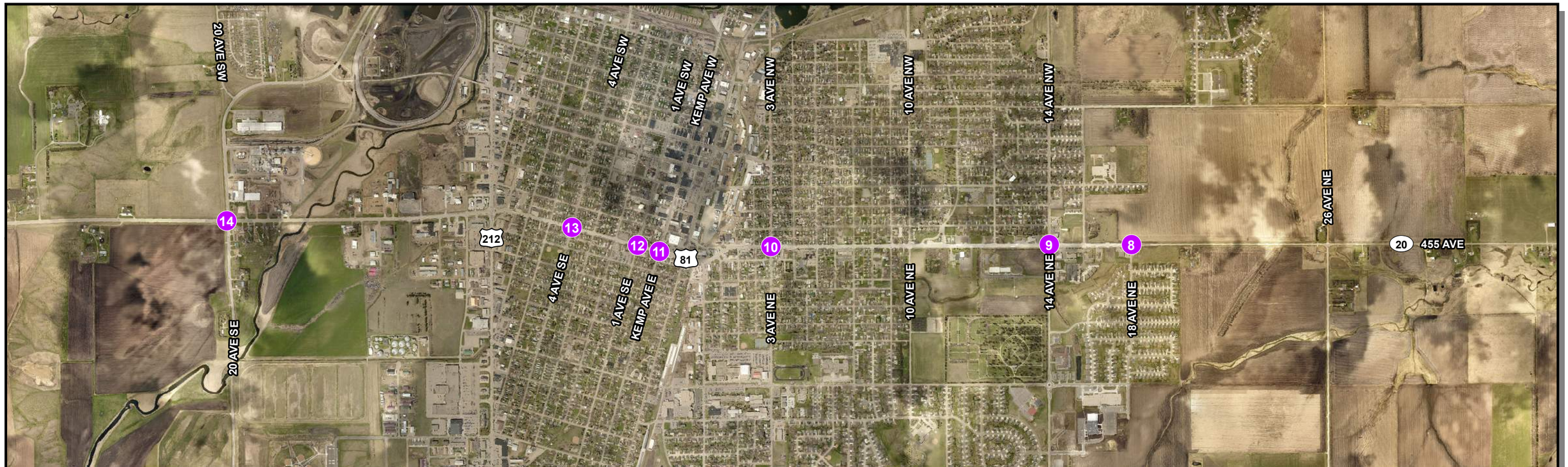
Roundabout

0 Miles 0.2

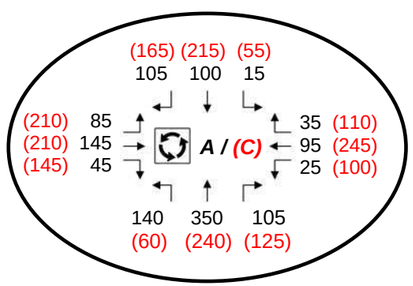
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 212 (9TH AVENUE S) CORRIDOR

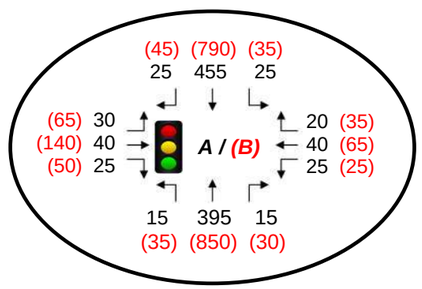
FIGURE 30



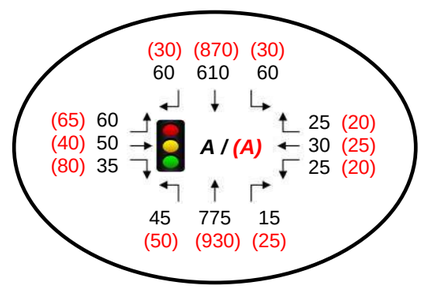
14. US 81 & 20th Ave SE



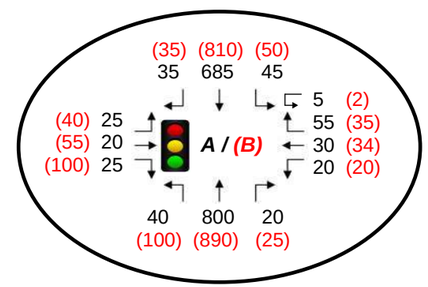
13. US 81 & 4th Avenue SE



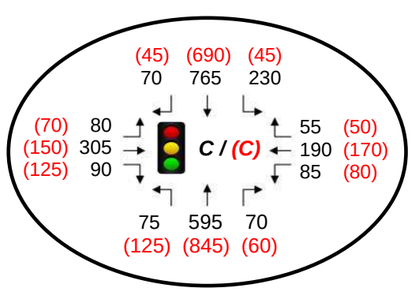
12. US 81 & 1st Avenue SE



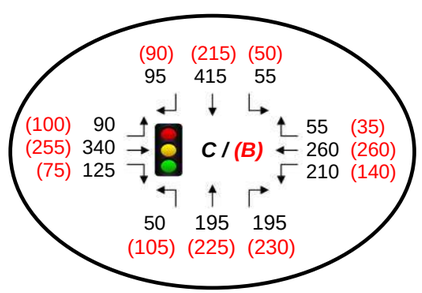
11. US 81 & E Kemp Avenue



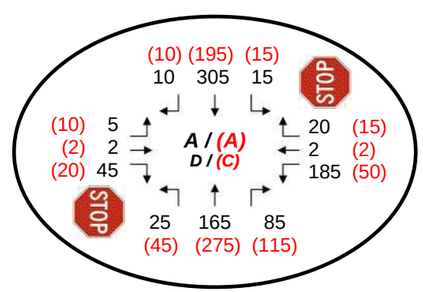
10. US 81 & 3rd Avenue NE



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

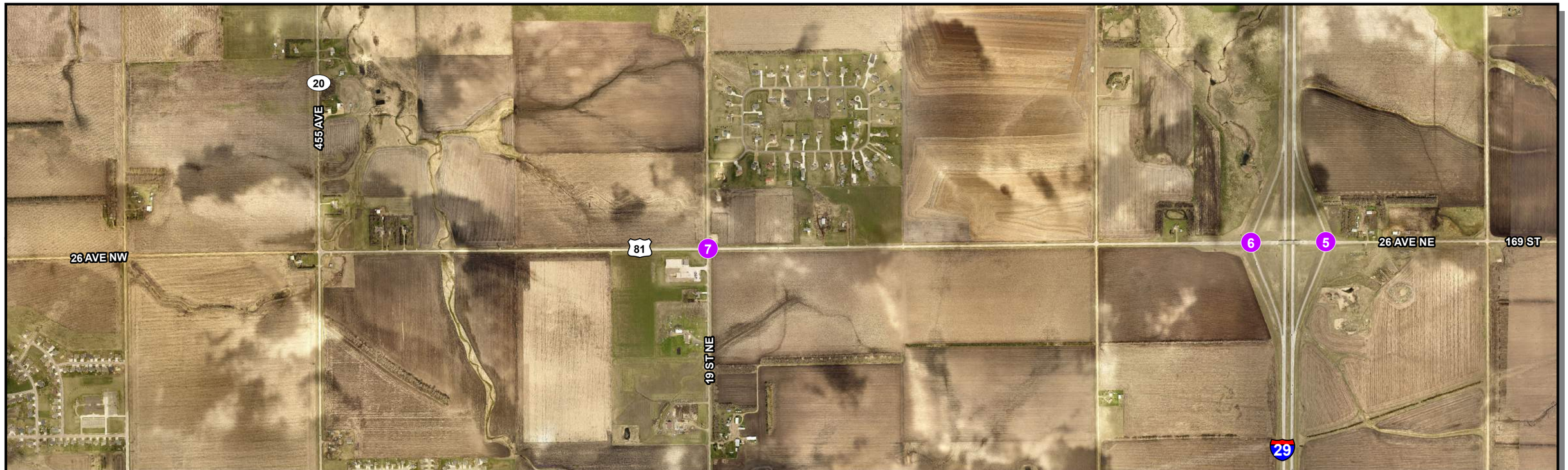
Roundabout Control

0 Miles 0.35

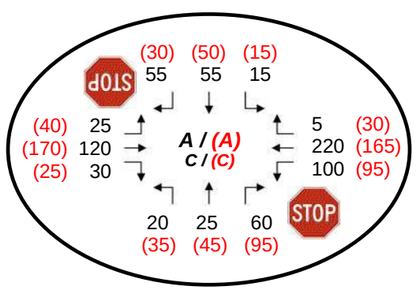
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (5TH STREET E) CORRIDOR

