



# Minnesota Department of Transportation

## District 7

2151 Bassett Drive  
Mankato, MN 56001

## Memo

**TO:** All holders of the 2014 TH 14 / TH 111 Intersection Control Evaluation

**FROM:** Scott M. Thompson, PE/PLS *SMT*  
District Traffic Engineer

**DATE:** March 12, 2014

**SUBJECT:** Traffic Control Improvement for the new TH 14 / TH 111 Intersection

Through a detailed analysis of five build alternatives which examined traffic operations benefits, crash reduction benefits, as well as costs, the Intersection Control Evaluation (ICE) for the above intersection recommended the implementation of a Reduced Conflict intersection (RCI) intersection for the new Trunk Highway (TH) 14 / TH 111 intersection. This recommendation was based on the RCI alternative having the lowest cost and the highest benefit/cost ratio of the five build alternatives reviewed.

As noted in the evaluation, public opinion was heavily in favor of either of the two interchange alternatives. While the public input and comments provided to MnDOT were received and acknowledged, an engineering recommendation for the interchange alternatives was not provided due to the other alternatives (notably the RCI) having a higher benefit/cost.

Because of the strong public support for an interchange alternative, as well as the political outreach efforts of our customers, Governor Dayton asked MnDOT "...to work with the community to build an interchange at the [new] intersection of Highway 14 and Highway 111". A copy of the Governor's letter to Nicollet Mayor Fred Froehlich, relaying the Governor's request, is included in the appendix of the evaluation. In recognition of this, as well as the community's concerns towards the proposed RCI treatment, MnDOT will be working with our partners towards the construction of an interchange at the new intersection of TH 14 & TH 111.

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# STATE OF MINNESOTA

## Office of Governor Mark Dayton

130 State Capitol ♦ 75 Rev. Dr. Martin Luther King Jr. Boulevard ♦ Saint Paul, MN 55155

February 3, 2014

The Honorable Fred Froehlich  
Mayor  
City of Nicollet  
401 Pine Street  
Nicollet, Minnesota 56074-2078

Dear Mayor Froehlich:

Thank you for inviting me to attend tonight's Chamber of Commerce meeting to discuss the Nicollet Bypass funded through the Corridors of Commerce program. I am sorry I am unable to attend your meeting due to my recent surgery.

I appreciate your support for an interchange on the Nicollet Bypass. I agree that an interchange will best serve the community by addressing safety issues and providing economic development opportunities. I have asked Charlie Zelle, Commissioner, Minnesota Department of Transportation (MnDOT), and his staff to work with the community to build an interchange at the intersection of Highway 14 and Highway 111:

MnDOT is committed to working with you and local leaders to develop an agreement inviting local participation in construction, operation, and maintenance of the enhanced highway system, which will allow MnDOT to responsibly build an interchange. Please continue to work with MnDOT staff to develop the details of the agreement. The ongoing partnership between the city, county, elected officials, and MnDOT is essential to delivering this project successfully.

Highway 14 is a critical, east-west route for transportation of goods across Minnesota. You and other very dedicated leaders along Highway 14 have been working far too long to fund the much-needed improvements. I appreciate your commitment to ensuring the Nicollet Bypass is completed and completed correctly.

Sincerely,

Mark Dayton  
Governor

cc: Congressman Tim Walz  
Senator Kathy Sheran  
Representative Clark Johnson  
Charlie Zelle, Commissioner, MnDOT  
Greg Ous, Engineer, MnDOT District 7  
✓ Zak Tess, Project Manager, MnDOT District 7

# Minnesota Department of Transportation

## INTERSECTION CONTROL EVALUATION ICE REPORT

For

TH 14 and TH 111  
City of Nicollet  
Nicollet County, Minnesota

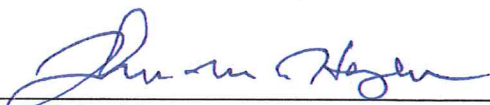
MnDOT State Project Number SP 5203-104


PREPARED BY

**Stantec Consulting Services Inc.**

April  
2014

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

	25789	4/3/14
Name: John M. Hagen	Reg. No.	Date

APPROVED: 	4-16-2014
Scott Thompson MnDOT District 7 Traffic Engineer	Date



# Table of Contents

Table of Contents	2
I. Description of Location	3
A. Introduction	3
B. Intersection Location	3
C. Schedule and Contact Information	3
Figure 1 – Location Map	4
II. Existing Conditions	5
A. Existing Intersection Characteristics	5
B. Existing Volumes	5
C. Crash Data	5
Figure 2 – Existing Conditions	6
III. Future Conditions	9
A. Design Year Volumes	9
Figure 3 – Year 2035 Conditions (1% Growth Rate)	10
Figure 4 – Year 2035 Conditions (3.5% Growth Rate)	11
IV. Analysis of Alternatives	12
A. Traffic Control Alternatives	12
Figure 5 – Alternative No. 1 – Traffic Signal Concept	14
Figure 6 – Alternative No. 2 – Roundabout Concept	15
Figure 7 – Alternative No. 3 – Reduced Conflict Intersection (RCI) Concept	16
Figure 8 – Alternative No. 4 – Interchange Concept with Local Access	17
Figure 9 – Alternative No. 4 – Interchange Concept with Limited Local Access	18
B. Signal Warrant Analysis	19
C. Safety Analysis	20
D. Traffic Operations Analysis	21
E. Preliminary Estimated Construction Costs	23
F. Preliminary Benefit-cost Analysis	24
G. Other Considerations	26
H. Selection of the recommended Alternative	26
V. Findings and Recommendations	28
Appendix	30

# I. Description of Location

The purpose of this Intersection Control Evaluation (ICE) is to determine the appropriate control at the new intersection of the proposed Trunk Highway (TH) 14 bypass with TH 111 in the City of Nicollet, Minnesota.

## A. INTRODUCTION

TH 14 is classified by the Minnesota Department of Transportation (MnDOT) as a medium priority interregional corridor. It is a critical east-west transportation corridor that connects points in southern Minnesota. The portion of TH 14 that currently passes through Nicollet also connects two secondary regional trade centers – Mankato/North Mankato and New Ulm. Previous scoping studies have identified the need for a four-lane TH 14 corridor between New Ulm and Mankato/North Mankato.

In 2013, the Minnesota State Legislature created the Corridors of Commerce program in order to provide the necessary funding for the construction, reconstruction, and improvement of trunk highways. The two primary goals of this program are as follows: Provide additional highway capacity on roadway segments where bottlenecks currently exist and improve the movement of freight and reduce the barriers to commerce.

As part of the Corridors of Commerce program, the 2.5 mile bypass of the City of Nicollet was added to the larger TH 14 improvement project that will expand TH 14 from two to four lanes between North Mankato to Nicollet, and the overall TH 14 project was advanced two years from 2018 to 2016 construction.

