

## **APPENDIX C**

### **Existing Traffic Conditions Analysis Memo**



**To:** Angie Stenson, AICP, Sr. Transportation Planner  
Carver County

**From:** Leif Garnass, PE, PTOE  
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**Date:** May 7, 2019

**Subject:** Arboretum Area Transportation Plan  
Drafting Existing Conditions Traffic Memorandum

## Introduction

The Arboretum Area Transportation Plan is being developed to provide short-, mid-, and long-term transportation improvements along Highway 5 and the additional study areas, which include CSAH 13 (Rolling Acres Road), Highway 7, Highway 41, and CSAH 18. The study area is shown in Figure 1. The first step in the development of the Plan is to define the problem. Before proceeding with analysis or jumping to solutions, it is important to develop a well-rounded understanding of existing conditions within the study area. This memorandum documents the existing traffic operations analysis which includes data collection, an intersection capacity analysis, and a speed distribution analysis.

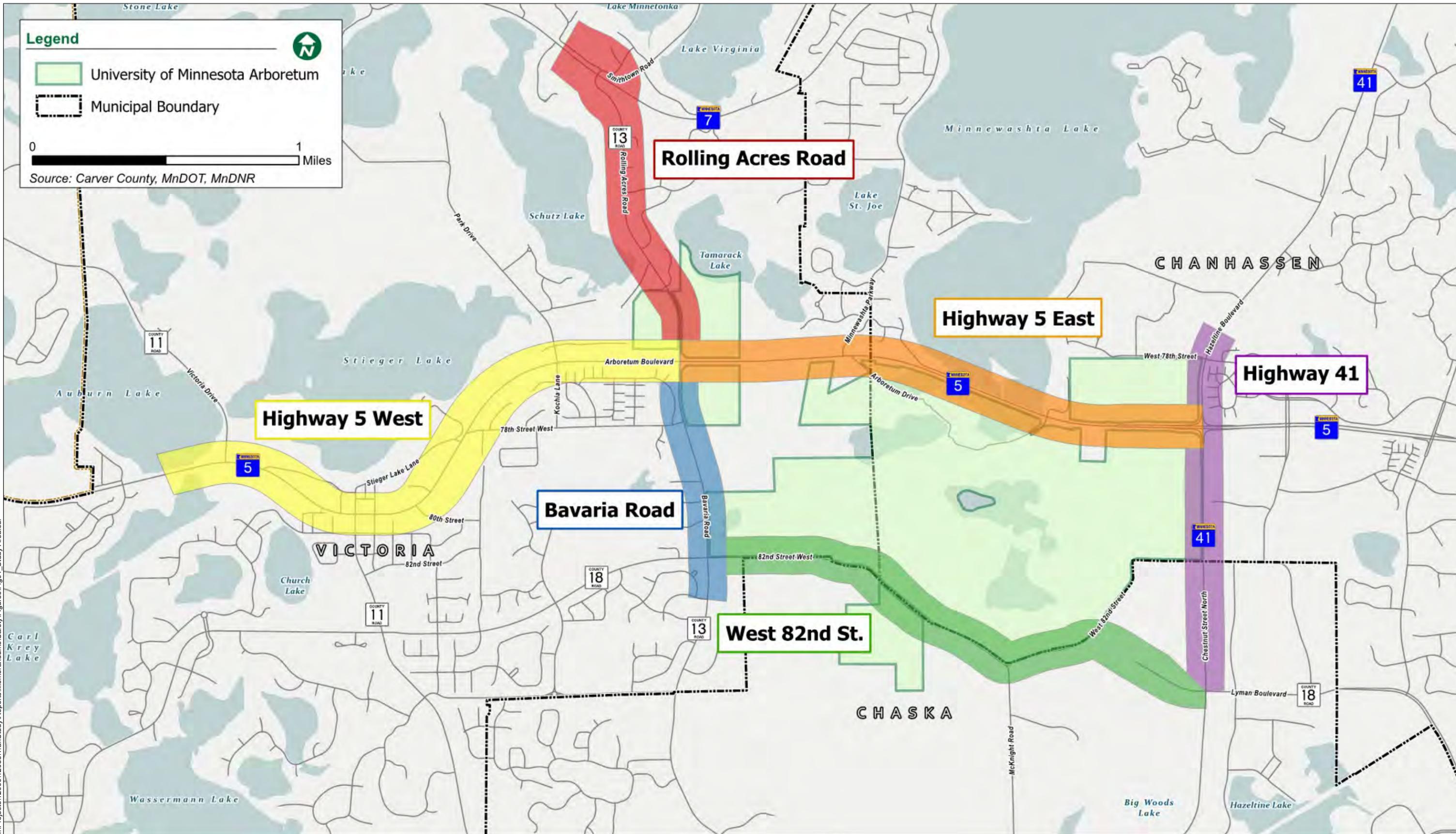
## Data Collection

Weekday 48-hour turning movement counts were collected by SRF during March, 2019 at the following key study intersections:

- Hwy 7/CSAH 13
- Hwy 5/CSAH 11 (Victoria Drive - North)
- Hwy 5/CSAH 11 (Victoria Drive - South)
- Hwy 5/78th St
- Hwy 5/Park Dr
- Hwy 5/CSAH 13 (Rolling Acres Rd)
- Hwy 5/Minnewashta Pkwy
- Hwy 5/Crimson Bay Rd
- Hwy 5/Hwy 41
- CSAH 18 (82nd St)/CSAH 13 (Bavaria Rd)
- CSAH 18 (82nd St)/McKnight Rd
- Hwy 41/82nd Street
- Hwy 41/CSAH 18 (Lyman Blvd)

In addition to the 48-hour turning movement counts, peak hour counts were collected at the following intersections:

- Hwy 5/Stieger Lake Ln (West)
- Hwy 5/Stieger Lane Ln (East)
- Hwy 5/Quamoclit
- Hwy 5/80th St
- Hwy 41/78th St



Historical annual average daily traffic (AADT) volumes within the study area were provided by the Minnesota Department of Transportation (MnDOT). Geometric and traffic control information was obtained using aerial imagery and confirmed in the field. Traffic signal timing from March, 2019 was obtained from MnDOT's database using MaxView Advanced Traffic Management System (ATMS). Existing geometrics, traffic controls, and peak hour traffic volumes within the study area are shown in Figure 2.