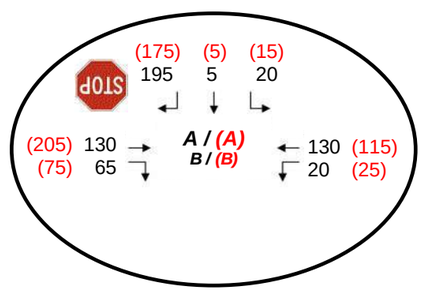
FIGURE 31



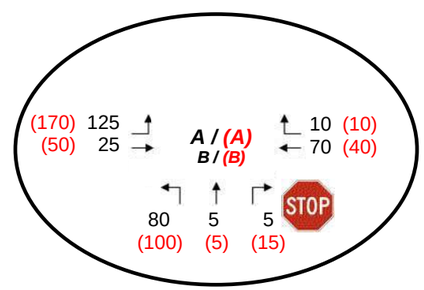
7. US 81 & 19th Street NE (456th Avenue)



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

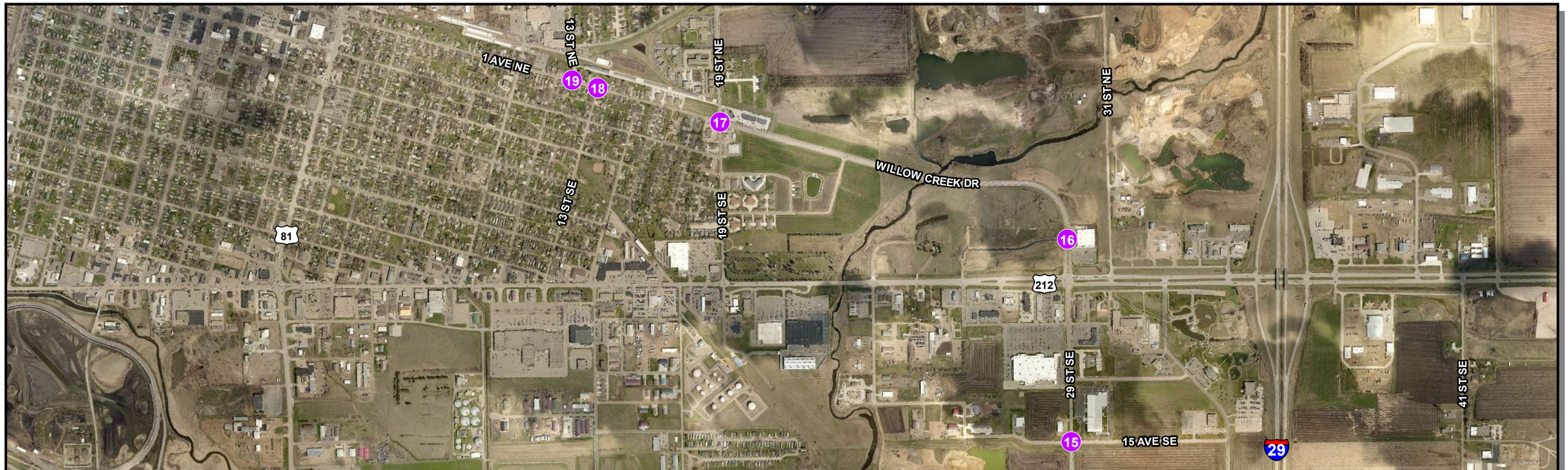
Roundabout Control

0 Miles 0.25

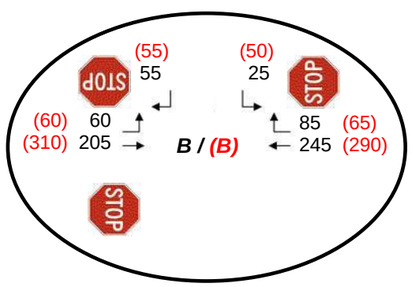
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
US 81 (26TH AVENUE NE) CORRIDOR

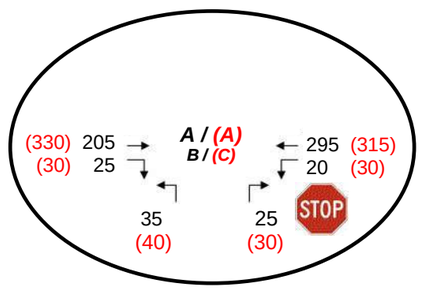
FIGURE 32



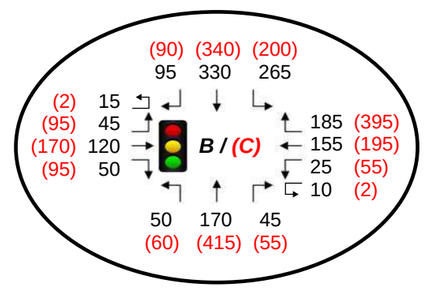
19. 1st Avenue NE & 13th Street NE (NB)



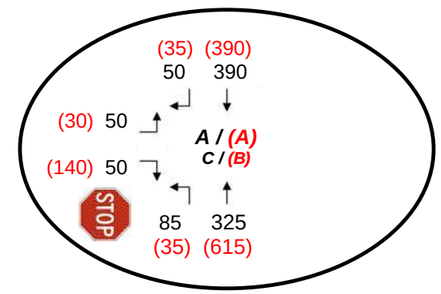
18. 1st Avenue NE & 13th Street NE (SB)