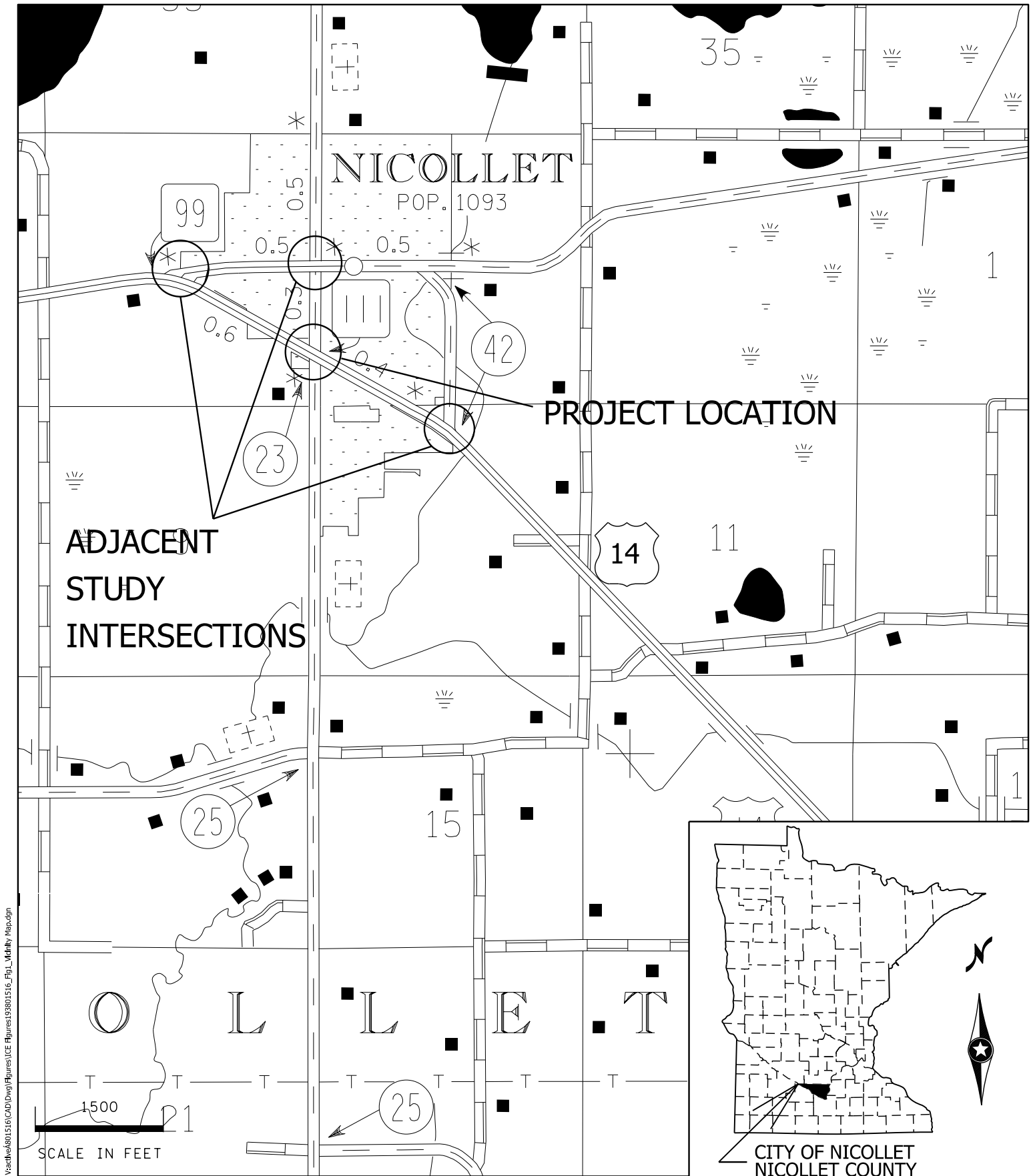
This report contains the intersection control evaluation results and a recommended traffic control alternative for the new TH 14/TH 111 intersection to be constructed as part of the proposed Nicollet Bypass.

## B. INTERSECTION LOCATION

The existing TH 14/TH 111 intersection is located in the City of Nicollet, Nicollet County, MN. Figure 1 illustrates the location of the TH 14/TH 111 intersection and other area intersections including TH 14/TH 99, TH 111/TH 99, and TH 14/Birch Street/Nicollet County Road (CR) 72.

## C. SCHEDULE AND CONTACT INFORMATION

Project Manager:	Rolin Sinn Engineer Principal MnDOT – D-7 2151 Bassett Drive 070 – TRAFFIC Mankato, MN 56001-6888	Dale Grove Senior Associate Stantec Consulting Ltd. 6188 Rome Circle NW Rochester, MN 55901
Telephone Number:	(507) 304-6160	(507) 529-6039
Estimated Letting Date:	2015	
Estimated Construction Completion Date:	2016	



# LOCATION MAP

NICOLLET, MINNESOTA

TH 14/ TH 111-INTERSECTION CONTROL EVALUATION



FIGURE: 1

## II. Existing Conditions

### A. EXISTING INTERSECTION CHARACTERISTICS

The existing intersection of TH 14 and TH 111/County State-Aid Highway (CSAH) 23 is a side-street stop condition with stop signs and flashing red beacons on the north-south approaches. TH 14 has right- and left-turn lanes at the TH 111/CSAH 23 intersection. Southbound TH 111 has a yield-controlled right-turn lane and a shared through/left-turn lane. Northbound CSAH 23 consists of a single lane approach (shared left/through/right-turn lane). Both TH 14 and TH 111 are two-lane rural roadways and intersection lighting is provided for the northwest and southeast quadrants of the intersection.

The intersection of TH 14 and TH 99 is a T-intersection with a stop sign on the TH 99 approach. Westbound TH 14 has a right-turn lane and eastbound TH 14 has a dedicated left-turn lane at the TH 99 intersection. TH 99 is a two-lane rural road. Intersection lighting is provided in the northwest and southeast quadrants of the intersection.

The intersection of TH 111 and TH 99 is a side-street stop-controlled intersection with stop signs and red flashing beacons on the TH 111 approaches. TH 111 is a two-lane urban-section roadway with curb and gutter on both sides of the roadway. Eastbound TH 99 has a dedicated left turn lane and a shared through/right-turn lane. Westbound TH 99 has a two-way center left-turn lane and a shared through/right-turn lane. TH 99 east of the intersection has on-street parallel parking on both the north and south sides of the roadway. TH 99 is also an urban-section roadway with curb and gutter on each side of the roadway. Intersection lighting is provided in the northwest and southeast quadrants of the intersection.