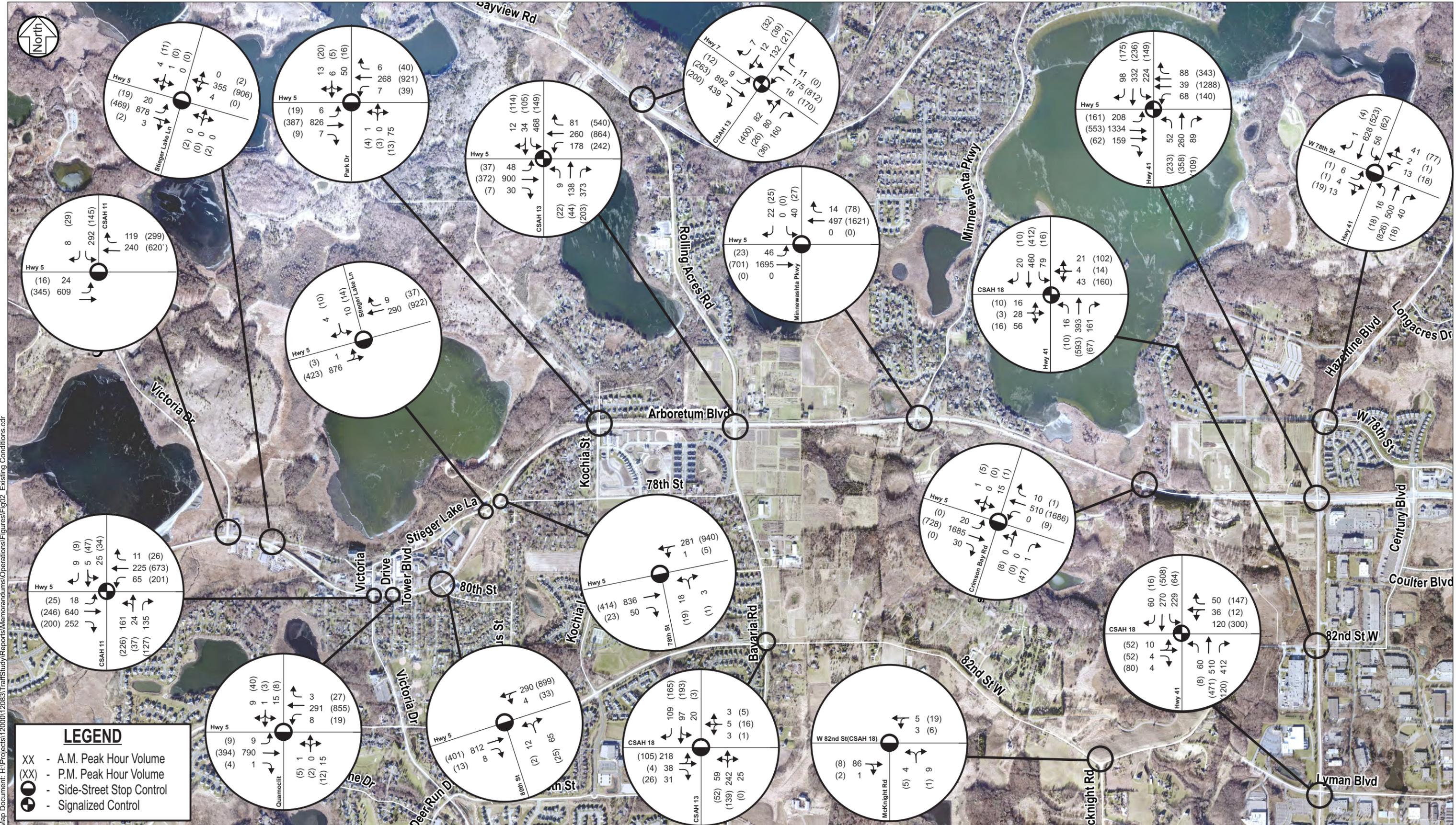
## Existing Traffic Operations

An existing traffic operations analysis has been completed for the weekday a.m. and p.m. peak hour to establish a baseline condition to which future traffic operations can be compared. The study intersections were analyzed using Synchro/SimTraffic (Version 9.2) software. Analysis results identify a Level of Service (LOS), which indicates the quality of traffic flow through an intersection. Intersections are given a ranking from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 1. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS F indicates an intersection where demand exceeds capacity, or a breakdown of traffic flow.

**Table 1 Level of Service Criteria for Signalized and Unsignalized Intersections**

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
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	> 50

For side-street stop and yield controlled intersections, special emphasis is given to providing an estimate for the LOS of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop and yield control can be described in two ways. First, consideration is given to the overall intersection level of service. This considers the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the side-street approaches. Since the mainline does not have to stop, most delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (i.e. poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.



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Results of the existing traffic operations analysis, shown in Table 2, indicate that the Highway 5/CSAH 13 (Rolling Acres Road) and Highway 5/Park Drive intersections operate at an overall LOS F during the a.m. peak hour. Queues from the Highway 5/CSAH 13 intersection extend west and impact operations at the Highway 5/Park Drive, Highway 5/78th Street, and Highway 5/Stieger Lake Lane intersections. The Highway 7/CSAH 13 intersection operates at an overall LOS E and the Highway 5/Highway 41 intersection operates at an overall LOS F during the p.m. peak hour. All other study intersections operate at an overall LOS D or better during the a.m. and p.m. peak hours.

The a.m. and p.m. peak hour LOS and traffic queues are illustrated in Figure 3 and Figure 4, respectfully. Complete results of the analysis which, includes delay and queuing by approach and movement, can be found in Attachment 1.