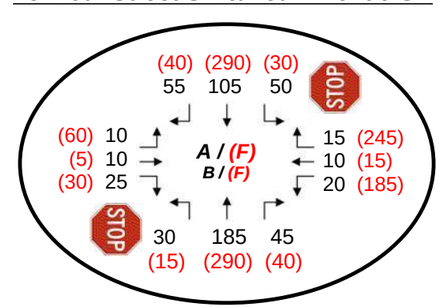
17. 1st Avenue NE & 19th Street NE



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

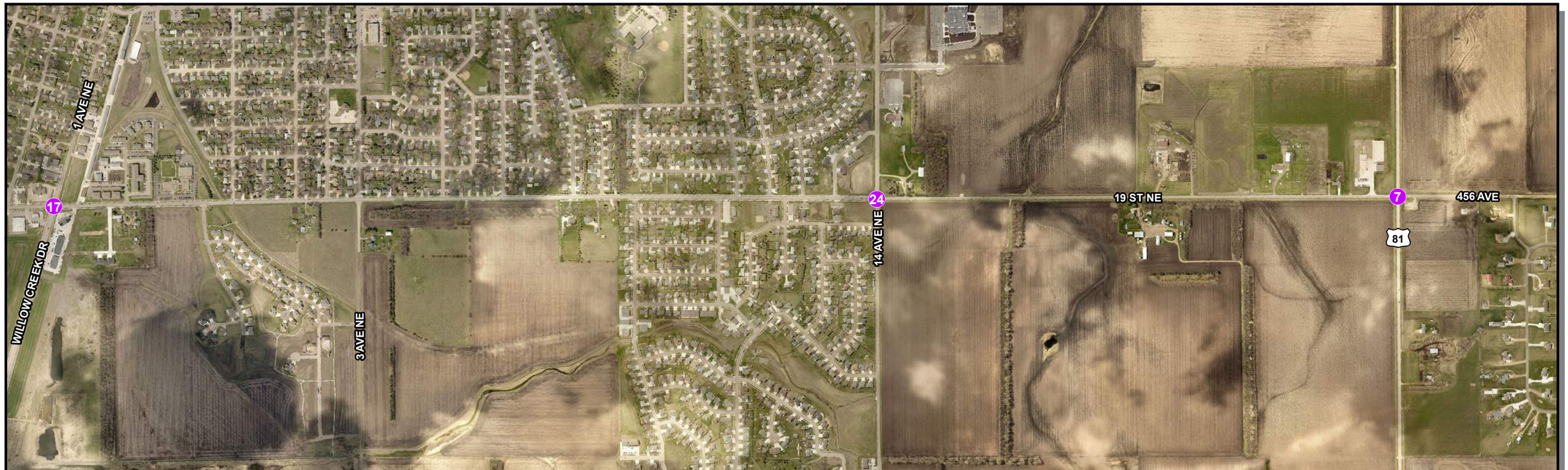
Roundabout Control

0 Miles 0.2

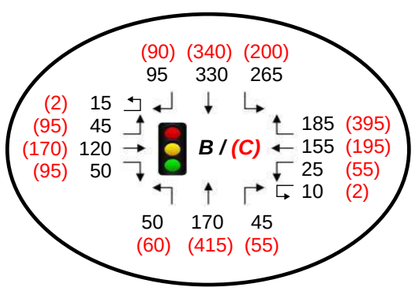
HDR

2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
1ST AVENUE NE / WILLOW CREEK DRIVE (29TH STREET SE) CORRIDOR

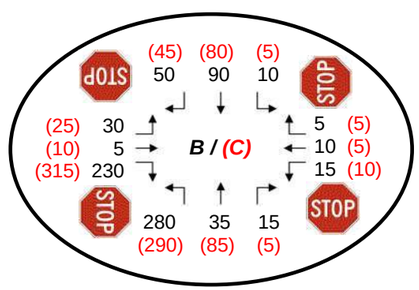
FIGURE 33



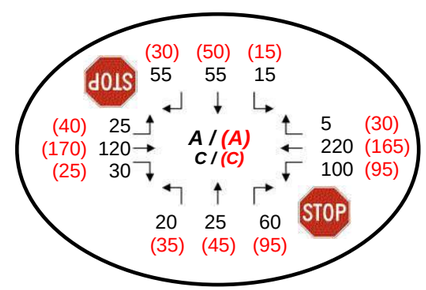
17. 1st Avenue NE & 19th Street NE



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

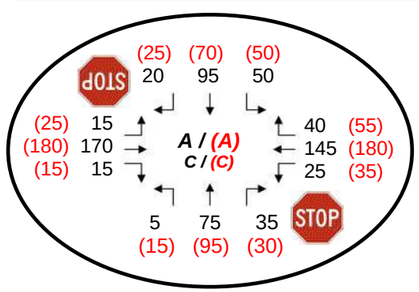
Roundabout

0 Miles 0.3

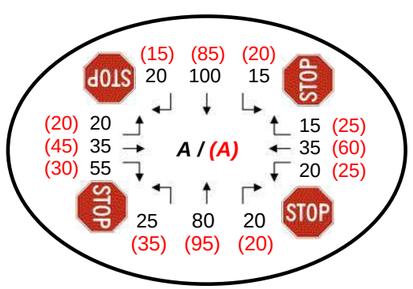
2040 PLANNING HORIZON PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS)
19TH STREET (456TH AVENUE) CORRIDOR