The intersection of TH 14 and Birch Street (CR 72) is also a T-intersection with a stop sign on the Birch Street approach. Westbound TH 14 has a right-turn lane at Birch Street. There is no left-turn lane on the eastbound TH 14 approach at Birch Street. Intersection lighting is provided in the northwest quadrant of the TH 14/ Birch Street intersection.

Intersection lane geometry is shown graphically in Figure 2.

### B. EXISTING VOLUMES

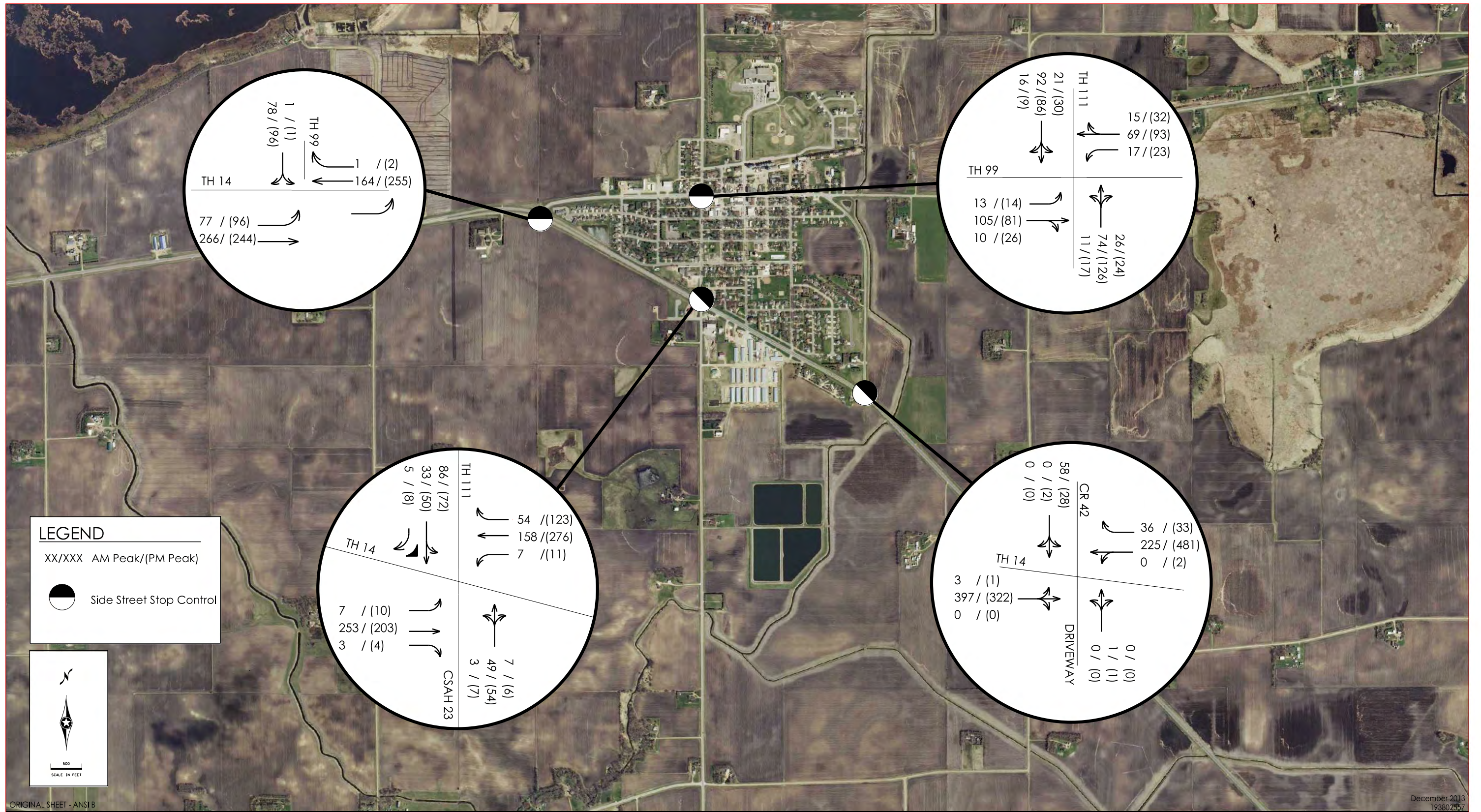
Existing 13-hour turning movement counts were collected in October 2013. Figure 2 shows the existing year 2013 a.m. and p.m. peak hour traffic volumes at the TH 14/TH 111 intersection and other adjacent study intersections. Copies of the turning movement counts are provided in the Appendix.

### C. CRASH DATA

Crash data for five years (2008 through 2012) was obtained from MnDOT Crash Mapping Analysis Tool (MnMCAT) at the four study intersections. Table 2.1 shows the number and severity of crashes and subsequent crash rate and severity rate. The crash report data is included in the Appendix.



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By: SWagoon



## Existing Conditions

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 2



Table 2.1 – Intersection Crash Data (2008 – 2012)

Intersection	Crash Severity					Total	Crash Rates			Severity Rates		
	Fatal	Personal Injury*			Property Damage		Subject Intersection	Statewide Average**	Critical Crash Rate***	Subject Intersection	Statewide Average**	Critical Severity Rate****
		Type A	Type B	Type C								
TH 14 at TH 111 (CSAH 23)	1	0	1	1	3	6	0.40	0.26	0.63	0.86	0.42	0.89
TH 14 at TH 99	1	0	3	1	9	14	1.09	0.26	0.66	1.94	0.42	0.93
TH 14 at Birch St (CR 72)	0	0	0	1	0	1	0.08	0.26	0.66	0.23	0.42	0.92
TH 99 at TH 111	0	0	1	2	4	7	0.71	0.19	0.59	1.11	0.27	0.74

\*Personal Injury Crashes include Type A (Incapacitating Injury), Type B (Non-Incapacitating Injury), and Type C (Possible Injury).

\*\*Average crash rates based on crash rates from the MnDOT 2012 Intersection Toolkit based on five years of crash data.

\*\*\*Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.

Looking at statewide data for comparable intersections, the average crash rate was 0.26 (rural) or 0.19 (suburban), and the severity rate was 0.42 (rural) or 0.27 (suburban).

As shown in Table 2.1, the crash and severity rates at the TH 14/TH 111 intersection are higher than the statewide average for similar intersections. A recent roadway safety audit completed in 2012 determined the TH 14/TH 111 intersection also exceeds the critical crash rate for a 5-year period between 2006 and 2010. Critical crash and severity rates help to give an indication of the statistical significance of the reported intersection crash and severity rates. Locations with crash and/or severity rates above the critical rates are considered to be in need of safety improvements because there is statistically significant evidence (99.5 percent probability) that the intersection's crash/severity rates are higher than the statewide averages for similar intersections. With crash and severity rates above the statewide averages, and as recently as 2012 the crash rate at the intersection was above the critical crash rate, the TH 14/TH 111 intersection should be considered for safety improvements.