**Table 2 Existing Traffic Operations Analysis Results**

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Hwy 7 & CSAH 13	C	28 sec.	E	56 sec.
Hwy 5 & CSAH 11 (North) <sup>(1)</sup>	C/F	68 sec.	A/C	19 sec.
Hwy 5 & Stieger Lake Ln (West) <sup>(1)</sup>	A/A	9 sec.	A/B	12 sec.
Hwy 5 & CSAH 11 (South)	B	14 sec.	B	16 sec.
Hwy 5 & Quamoclit <sup>(1)</sup>	A/B	13 sec.	A/C	20 sec.
Hwy 5 & 80th St <sup>(1)</sup>	A/D	31 sec.	A/A	4 sec.
Hwy 5 & Stieger Lake Ln <sup>(1)</sup>	D/F	54 sec.	A/C	21 sec.
Hwy 5 & 78th St <sup>(1)</sup>	A/D	34 sec.	A/D	33 sec.
Hwy 5 & Park Dr <sup>(1)</sup>	F/F	>2 min.	A/C	21 sec.
Hwy 5 & CSAH 13 <sup>(2)</sup>	F	>2 min.	D	42 sec.
Hwy 5 & Minnewashta Pkwy <sup>(1)</sup>	B/F	97 sec.	C/F	>2 min.
Hwy 5 & Crimson Bay Rd <sup>(1)</sup>	A/E	47 sec.	B/F	>2 min.
Hwy 5 & Hwy 41 <sup>(3)</sup>	D	54 sec.	F	118 sec.
CSAH 18/82nd St & CSAH 13 <sup>(1)</sup>	A/B	13 sec.	A/A	9 sec.
82nd St & McKnight Rd <sup>(1)</sup>	A/A	3 sec.	A/A	4 sec.
82nd St & Hwy 41	B	17 sec.	B	18 sec.
Hwy 41 & 78th St <sup>(1)</sup>	A/B	11 sec.	A/C	21 sec.
Hwy 41 & Lyman Blvd	C	21 sec.	C	23 sec.

(1) Indicates an unsignalized intersection with side-street stop/yield control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

(2) Queues exceed 1/2 mile on the eastbound approach and 2,000 on the northbound approach during the a.m. peak hour.

(3) Queues exceed 2,000 feet on the westbound approach during the p.m. peak hour.





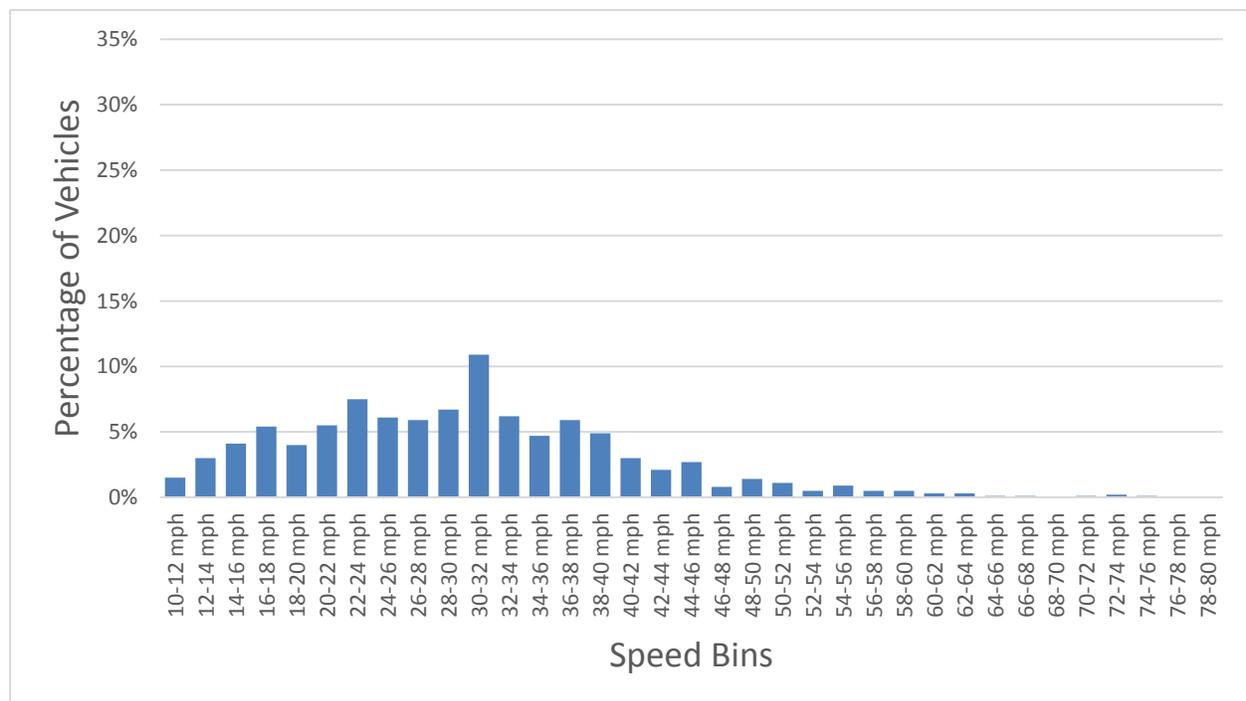
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## Speed Distribution Analysis