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

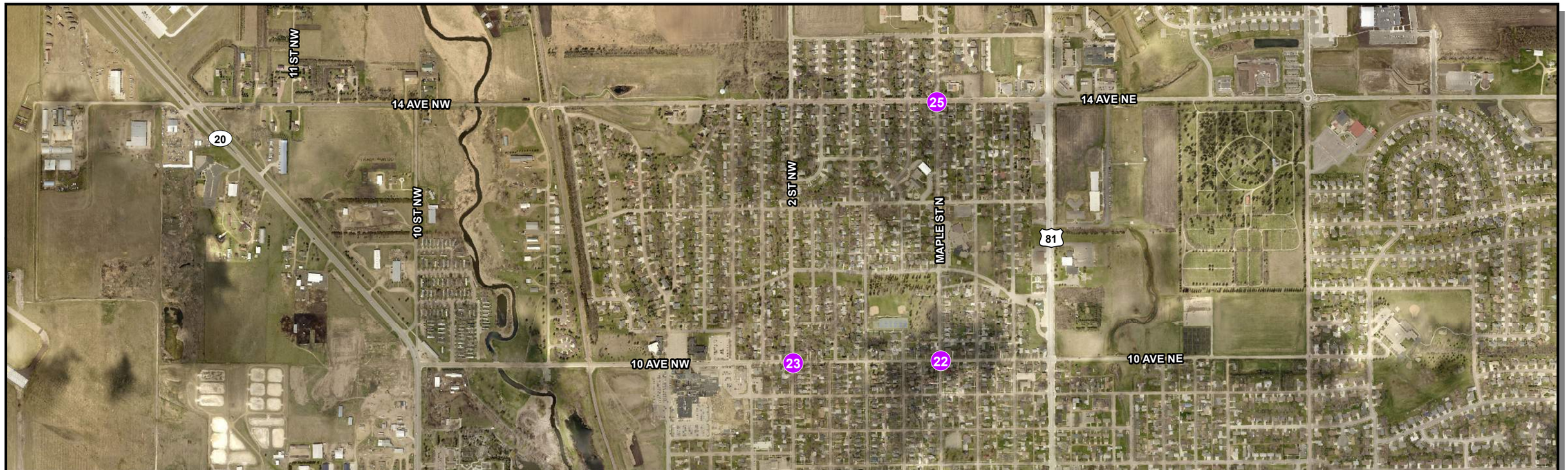
Stop Control

Roundabout

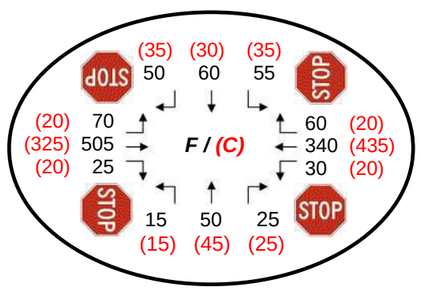
0 Miles 0.05

2030 INTERIM PEAK HOUR INTERSECTION LEVEL OF SERVICE (NO-BUILD CONDITIONS) 3RD STREET NW CORRIDOR

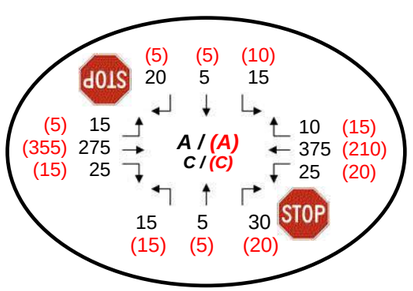
FIGURE 35



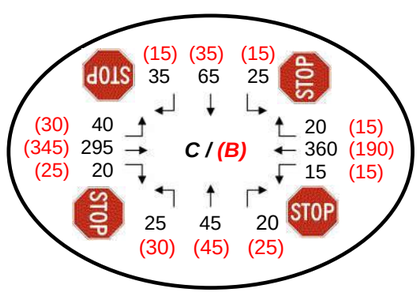
25. N Maple Street & 14th Avenue N



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

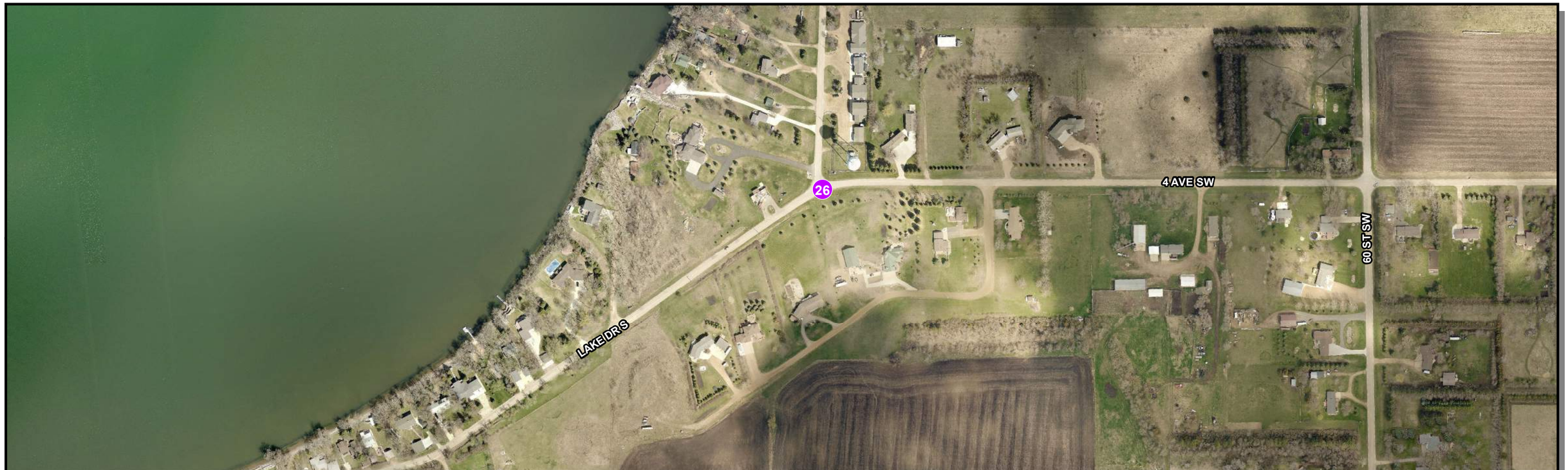
Stop Control

Roundabout

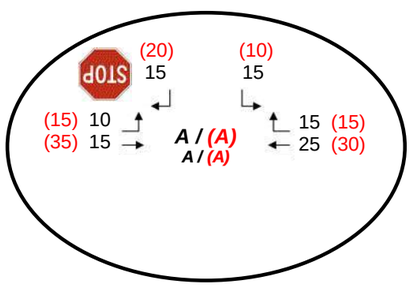
0 Miles 0.15

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.

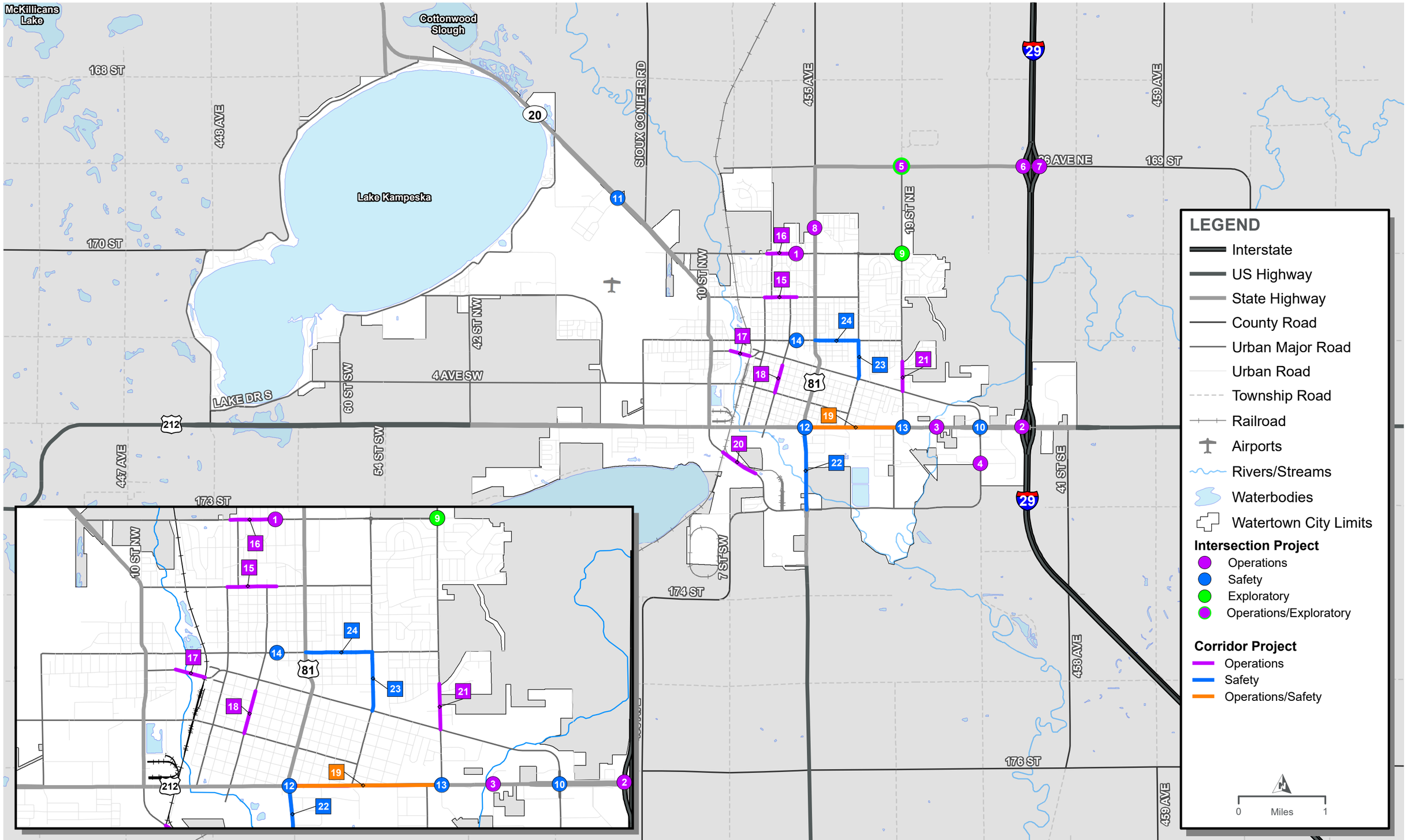
11th Street: 1st Avenue NE to 3rd Avenue NE

- 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

FIGURE 38

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/05/2021

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

Lanes, Volumes, Timings
1: I-29 NB Exit 180 RTI & US 81 (26th Avenue NE)