Table 2.1 also shows that crash statistics for two of the remaining three adjacent intersections are higher than comparable statewide intersections according to MnDOT crash statistics. These intersections should also be considered for safety improvements.

## III. Future Conditions

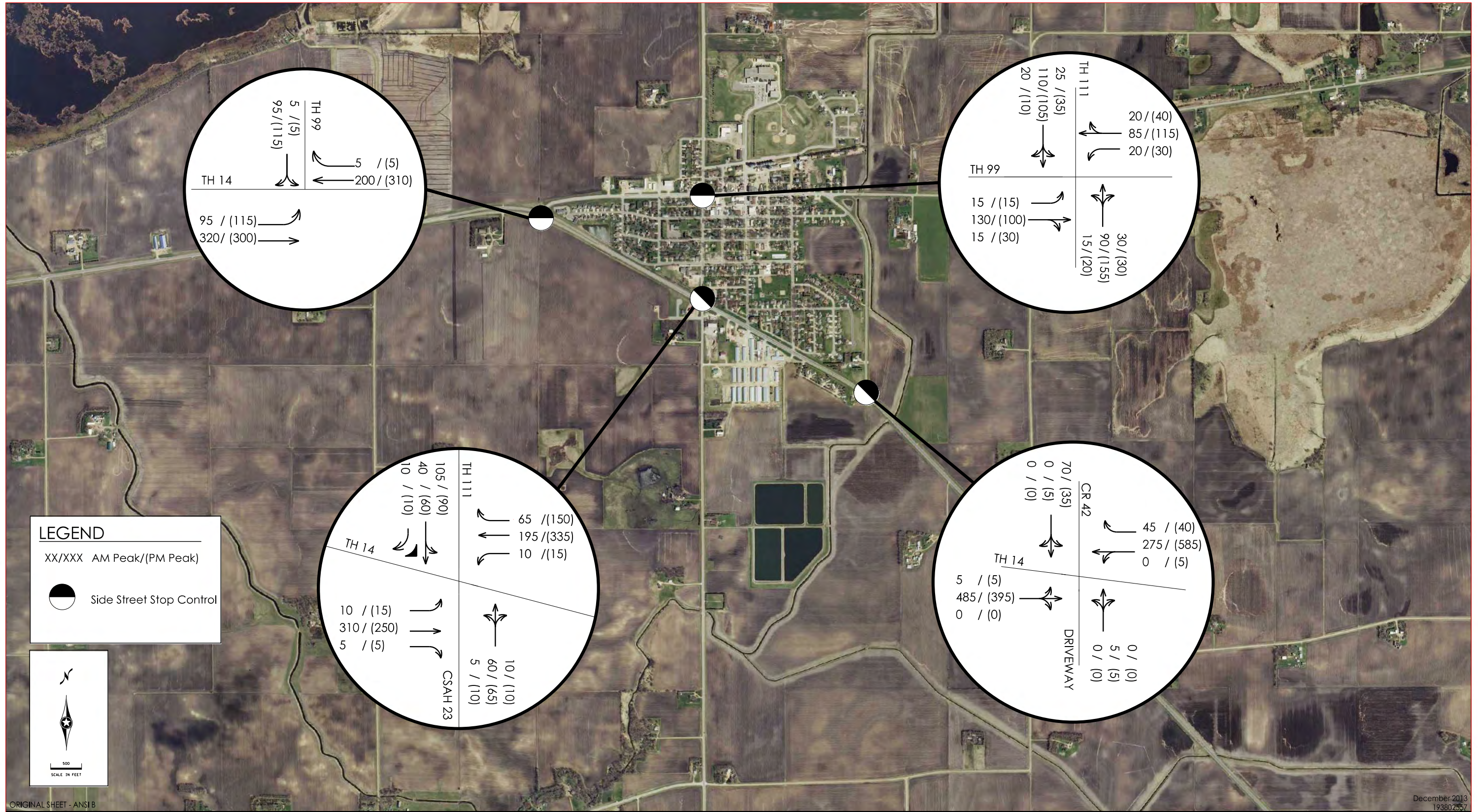
### A. DESIGN YEAR VOLUMES

Projected turning movement and annual average daily traffic volumes were developed for the year 2033 under two growth scenarios. A low-growth scenario assumed a 1.0 percent annual growth in background traffic volumes, while a high-growth scenario assumed a 3.5 percent annual growth rate.

Figures 3 and 4 show the resultant year 2033 peak hour turning movement volumes under the low-growth and high-growth conditions, respectively.



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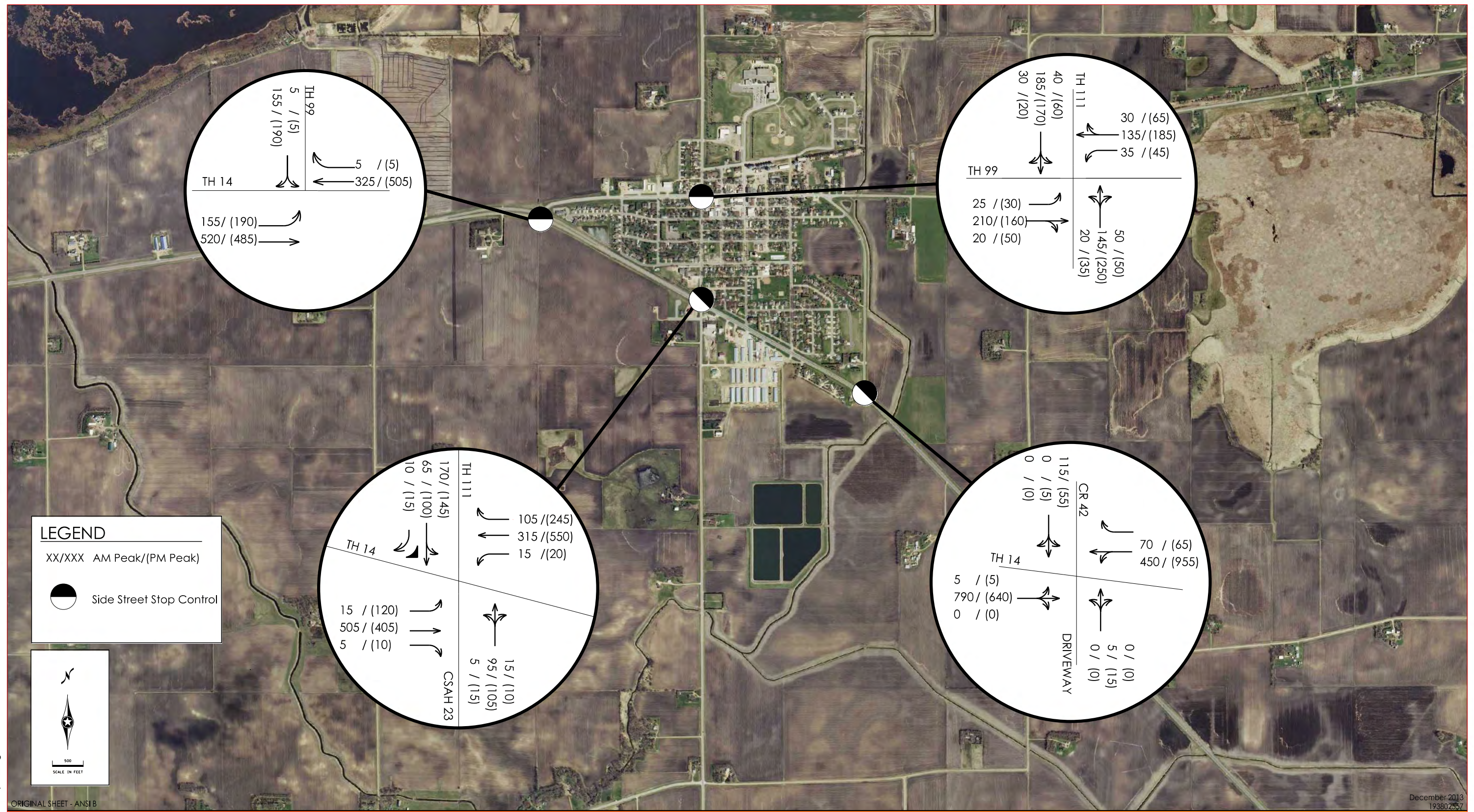