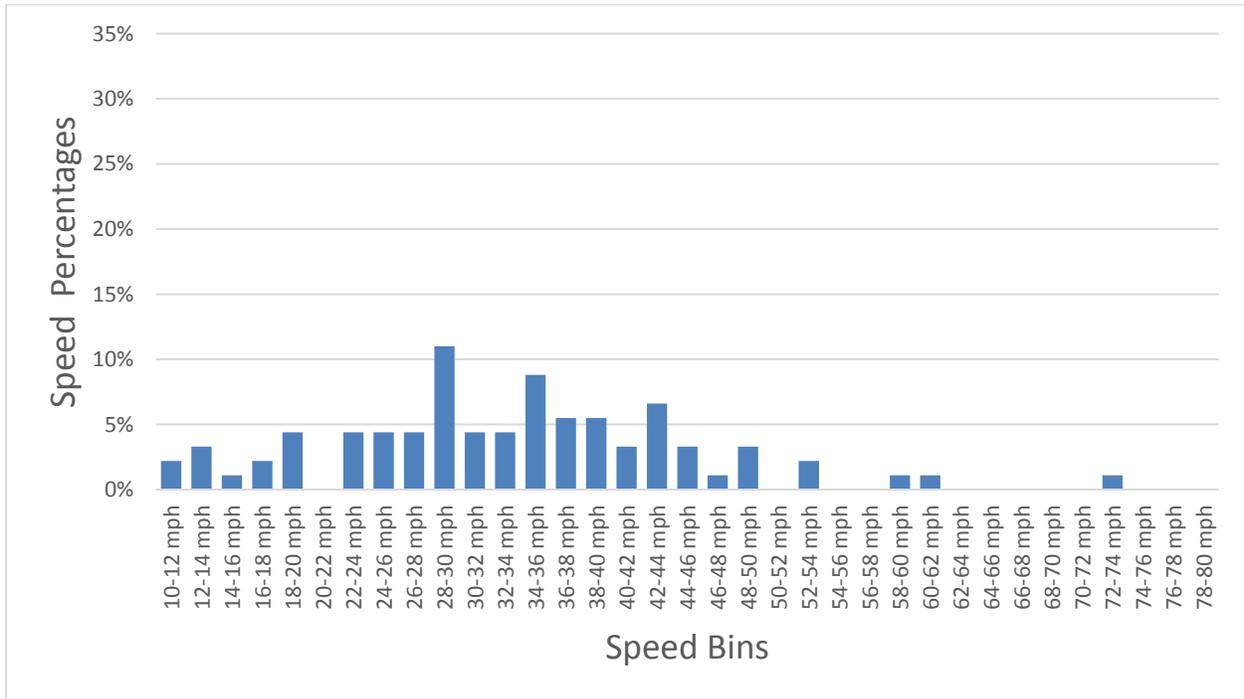
Speed distribution data along CSAH 13 (Rolling Acres Road) between Highway 7 and Highway 5 was obtained from StreetLight. The data includes weekdays (Monday-Thursday) for the entire year of 2018. The data was grouped into 2 mile per hour (mph) speed bins.

The speed distribution data obtained from StreetLight was used to determine the average speed and speed distribution along CSAH 13 (Rolling Acres Road) between Highway 7 and Highway 5. The posted speed limit along CSAH 13 is 45 mph. The speed distribution data indicates that the average speed along northbound CSAH 13 is 30 mph, while the average speed along southbound CSAH 13 is 32 mph. Approximately 7 percent of the vehicles sampled in the northbound direction had an average speed greater than the posted speed limit, while approximately 10 percent of the southbound vehicles had an average speed greater than the posted speed limit. Chart 1 and Chart 2 display the average speeds in 2 mph bins for northbound and southbound CSAH 13, respectfully.

**Chart 1 Northbound CSAH 13 (Rolling Acres Road) – Daily**



**Chart 2 Southbound CSAH 13 (Rolling Acres Road) – Daily**



## Attachment 1

### Existing Traffic Operations Analysis Results

Delay by Approach

5: CSAH 13 & TH 7 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.5	0.4	0.0	0.1	1.8
Total Del/Veh (s)	17.7	17.9	66.4	97.5	28.2

10: TH 5 & CSAH 11 (North) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.7	0.0	0.3	0.4
Total Del/Veh (s)	2.5	1.0	68.4	18.0

15: TH 5 & Stieger Lake Ln (West) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.3	3.1	8.5	2.5

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.9	1.0	0.4
Total Del/Veh (s)	12.3	9.0	23.2	23.3	14.1

25: Quamoelit & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.9	1.7	12.6	11.3	2.9

30: 80th St & TH 5 Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	6.8	2.1	30.7	7.2

35: TH 5 & Stieger Lake Ln (East) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	53.9	38.0	1.4	28.8

40: 78th St & TH 5 Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	33.7	11.0	2.9	9.3

45: Kochia Ln/Park Dr & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	4.7	0.1	0.7
Total Del/Veh (s)	228.3	6.0	577.3	415.6	206.5

50: CSAH 13 & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	21.4	0.1	2.2	0.0	7.7
Total Del/Veh (s)	339.8	48.7	353.2	96.7	225.9

55: TH 5 & Minnewashta Pkwy Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	1.4	0.2
Total Del/Veh (s)	11.2	5.1	96.6	12.2

60: Arboretum Dr/Crimson Bay Rd & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0		0.1	0.0
Total Del/Veh (s)	8.6	2.2		47.0	7.2

65: TH 41 & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1	0.1
Total Del/Veh (s)	53.6	65.8	50.5	46.4	53.9

70: CSAH 13 & CSAH 18/82nd St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.7	0.1	0.3	2.1	0.9
Total Del/Veh (s)	13.3	7.8	2.6	0.9	5.9

75: McKnight Rd & 82nd St Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1
Total Del/Veh (s)	0.1	0.6	2.8	0.4

80: TH 41 & 82nd St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.0
Total Del/Veh (s)	26.8	33.7	9.9	19.6	16.5

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85: TH 41 & 78th St Performance by approach

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Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	0.9	0.0	0.8	0.5
Total Del/Veh (s)	11.4	10.6	7.7	1.4	4.6

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90: TH 41 & Lyman Blvd Performance by approach

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Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	2.1	0.0	1.2
Total Del/Veh (s)	28.0	31.3	16.9	25.1	21.3

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Total Network Performance

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Denied Del/Veh (s)	3.3
Total Del/Veh (s)	145.9

5: CSAH 13 & TH 7 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.0	1.2	0.0	0.1	1.0
Total Del/Veh (s)	44.5	50.0	77.2	80.0	56.4

10: TH 5 & CSAH 11 (North) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.5	0.2
Total Del/Veh (s)	1.4	1.8	19.2	3.9

15: TH 5 & Stieger Lake Ln (West) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.7	5.2	11.7	9.2	4.0

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.5	0.6	0.4
Total Del/Veh (s)	12.2	13.8	24.3	26.0	16.3

25: Quamoelit & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	1.9	3.6	13.8	19.9	3.9

30: 80th St & TH 5 Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.8	3.7	4.3	2.8

35: TH 5 & Stieger Lake Ln (East) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	21.1	1.6	1.7	2.0