04/07/2021

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	-	-

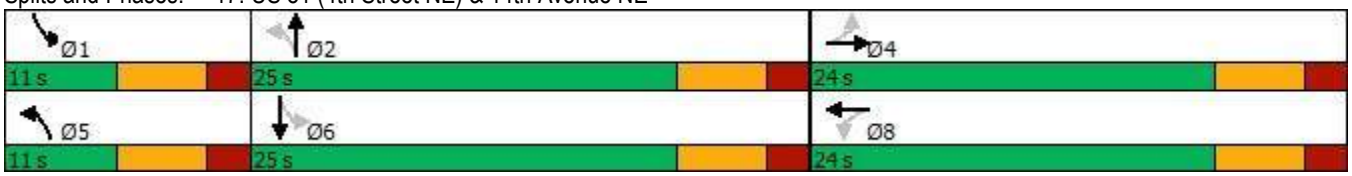
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	295	110	180	230	50	45	170	170	50	360	85
Future Volume (vph)	75	295	110	180	230	50	45	170	170	50	360	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

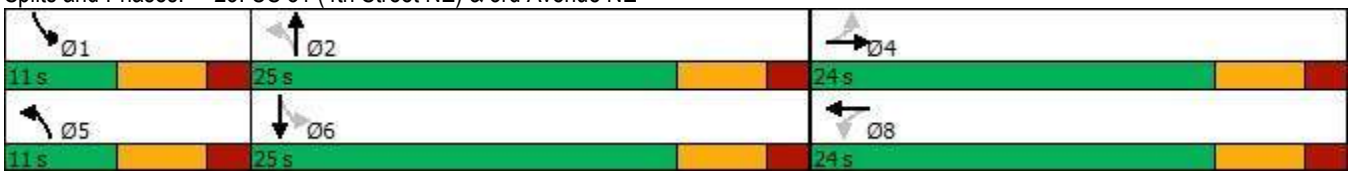
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	265	80	75	165	45	60	485	55	200	665	60
Future Volume (vph)	70	265	80	75	165	45	60	485	55	200	665	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

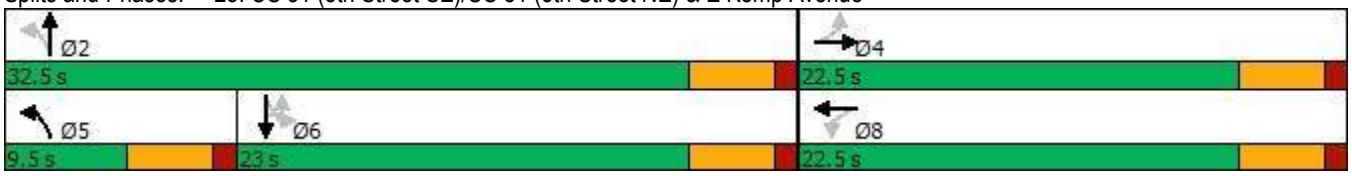
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	15	15	15	25	45	30	695	15	2	35	600
Future Volume (vph)	15	15	15	15	25	45	30	695	15	2	35	600
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Storage Length (ft)	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	

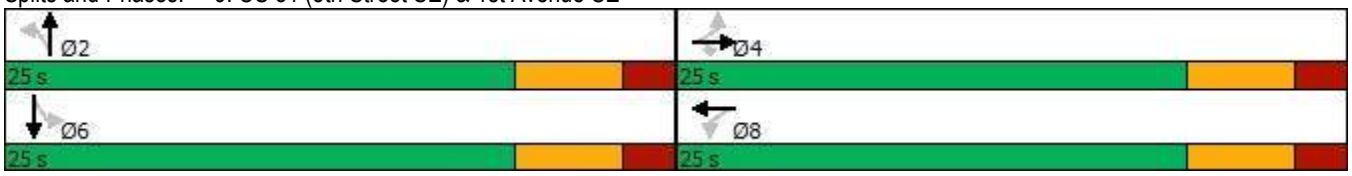
Intersection Summary

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

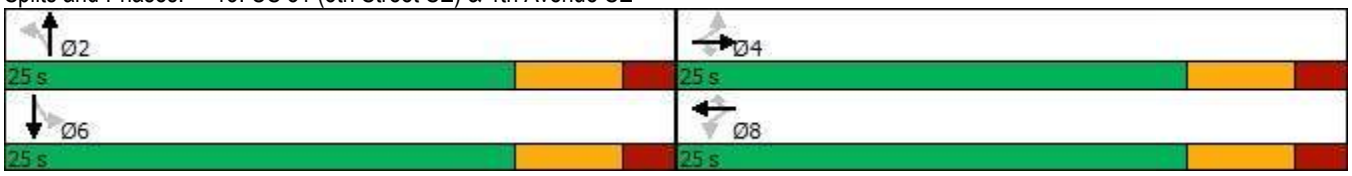
Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

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

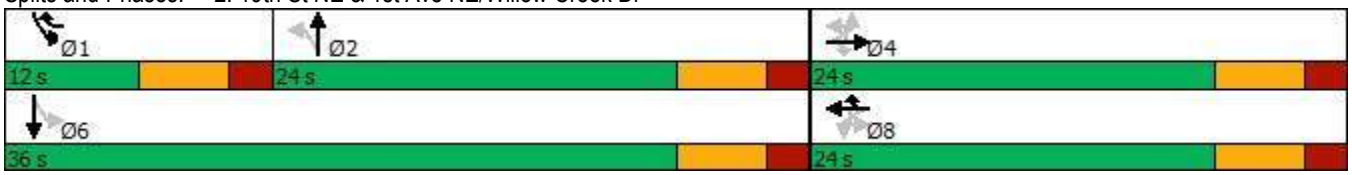
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	290	75
Future Volume (vph)	290	75
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.969	
Flt Protected		
Satd. Flow (prot)	1717	0
Flt Permitted		
Satd. Flow (perm)	1717	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

Lanes, Volumes, Timings
3: 3rd Street NW & 1st Avenue NW

04/05/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/05/2021

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/05/2021

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

Lanes, Volumes, Timings
1: I-29 NB Exit 180 RTI & US 81 (26th Avenue NE)

04/05/2021

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	-	-

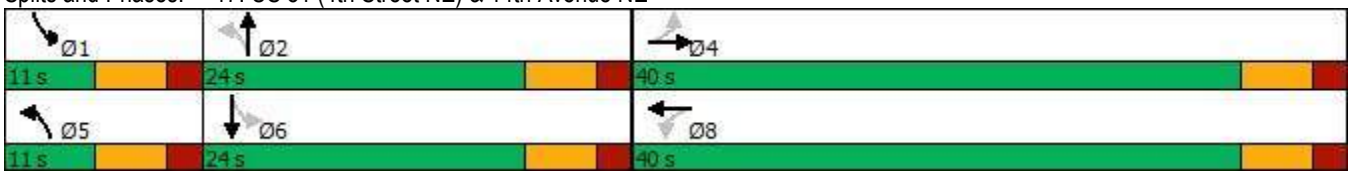
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	340	125	210	260	55	50	195	195	55	415	95
Future Volume (vph)	90	340	125	210	260	55	50	195	195	55	415	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