## Year 2035 Conditions (1% Growth Rate)

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 3







## IV. Analysis of Alternatives

Traffic control and conceptual layouts were analyzed at the TH 14/TH 111 intersection. The analysis utilized traffic volumes collected in 2013 as existing/current conditions, and forecast year 2033 high-growth traffic volume conditions. As it is comparable to recent growth rates in other communities just outside of the Mankato/North Mankato area such as Eagle Lake, the high-growth (3.5 percent annual growth rate) was used for the future conditions analysis. As part of the alternative analysis, the following was completed:

- Signal warrant analysis – to determine if a traffic signal is a justified alternative.
- Crash analysis – to estimate the crash reduction potential of each traffic control alternative.
- Traffic operations analysis – to assess the performance of each traffic control alternative.
- Development of preliminary construction cost estimates for use in a benefit-cost analysis that will provide valuable input into the development of preliminary recommendations.

### A. TRAFFIC CONTROL ALTERNATIVES

The following traffic control alternatives were considered at the TH 14/TH 111 intersection:

- Existing conditions (No-build Alternative)
- Traffic signal at the new TH 14/TH 111 intersection
- Roundabout at the new TH 14/TH 111 intersection
- Reduced Conflict Intersection (RCI) at the new TH 14/TH 111 intersection
- Diamond Interchange at the new TH 14/TH 111 intersection with local access
- Diamond Interchange at the new TH 14/TH 111 intersection with limited local access

Conceptual layouts were developed for each traffic control alternative at the new TH 14/TH 111 intersection. It should be noted that the concepts were only developed to a level that allowed the generation of preliminary cost estimate ranges; roadway cross-sections and alignment profiles were not generated or reviewed as part of the concept development process. Below is a brief summary of each traffic control alternative at the new TH 14/TH 111 intersection:

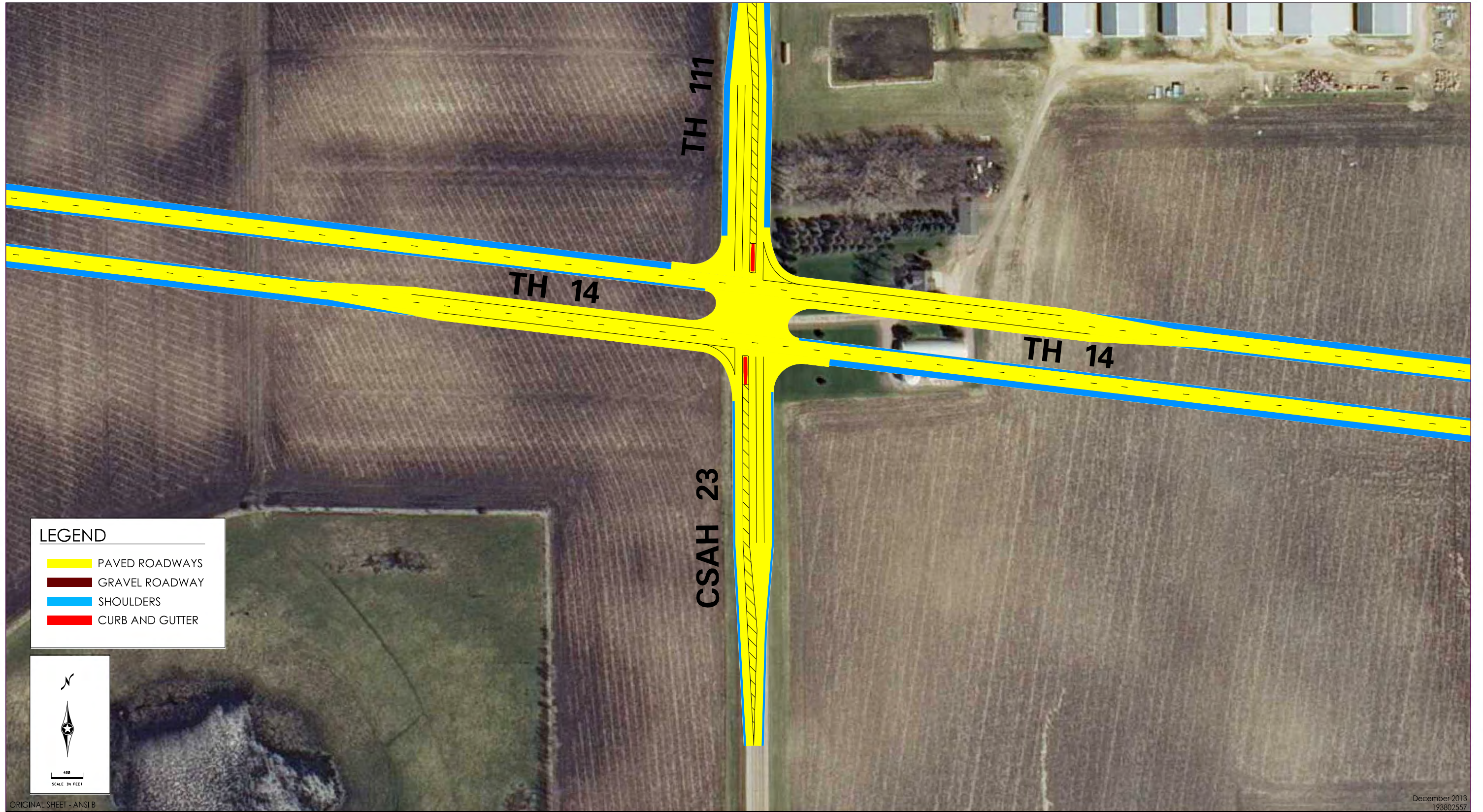
- **Existing Conditions (No-build Alternative):** Assumes that the proposed TH 14 bypass is not constructed. The TH 14/TH 111 intersection remains as it does under the existing conditions, and no additional changes are made to the adjacent study intersections. This No-Build Alternative serves as a baseline from which all of the build alternatives are compared.
- **Alternative No. 1 – Traffic Signal:** The proposed TH 14 bypass of Nicollet is constructed and a traffic signal is installed at new TH 14/TH 111 intersection. Access to TH 14 east of the City of Nicollet is provided by a proposed right-in/right-out access at 451st Avenue and a full access at 478th Street. Access to TH 14 west of the City of Nicollet is provided by a full access at 471st Avenue. TH 99 will no longer connect directly with TH 14, but rather will end at the existing TH 99/TH 111 intersection in downtown Nicollet. Figure 5 shows the concept layout of the traffic signal alternative at the new TH 14/TH 111 intersection.