40: TH 5 & 78th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	33.2	0.4	4.6	3.6

45: Kochia Ln/Park Dr & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	2.6	0.1	0.1
Total Del/Veh (s)	2.5	8.0	10.2	20.8	6.8

50: CSAH 13 & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.8	0.0	0.4
Total Del/Veh (s)	56.6	36.2	28.8	58.0	41.7

55: TH 5 & Minnewashta Pkwy Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	2.2	0.1
Total Del/Veh (s)	8.0	14.2	355.5	19.1

60: Arboretum Dr/Crimson Bay Rd & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.7	3.7	0.1	1.3
Total Del/Veh (s)	5.9	9.1	117.4	276.4	11.4

65: TH 41 & TH 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1	0.2
Total Del/Veh (s)	101.6	168.4	55.9	50.6	118.3

70: CSAH 13 & CSAH 18/82nd St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.0	0.1	0.2	2.0	1.3
Total Del/Veh (s)	6.5	8.9	1.8	1.0	2.5

75: McKnight Rd & 82nd St Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1
Total Del/Veh (s)	0.0	0.5	3.7	0.9

80: TH 41 & 82nd St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.0	0.1
Total Del/Veh (s)	17.6	35.6	11.5	15.1	17.5

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85: TH 41 & 78th St Performance by approach

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Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.9	0.1	0.9	0.4
Total Del/Veh (s)	7.1	20.5	12.7	2.2	9.2

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90: TH 41 & Lyman Blvd Performance by approach

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Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	1.0	0.0	0.4
Total Del/Veh (s)	20.3	34.9	16.0	20.8	22.6

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Total Network Performance

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Denied Del/Veh (s)			1.2		
Total Del/Veh (s)			108.0		

## Delay by Movement

5: CSAH 13 & TH 7 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.1	2.1	3.2	2.2	0.2	1.4	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	112.5	21.1	8.7	129.1	9.5	3.3	107.1	113.2	19.0	114.4	117.1	4.5

5: CSAH 13 & TH 7 Performance by movement

Movement	All
Denied Del/Veh (s)	1.8
Total Del/Veh (s)	28.2

10: TH 5 & CSAH 11 (North) Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	3.1	0.6	0.0	0.0	0.3	1.1	0.4
Total Del/Veh (s)	2.4	2.5	1.2	0.6	70.3	17.7	18.0

15: TH 5 & Stieger Lake Ln (West) Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.6	2.3	0.9	8.2	3.0	23.2	3.6	2.5

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.2	0.0	0.0	0.0	0.6	0.6	3.6	0.1	0.2	4.2
Total Del/Veh (s)	13.5	14.9	5.6	19.0	6.5	0.6	30.9	27.8	13.3	28.7	26.9	4.0

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	14.1

25: Quamoelit & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.1		0.1	0.0
Total Del/Veh (s)	4.6	2.8	1.4	8.8	1.5	1.1		11.3	16.2		3.7	2.9

30: 80th St & TH 5 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	6.9	0.8	10.6	2.1	49.0	27.4	7.2

35: TH 5 & Stieger Lake Ln (East) Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1		0.0	0.0	0.0	0.0
Total Del/Veh (s)	71.9	13.2		38.0	1.5	0.0	28.8

40: 78th St & TH 5 Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	25.1	70.5	11.6	0.3	4.6	2.9	9.3

45: Kochia Ln/Park Dr & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.5	0.0	0.0	0.0	0.3	0.1	4.8	0.1	0.2	0.1	0.7
Total Del/Veh (s)	203.0	229.2	161.3	8.7	6.0	3.9	189.6	574.9	466.7	227.8	332.4	206.5

50: CSAH 13 & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	14.4	21.4	156.6	0.1	0.0	0.1	2.5	1.3	2.5	0.0	0.0	0.0
Total Del/Veh (s)	348.4	339.4	225.9	88.9	35.2	7.9	300.4	351.1	355.1	102.1	50.3	34.9

50: CSAH 13 & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	7.7
Total Del/Veh (s)	225.9

55: TH 5 & Minnewashta Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.5	0.3	0.0	0.0	0.2	3.4	0.2
Total Del/Veh (s)	13.0	11.1	5.2	3.8	147.9	5.1	12.2

60: Arboretum Dr/Crimson Bay Rd & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.6		0.1	0.1	0.0
Total Del/Veh (s)	10.2	8.6	6.7	17.6	1.6	0.6		52.7	4.5	7.2

65: TH 41 & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.1
Total Del/Veh (s)	62.1	58.0	7.3	91.3	73.6	11.5	88.7	57.5	7.8	70.2	42.9	4.6

65: TH 41 & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	53.9

70: CSAH 13 & CSAH 18/82nd St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.4	3.7	0.1	0.1	0.1	0.3	0.3	0.3	0.5	0.4	3.8
Total Del/Veh (s)	13.9	17.4	4.0	4.6	13.8	2.0	2.5	2.9	0.7	1.5	1.4	0.4

70: CSAH 13 & CSAH 18/82nd St Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	5.9

75: McKnight Rd & 82nd St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	0.1	0.0	2.1	0.0	4.3	2.4	0.4

80: TH 41 & 82nd St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	39.9	42.0	16.2	40.5	47.1	15.8	50.5	9.5	7.1	55.8	13.7	9.6

80: TH 41 & 82nd St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	16.5

85: TH 41 & 78th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.2	0.1	4.1	0.1	0.1	0.0	0.0	0.3	3.2	0.6	4.4
Total Del/Veh (s)	21.3	16.0	5.8	22.7	28.4	6.3	11.4	7.6	8.3	3.7	1.2	0.2

85: TH 41 & 78th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	4.6

90: TH 41 & Lyman Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.1	2.8	1.5	2.7	0.0	0.0	0.0
Total Del/Veh (s)	38.2	36.4	2.7	38.3	40.9	7.1	43.2	20.8	8.2	43.6	13.2	5.8

90: TH 41 & Lyman Blvd Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	21.3

Total Network Performance

Denied Del/Veh (s)	3.3
Total Del/Veh (s)	145.9

5: CSAH 13 & TH 7 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	0.7	3.4	1.7	1.0	1.7	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	118.9	71.6	5.1	71.0	46.5	15.6	82.3	75.4	15.2	102.9	103.5	39.3