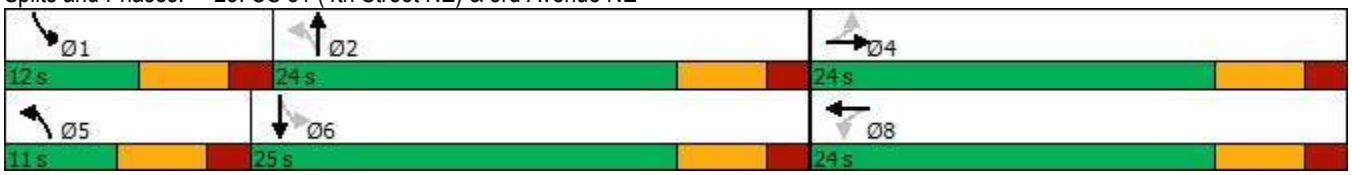
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	305	90	85	190	55	75	595	70	230	765	70
Future Volume (vph)	80	305	90	85	190	55	75	595	70	230	765	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

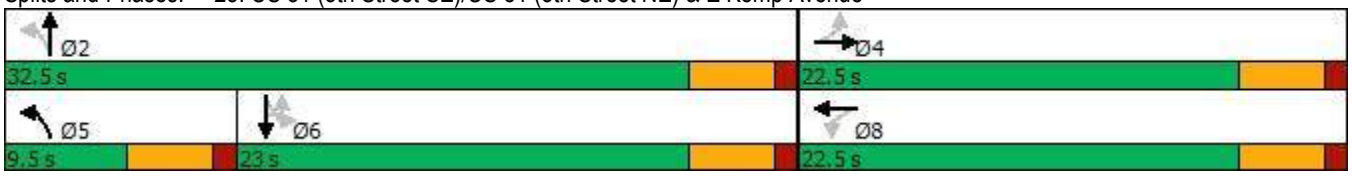
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	25	20	25	20	30	55	40	800	20	5	45	685
Future Volume (vph)	25	20	25	20	30	55	40	800	20	5	45	685
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Storage Length (ft)	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	

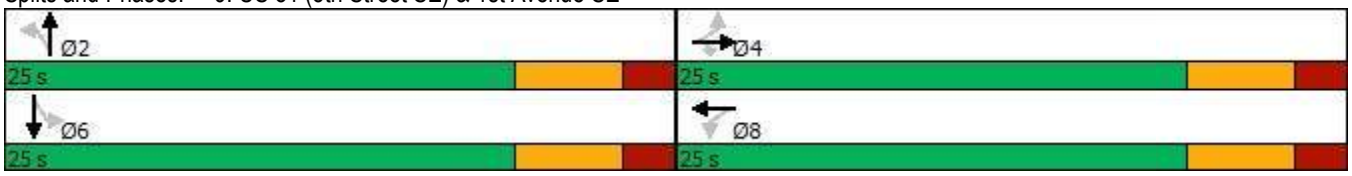
Intersection Summary

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				

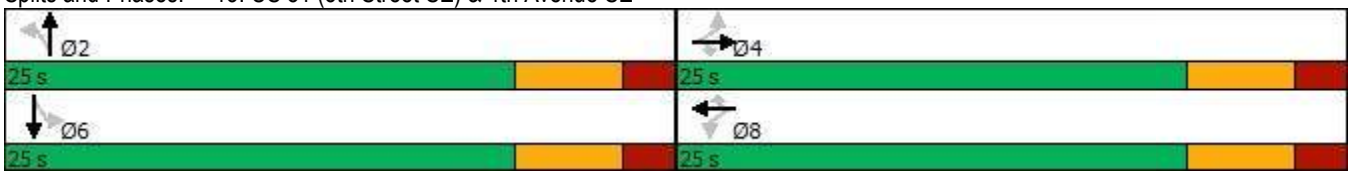
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

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	-

Lanes, Volumes, Timings
2: 19th St NE & 1st Ave NE/Willow Creek Dr

04/05/2021

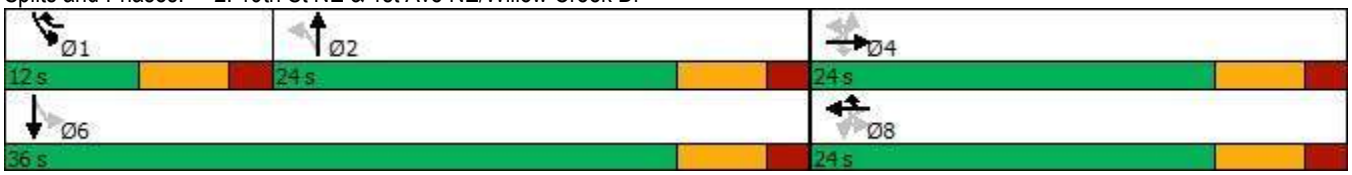
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	45	120	50	10	25	155	185	50	170	45	265
Future Volume (vph)	15	45	120	50	10	25	155	185	50	170	45	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

Lanes, Volumes, Timings
3: 3rd Street NW & 1st Avenue NW

04/05/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/05/2021

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

2040 PLANNING HORIZON (NO-BUILD) CONDITIONS - PM

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/05/2021

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

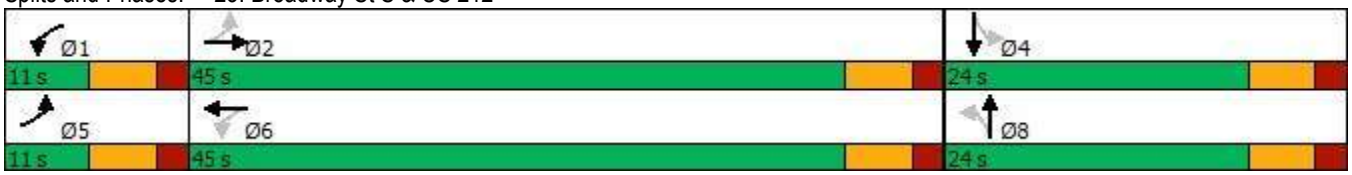
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1180	20	25	1190	155	30	25	25	225	20	70
Future Volume (vph)	95	1180	20	25	1190	155	30	25	25	225	20	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

Lanes, Volumes, Timings
1: I-29 NB Exit 180 RTI & US 81 (26th Avenue NE)

04/05/2021

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	-	-

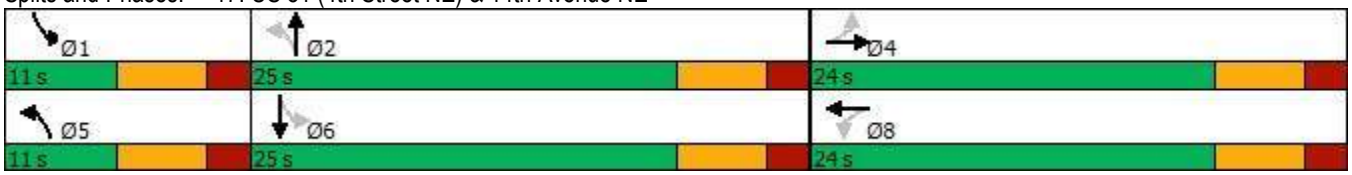
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	255	75	140	260	35	105	225	230	50	215	90
Future Volume (vph)	100	255	75	140	260	35	105	225	230	50	215	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

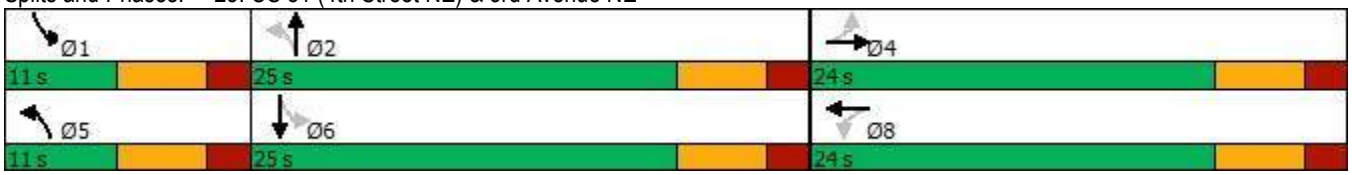
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	150	125	80	170	50	125	845	60	45	690	45
Future Volume (vph)	70	150	125	80	170	50	125	845	60	45	690	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage 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