- **Alternative No. 2 – Roundabout:** The proposed TH 14 bypass of Nicollet is constructed and a roundabout is installed at new TH 14/TH 111 intersection. Access to TH 14 east and west of the City of Nicollet matches Alternative No. 1. Figure 6 shows the concept layout of the roundabout alternative at the new TH 14/TH 111 intersection.
- **Alternative No. 3 – Reduced Conflict Intersection (RCI):** The proposed TH 14 bypass of Nicollet is constructed and a reduced conflict intersection (RCI) is installed at new TH 14/TH 111 intersection. RCIs are a non-traditional intersection design alternative that prohibits left-turns and through movements from the side-street and accommodates these movements by requiring drivers to make a right-turn onto the mainline and then make a U-turn maneuver at a one-way median opening 400 to 1,000 feet downstream from the intersection. Access to TH 14 east and west of the City of Nicollet matches Alternative No. 1. Figure 7 shows the concept layout of the RCI alternative at the new TH 14/TH 111 intersection.
- **Alternative No. 4 – Diamond Interchange with Local Access:** The proposed TH 14 bypass of Nicollet is constructed and a grade-separated, diamond interchange is constructed at new TH 14/TH 111 intersection. This diamond interchange will remove turning traffic from the TH 14 mainline and provide for two grade-separated roundabout intersections for entering/exiting between TH 14 and TH 111. Access to TH 14 east and west of the City of Nicollet matches Alternative No. 1. Figure 8 shows the concept layout of the Diamond Interchange with Local Access alternative at the new TH 14/TH 111 intersection.
- **Alternative No. 5 – Diamond Interchange with Limited Local Access:** Uses the same grade-separated diamond interchange as Alternative No. 4; however, this option limits access on the east and west sides of the City of Nicollet to farmsteads that currently have access to TH 14. No public street access will be provided at 451st Avenue or 478th Street on the east side of Nicollet, and no public street access will be provided at 471st Avenue on the west side of Nicollet. The new grade-separated diamond interchange at TH 14/TH 111 will provide the only direct access between TH 14 and the City of Nicollet. Figure 9 shows the concept layout of the Diamond Interchange with Limited Local Access alternative at the new TH 14/TH 111 intersection.

It should be noted that an all-way stop-controlled intersection was not considered at the new TH 14/TH 111 intersection since it would introduce a required stop (and added delay) to all traffic along TH 14. Since TH 14 is classified as an inter-regional corridor, the required stop and added delay was considered unacceptable.



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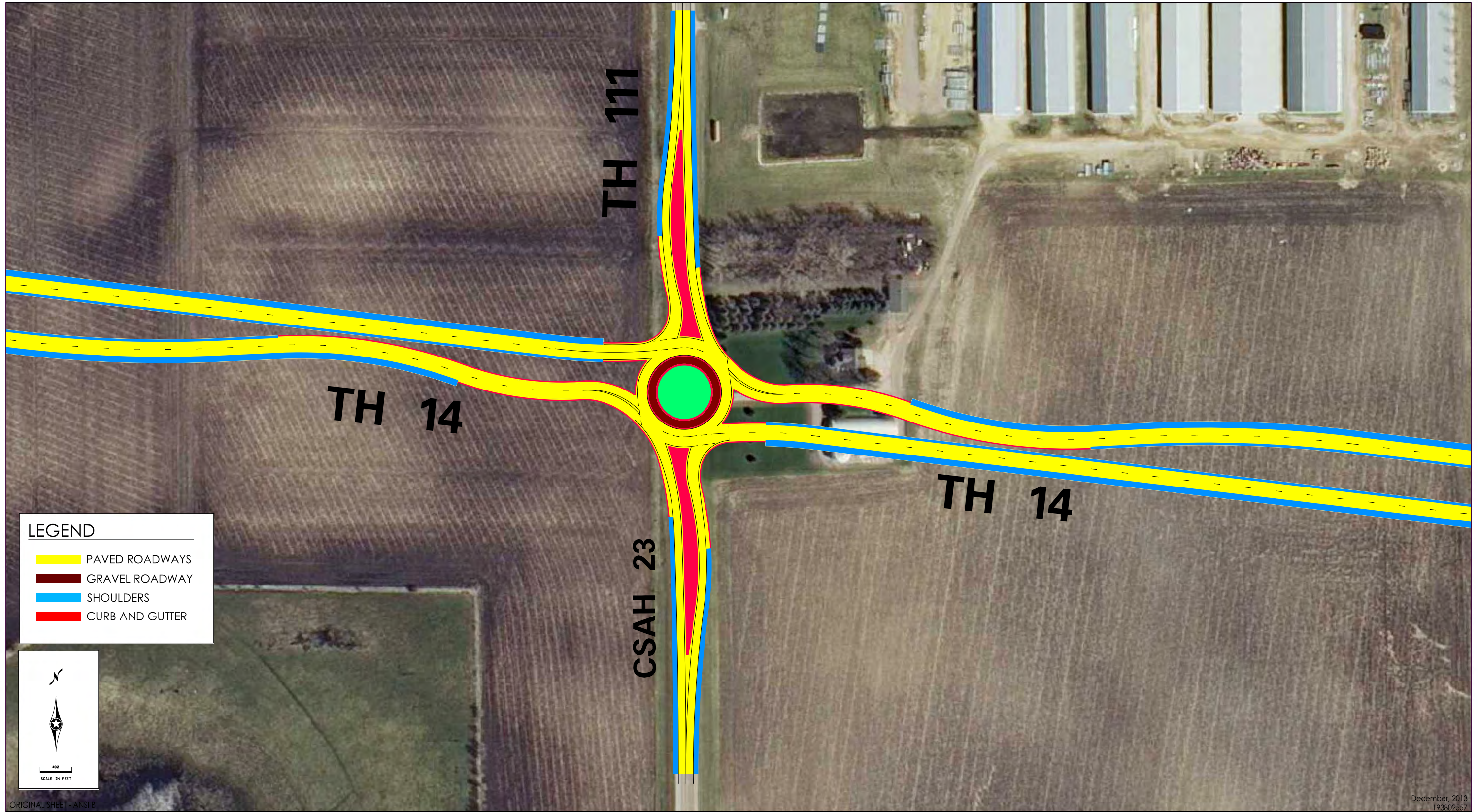
## Alternative #1-Traffic Signal