5: CSAH 13 & TH 7 Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	56.4

10: TH 5 & CSAH 11 (North) Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	3.7	0.3	0.0	0.0	0.2	2.1	0.2
Total Del/Veh (s)	7.0	1.2	1.9	1.5	22.4	4.9	3.9

15: TH 5 & Stieger Lake Ln (West) Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
Total Del/Veh (s)	7.2	1.5	0.9	5.2	4.8	19.7	3.8	9.2	4.0

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	3.5	0.2	0.2	4.0
Total Del/Veh (s)	20.5	18.7	3.2	17.6	13.2	1.7	32.0	33.4	7.4	28.8	25.8	13.9

20: CSAH 11 (South)/Victoria Dr & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	16.3

25: Quamoclit & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2
Total Del/Veh (s)	10.0	1.6	1.4	4.6	3.7	1.7	32.3	19.2	5.5	32.3	34.5	17.0

25: Quamoclit & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	3.9

30: 80th St & TH 5 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.9	0.3	5.8	3.6	12.0	3.7	2.8

35: TH 5 & Stieger Lake Ln (East) Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	25.5	14.6	10.0	1.5	1.8	0.1	2.0

40: TH 5 & 78th St Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	33.3	31.2	0.4	0.0	6.6	4.5	3.6

45: Kochia Ln/Park Dr & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	0.1	0.1	0.1	0.1	3.8	0.1	0.1	0.1
Total Del/Veh (s)	8.9	2.3	1.1	8.3	8.0	6.5	24.2	18.8	4.6	28.9	19.5	12.1

45: Kochia Ln/Park Dr & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	6.8

50: CSAH 13 & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.1	0.5	0.2	0.5	2.1	0.5	2.1	0.0	0.0	0.0
Total Del/Veh (s)	95.3	53.8	7.9	62.8	36.5	23.7	55.4	77.8	14.6	61.6	62.6	49.3

50: CSAH 13 & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	41.7

55: TH 5 & Minnewashta Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.3	4.0	0.1
Total Del/Veh (s)	66.6	6.5	14.3	11.3	682.7	53.4	19.1

60: Arboretum Dr/Crimson Bay Rd & TH 5 Performance by movement

Movement	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.3	1.7	0.0	0.2	4.1	0.1	0.1	1.3
Total Del/Veh (s)	5.9	11.4	9.1	8.3	884.0	10.0	579.4	233.1	11.4

65: TH 41 & TH 5 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.1	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.0	0.2
Total Del/Veh (s)	91.9	113.6	5.8	102.9	195.0	92.3	74.6	58.8	8.6	90.0	61.2	4.5

65: TH 41 & TH 5 Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	118.3

70: CSAH 13 & CSAH 18/82nd St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	3.9	0.1	0.1	0.1	0.2	0.2	1.1	0.7	3.6	1.3
Total Del/Veh (s)	7.2	11.6	3.1	3.4	11.2	2.9	3.0	1.4	0.7	1.3	0.7	2.5

75: McKnight Rd & 82nd St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	0.0	0.0	1.7	0.1	4.1	2.6	0.9

80: TH 41 & 82nd St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.3	0.0	0.0	0.0	0.2	0.0	0.1
Total Del/Veh (s)	35.8	27.2	8.5	39.5	43.0	27.9	53.7	11.5	6.0	54.6	13.9	6.9

80: TH 41 & 82nd St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	17.5

85: TH 41 & 78th St Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	4.2	0.1	0.2	0.1	0.1	0.3	3.3	0.6	3.0	0.4
Total Del/Veh (s)	37.2	5.6	37.3	27.9	16.5	13.4	12.7	11.0	10.4	1.3	0.2	9.2

90: TH 41 & Lyman Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.1	0.2	0.2	0.2	2.7	0.6	2.6	0.0	0.0	0.0
Total Del/Veh (s)	25.4	33.1	8.6	45.9	54.7	9.2	57.0	18.2	4.1	47.5	17.9	6.5

90: TH 41 & Lyman Blvd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	22.6

Total Network Performance

Denied Del/Veh (s)	1.2
Total Del/Veh (s)	108.0

## Queuing Results

Intersection: 5: CSAH 13 & TH 7

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	LT	R	LT	R
Maximum Queue (ft)	161	743	449	78	138	562	354	143	45
Average Queue (ft)	14	230	44	22	39	226	77	58	8
95th Queue (ft)	102	605	251	63	111	437	229	125	31
Link Distance (ft)		1280			4142	1401		717	717
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	475		300	350			300		
Storage Blk Time (%)		6				8	0		
Queuing Penalty (veh)		28				13	0		

Intersection: 10: TH 5 & CSAH 11 (North)

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	32	496	225
Average Queue (ft)	5	213	24
95th Queue (ft)	23	421	125
Link Distance (ft)		2108	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		100
Storage Blk Time (%)		54	
Queuing Penalty (veh)		5	

Intersection: 15: TH 5 & Stieger Lake Ln (West)

Movement	EB	WB	SB
Directions Served	L	LTR	LTR
Maximum Queue (ft)	32	55	28
Average Queue (ft)	4	4	3
95th Queue (ft)	19	28	18
Link Distance (ft)		1939	1104
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 20: CSAH 11 (South)/Victoria Dr & TH 5

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	LT	R	LT	R
Maximum Queue (ft)	98	392	185	130	190	2	236	173	70	20
Average Queue (ft)	10	169	59	38	48	0	97	47	20	3
95th Queue (ft)	49	304	195	87	131	2	181	113	52	16
Link Distance (ft)		1939			338		530		420	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		125	120		225		115		60
Storage Blk Time (%)		12	0	0	1		7	0	1	
Queuing Penalty (veh)		31	0	1	1		10	0	0	

Intersection: 25: Quamoclit & TH 5

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	T	L	T	LTR	LTR
Maximum Queue (ft)	35	70	37	4	46	58
Average Queue (ft)	2	5	3	0	11	16
95th Queue (ft)	13	69	20	3	32	42
Link Distance (ft)		338		774	742	414
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		1				
Storage Bay Dist (ft)	100		90			
Storage Blk Time (%)		1				
Queuing Penalty (veh)		0				