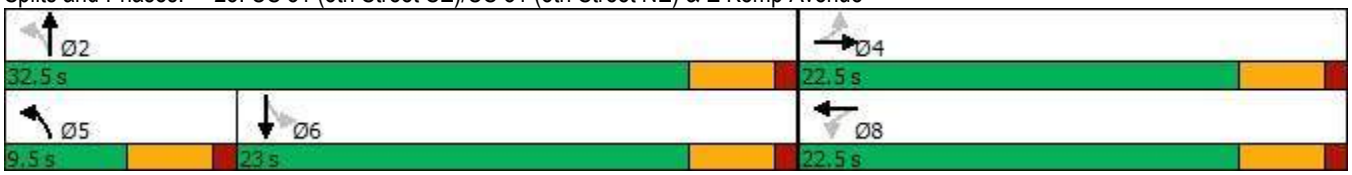
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	55	100	20	35	35	100	890	25	50	810	35
Future Volume (vph)	40	55	100	20	35	35	100	890	25	50	810	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (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				

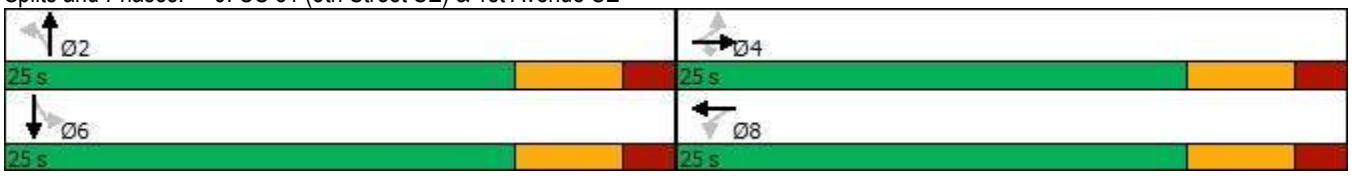
Intersection Summary												
HCM 6th Ctrl Delay			9.9									
HCM 6th LOS			A									

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				

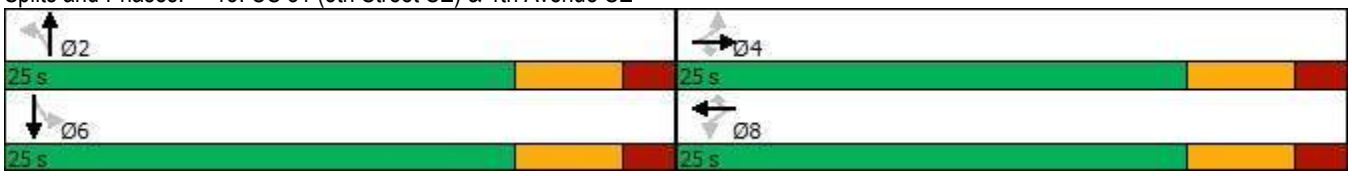
Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

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

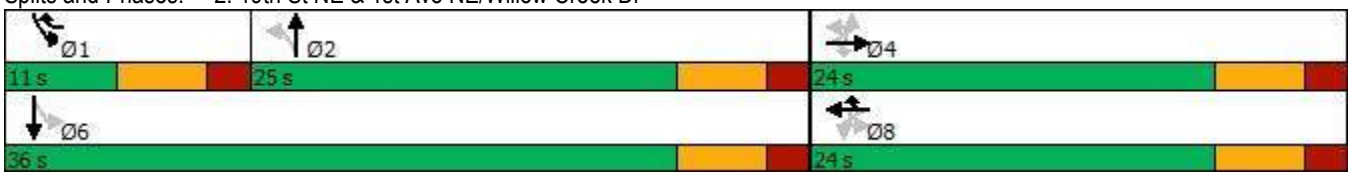
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	340	90
Future Volume (vph)	340	90
Ideal Flow (vphpl)	1800	1800
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt	0.969	
Flt Protected		
Satd. Flow (prot)	1723	0
Flt Permitted		
Satd. Flow (perm)	1723	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

Lanes, Volumes, Timings
3: 3rd Street NW & 1st Avenue NW

04/05/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/05/2021

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/11/2021

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

Lanes, Volumes, Timings
11: 23rd St SE & US 212

04/11/2021

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

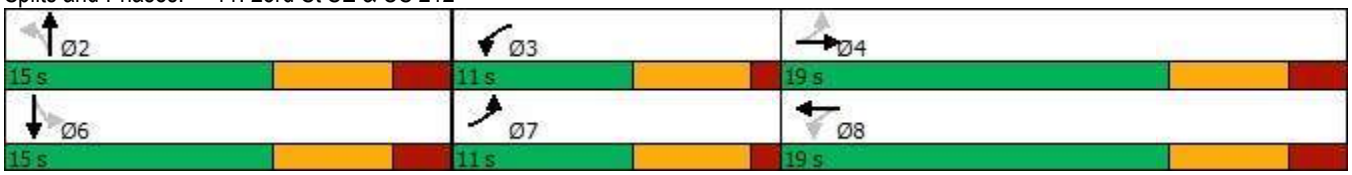
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Future Volume (vph)	45	415	50	20	410	15	35	1	20	25	1	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	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

Lanes, Volumes, Timings
2: I-29 SB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

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	-	-

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
6: 19th St NE/456th Ave (19th St NE) & 14th Ave NE

04/11/2021

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/11/2021

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

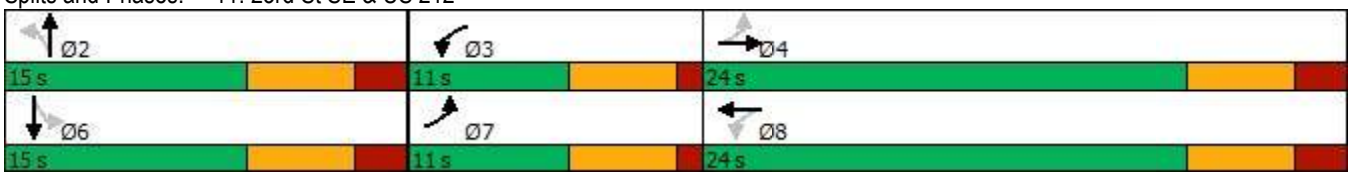
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Future Volume (vph)	65	720	30	20	870	30	55	1	30	20	1	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	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.