Intersection: 30: 80th St & TH 5

Movement	EB	WB	NB
Directions Served	T	LT	LR
Maximum Queue (ft)	353	45	150
Average Queue (ft)	31	2	43
95th Queue (ft)	246	21	120
Link Distance (ft)	774	1473	1032
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	3		
Storage Bay Dist (ft)			
Storage Blk Time (%)	3		
Queuing Penalty (veh)	0		

Intersection: 35: TH 5 & Stieger Lake Ln (East)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	44	1370
Average Queue (ft)	13	233
95th Queue (ft)	39	1015
Link Distance (ft)	596	1473
Upstream Blk Time (%)		2
Queuing Penalty (veh)		13
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: 78th St & TH 5

Movement	WB	NB	SB
Directions Served	LR	T	LT
Maximum Queue (ft)	72	244	10
Average Queue (ft)	17	68	0
95th Queue (ft)	53	242	5
Link Distance (ft)	710	232	2223
Upstream Blk Time (%)		8	
Queuing Penalty (veh)		34	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 45: Kochia Ln/Park Dr & TH 5

Movement	EB	EB	EB	WB	NB	NB	SB
Directions Served	L	T	R	L	LT	R	LTR
Maximum Queue (ft)	147	2234	185	28	800	225	530
Average Queue (ft)	15	1296	12	2	297	134	199
95th Queue (ft)	97	2837	86	13	834	267	570
Link Distance (ft)		2223			1172		1936
Upstream Blk Time (%)		8			1		
Queuing Penalty (veh)		62			0		
Storage Bay Dist (ft)	100		100	100		150	
Storage Blk Time (%)		60			11	44	
Queuing Penalty (veh)		8			8	0	

Intersection: 50: CSAH 13 & TH 5

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	B22
Directions Served	L	T	R	L	T	R	L	T	R	L	TR	T
Maximum Queue (ft)	480	2366	382	335	386	237	41	2020	360	480	804	62
Average Queue (ft)	140	2213	14	190	162	24	8	1303	360	420	341	5
95th Queue (ft)	453	2719	146	308	325	118	30	2128	360	560	901	34
Link Distance (ft)		2350			3173			2408			788	807
Upstream Blk Time (%)		20						2			3	
Queuing Penalty (veh)		192						0			0	
Storage Bay Dist (ft)	300		300	300		300	180		180	300		
Storage Blk Time (%)		63		2	2			21	90	41		
Queuing Penalty (veh)		32		6	4			79	133	19		

Intersection: 55: TH 5 & Minnewashta Pkwy

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	38	152	49
Average Queue (ft)	9	54	11
95th Queue (ft)	31	132	33
Link Distance (ft)		1153	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	220		300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 60: Arboretum Dr/Crimson Bay Rd & TH 5

Movement	EB	WB	NB	SB
Directions Served	L	L	R	LTR
Maximum Queue (ft)	32	62	3	58
Average Queue (ft)	4	12	0	17
95th Queue (ft)	20	39	2	46
Link Distance (ft)				594
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	160	430	75	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 65: TH 41 & TH 5

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	L	T	L	T
Maximum Queue (ft)	378	685	698	378	184	342	306	156	399	452	476
Average Queue (ft)	135	398	412	27	82	203	165	62	214	210	219
95th Queue (ft)	269	622	641	236	160	323	292	129	361	370	398
Link Distance (ft)		1760	1760			15620	15620		2562		1254
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	600			450	950			400		300	
Storage Blk Time (%)		1	10						1	5	5
Queuing Penalty (veh)		3	15						1	23	16

Intersection: 70: CSAH 13 & CSAH 18/82nd St

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	R	LTR	LTR	LT	R
Maximum Queue (ft)	168	39	31	73	49	12
Average Queue (ft)	73	14	9	12	3	1
95th Queue (ft)	133	34	30	42	18	6
Link Distance (ft)	995		1064	786	1241	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		110				447
Storage Blk Time (%)	3					
Queuing Penalty (veh)	1					

Intersection: 75: McKnight Rd & 82nd St

Movement	NB
Directions Served	LR
Maximum Queue (ft)	29
Average Queue (ft)	9
95th Queue (ft)	30
Link Distance (ft)	653
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 80: TH 41 & 82nd St

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R
Maximum Queue (ft)	146	113	59	166	66	162	220	34
Average Queue (ft)	53	42	15	40	18	65	57	3
95th Queue (ft)	111	89	43	118	45	137	149	18
Link Distance (ft)	1149	1168		2527			2562	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300		300	300		300
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 85: TH 41 & 78th St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	L	L
Maximum Queue (ft)	32	50	53	76	37	51
Average Queue (ft)	4	12	10	28	8	15
95th Queue (ft)	21	36	37	58	27	40
Link Distance (ft)		1036		835		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	185		240		175	245
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 90: TH 41 & Lyman Blvd

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	42	25	201	75	106	287	133	280	192	45
Average Queue (ft)	9	3	97	19	45	159	58	153	69	14
95th Queue (ft)	30	15	175	50	89	270	100	251	155	39
Link Distance (ft)	969	969	916	916		2009			2527	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					300		250	300		250
Storage Blk Time (%)						1		0	0	
Queuing Penalty (veh)						6		0	0	

Network Summary

Network wide Queuing Penalty: 751

Intersection: 5: CSAH 13 & TH 7

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	LT	R	LT	R
Maximum Queue (ft)	60	458	245	500	974	180	814	400	183	86
Average Queue (ft)	13	208	17	220	448	13	428	57	70	31
95th Queue (ft)	40	391	111	485	879	136	685	287	144	68
Link Distance (ft)		1280			4142		1401		717	717
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	475		300	350		300		300		
Storage Blk Time (%)		8		0	21		31			
Queuing Penalty (veh)		16		0	42		11			

Intersection: 10: TH 5 & CSAH 11 (North)

Movement	EB	WB	SB	SB
Directions Served	L	R	L	R
Maximum Queue (ft)	37	17	163	41
Average Queue (ft)	7	1	63	15
95th Queue (ft)	28	6	120	33
Link Distance (ft)			1590	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300	250		100
Storage Blk Time (%)			4	
Queuing Penalty (veh)			1	

Intersection: 15: TH 5 & Stieger Lake Ln (West)

Movement	EB	NB	SB
Directions Served	L	LTR	LTR
Maximum Queue (ft)	37	30	38
Average Queue (ft)	7	3	9
95th Queue (ft)	26	17	32
Link Distance (ft)		364	1104
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 20: CSAH 11 (South)/Victoria Dr & TH 5

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	LT	R	LT	R
Maximum Queue (ft)	57	262	159	234	322	119	281	190	111	63
Average Queue (ft)	14	101	20	96	177	4	144	63	45	6
95th Queue (ft)	44	202	95	214	312	58	240	163	90	29
Link Distance (ft)		1959			310		530		419	
Upstream Blk Time (%)					1					
Queuing Penalty (veh)					9					
Storage Bay Dist (ft)	125		125	120		225		115		60
Storage Blk Time (%)		4		1	14		21	0	7	0
Queuing Penalty (veh)		8		7	31		26	0	1	0

Intersection: 25: Quamoclit & TH 5

Movement	EB	WB	WB	WB	NB	SB
Directions Served	L	L	T	R	LTR	LTR
Maximum Queue (ft)	38	28	183	3	37	87
Average Queue (ft)	7	4	13	0	13	28
95th Queue (ft)	28	20	80	2	34	60
Link Distance (ft)			774		741	415
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100	90		90		
Storage Blk Time (%)			1			
Queuing Penalty (veh)			0			

Intersection: 30: 80th St & TH 5

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	196	48
Average Queue (ft)	19	15
95th Queue (ft)	93	37
Link Distance (ft)	1473	1032
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 35: TH 5 & Stieger Lake Ln (East)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	53	38
Average Queue (ft)	18	2
95th Queue (ft)	45	24
Link Distance (ft)	596	1473
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: TH 5 & 78th St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	79	70
Average Queue (ft)	19	6
95th Queue (ft)	57	44
Link Distance (ft)	710	2223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 45: Kochia Ln/Park Dr & TH 5

Movement	EB	WB	NB	NB	SB
Directions Served	L	L	LT	R	LTR
Maximum Queue (ft)	48	39	27	44	72
Average Queue (ft)	9	7	5	9	23
95th Queue (ft)	29	27	22	31	55
Link Distance (ft)			1012		584
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100	100		150	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 50: CSAH 13 & TH 5

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	TR
Maximum Queue (ft)	193	595	131	479	845	480	79	117	138	241	331
Average Queue (ft)	48	269	8	170	337	102	21	39	55	129	161
95th Queue (ft)	127	496	77	328	597	304	57	89	107	219	285
Link Distance (ft)		2352			3172			2560			788
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300		300	300		300	180		180	300	
Storage Blk Time (%)		11		1	11				0	0	2
Queuing Penalty (veh)		5		9	82				0	0	2

Intersection: 55: TH 5 & Minnewashta Pkwy

Movement	EB	WB	SB	SB
Directions Served	L	R	L	R
Maximum Queue (ft)	69	4	238	134
Average Queue (ft)	20	0	106	20
95th Queue (ft)	51	3	282	82
Link Distance (ft)			681	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	220	220		300
Storage Blk Time (%)			8	
Queuing Penalty (veh)			2	

Intersection: 60: Arboretum Dr/Crimson Bay Rd & TH 5

Movement	WB	B26	B26	NB	NB	SB
Directions Served	L	T		L	R	LTR
Maximum Queue (ft)	30	1210	1050	80	73	63
Average Queue (ft)	4	436	186	35	25	17
95th Queue (ft)	19	1277	807	119	53	49
Link Distance (ft)		1760	1760	872		372
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	430				75	
Storage Blk Time (%)				23	0	
Queuing Penalty (veh)				11	0	

Intersection: 65: TH 41 & TH 5

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	T	R	L	T	L	T
Maximum Queue (ft)	337	560	576	1130	1928	1928	680	331	458	252	357
Average Queue (ft)	174	318	330	407	1209	1188	472	205	256	150	215
95th Queue (ft)	302	519	539	1190	2148	2165	987	317	401	242	336
Link Distance (ft)		1760	1760		15620	15620			2562		1253
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	600			950			500	400		300	
Storage Blk Time (%)		0	6		28	44			1		3
Queuing Penalty (veh)		0	3		40	150			4		10

Intersection: 70: CSAH 13 & CSAH 18/82nd St

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	R	LTR	LTR	LT	R
Maximum Queue (ft)	67	50	49	48	6	23
Average Queue (ft)	30	13	17	10	0	2
95th Queue (ft)	53	34	42	33	4	14
Link Distance (ft)	895		882	623	1157	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		110			447	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 75: McKnight Rd & 82nd St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	29
Average Queue (ft)	0	6
95th Queue (ft)	4	25
Link Distance (ft)	614	653
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report  
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Intersection: 80: TH 41 & 82nd St

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R
Maximum Queue (ft)	72	316	47	220	43	55	247	21
Average Queue (ft)	17	151	8	92	11	14	69	2
95th Queue (ft)	47	260	31	176	34	43	184	12
Link Distance (ft)	1149	1168		2518			2562	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300		300	300		300
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 85: TH 41 & 78th St

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	L	L
Maximum Queue (ft)	46	50	107	27	66
Average Queue (ft)	13	13	41	5	22
95th Queue (ft)	37	38	79	21	52
Link Distance (ft)	852		605		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		240		175	245
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 90: TH 41 & Lyman Blvd

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	134	60	342	108	46	290	53	116	371	109
Average Queue (ft)	55	24	181	33	9	151	22	50	148	6
95th Queue (ft)	110	49	303	71	31	255	46	98	292	67
Link Distance (ft)	969	969	1264	1264		1964			2518	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					300		250	300		250
Storage Blk Time (%)						1			1	
Queuing Penalty (veh)						1			1	

Network Summary

Network wide Queuing Penalty: 474