Lanes, Volumes, Timings
2: I-29 SB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

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	-	-

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
6: 19th St NE/456th Ave (19th St NE) & 14th Ave NE

04/11/2021

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/11/2021

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

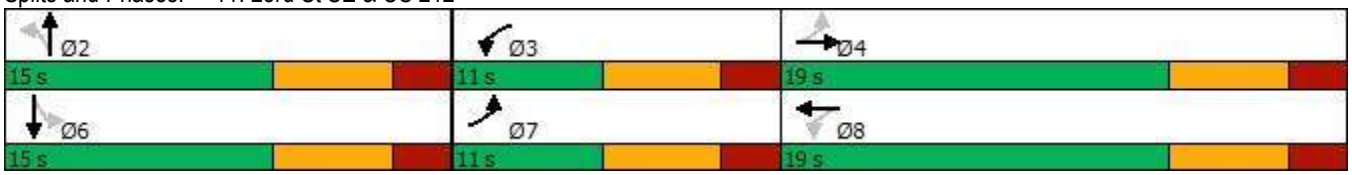
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	164	542	1025	-	-	920	-	-	190	642
HCM Lane V/C Ratio	0.271	0.055	0.049	-	-	0.03	-	-	0.146	0.099
HCM Control Delay (s)	34.9	12	8.7	-	-	9	-	-	27.2	11.2
HCM Lane LOS	D	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	1	0.2	0.2	-	-	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

Lanes, Volumes, Timings
1: I-29 NB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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	-	-	-

Lanes, Volumes, Timings
2: I-29 SB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
15: US 81 (4th Street NE)/US 81 (5th Street NE) & 18th Avenue NE

04/11/2021

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	-	-

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

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

Lanes, Volumes, Timings
13: 29th St SE & 15th Ave SE

04/11/2021

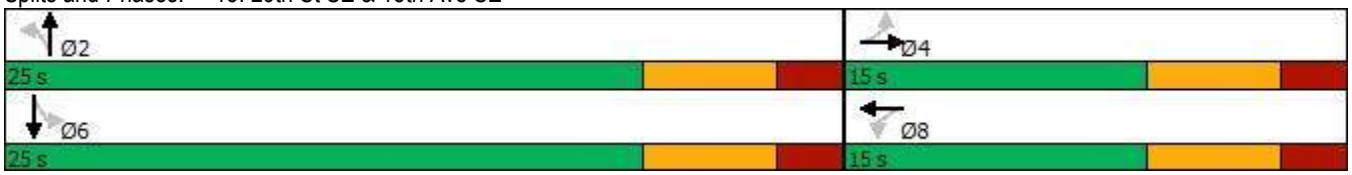
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Future Volume (vph)	10	5	25	20	5	15	30	185	45	50	105	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
6: 19th St NE/456th Ave (19th St NE) & 14th Ave NE

04/11/2021

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

Lanes, Volumes, Timings
2: I-29 SB Exit 177 RTI & US 212

04/11/2021

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

Lanes, Volumes, Timings
11: 23rd St SE & US 212

04/11/2021

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

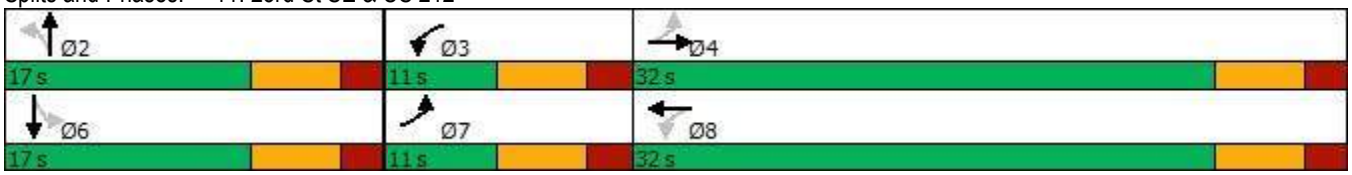
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Future Volume (vph)	65	810	40	25	1005	30	65	2	45	20	2	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	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

Lanes, Volumes, Timings
1: I-29 NB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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	-	-	-

Lanes, Volumes, Timings
2: I-29 SB Exit 180 RTI & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
10: 19th Street NE (456th Avenue) & US 81 (26th Avenue NE)

04/11/2021

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

Lanes, Volumes, Timings
15: US 81 (4th Street NE)/US 81 (5th Street NE) & 18th Avenue NE

04/11/2021

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

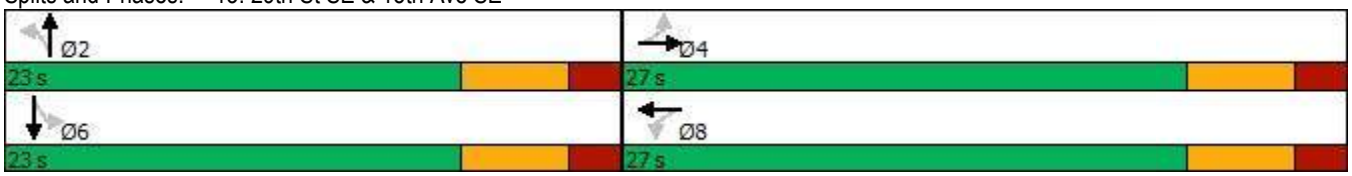
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Future Volume (vph)	60	5	30	185	15	245	15	290	40	35	290	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (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									

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
3: N Maple Street & 14th Avenue NW/14th Avenue NE

04/11/2021

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

Lanes, Volumes, Timings
6: 19th St NE/456th Ave (19th St NE) & 14th Ave NE

04/11/2021

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

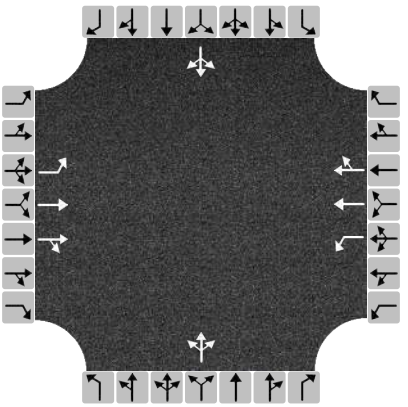
Project Information

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

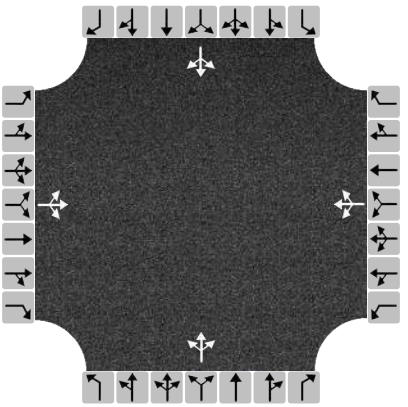
Project Information

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

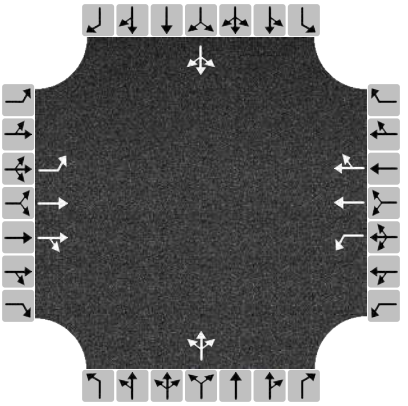
Project Information

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

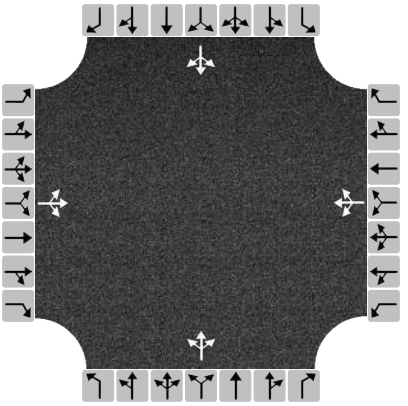
Project Information

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

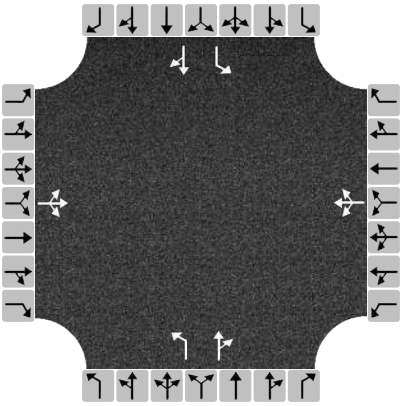
Project Information

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	