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 5



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By: S.Wagon



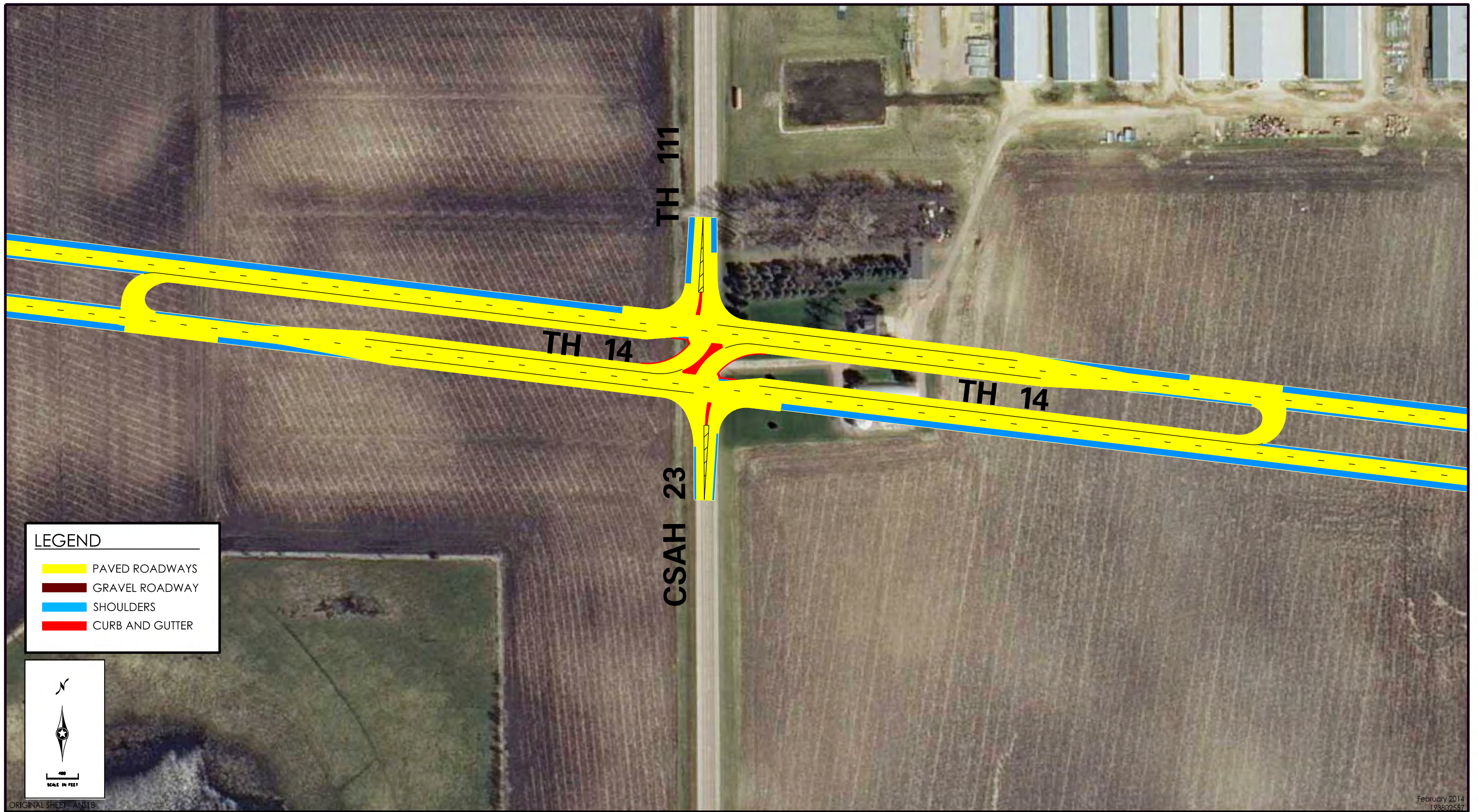
## Alternative #2-Roundabout

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 6



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By: SVoelker



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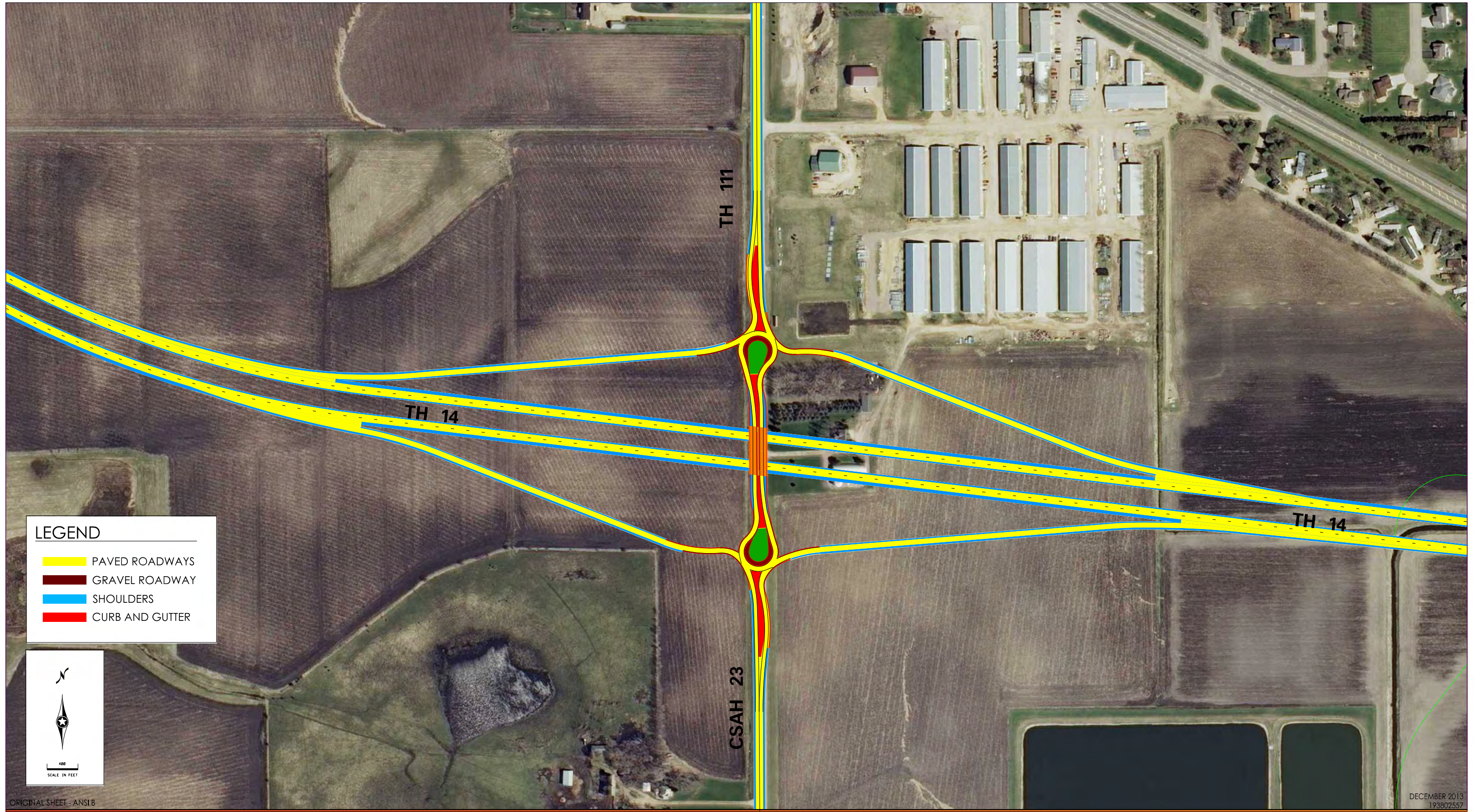
## Alternative #3-Reduced Conflict Intersection (RCI)

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 7



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By: SWaggon



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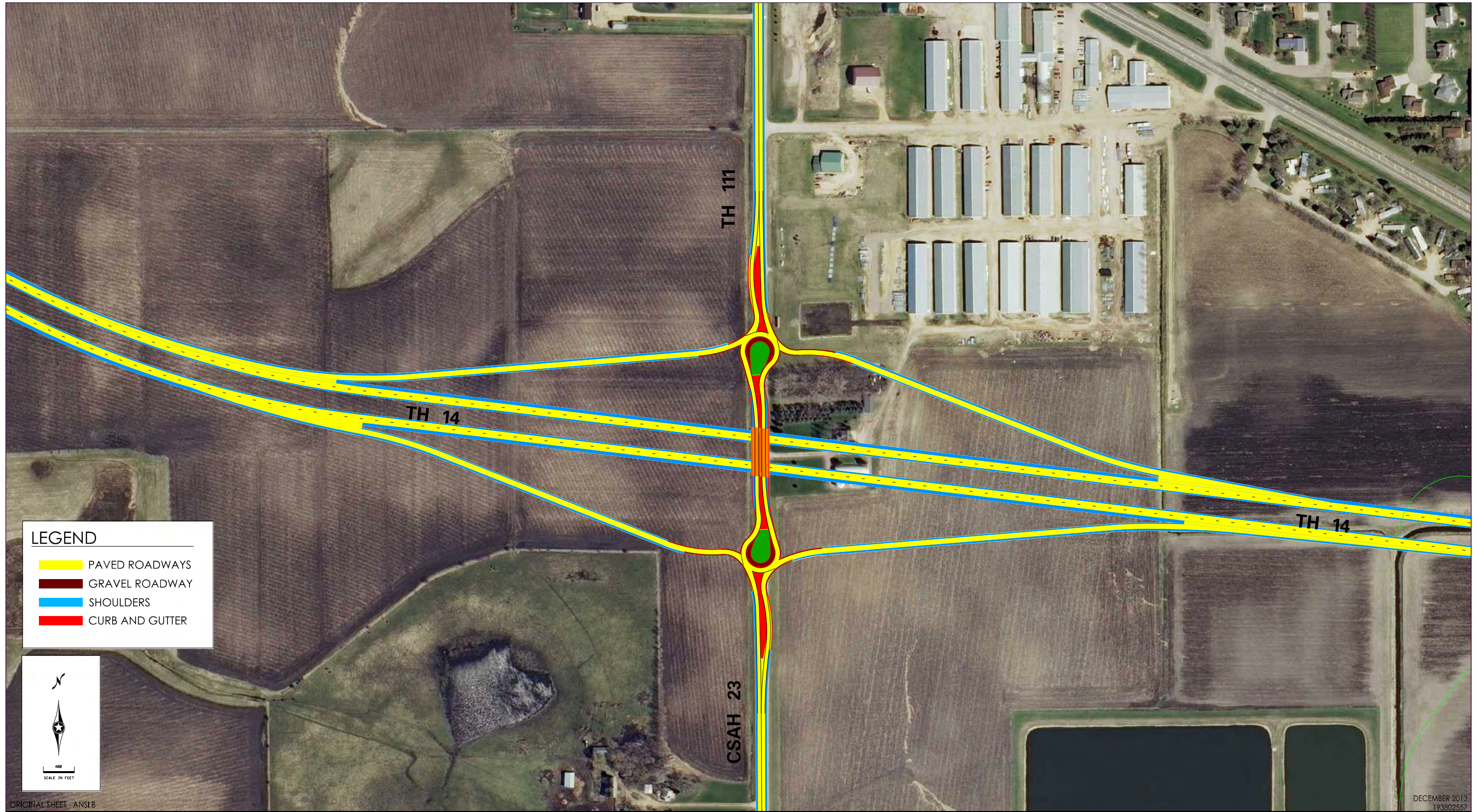
## Alternative #4-Interchange With Local Access

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 8



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By: SWaggon



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## Alternative #5-Interchange With Limited Local Access

TH 14/ TH 111-Intersection Control Evaluation  
Nicollet, Minnesota

Figure 9



## B. SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was completed to determine the feasibility of installing a traffic signal at the TH 14/TH 111 intersection using the Minnesota Manual on Uniform Traffic Control Devices (MMUTCD) guidance on signal warrants as a means of controlling highway traffic. Justification for new signal installation consists of analyzing the following eight warrants.

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 3 – Peak Hour Volume
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network

The warrant analysis that was conducted as part of this study focused on Warrants 1, 2 and 3 using the existing year 2013 and forecast year 2033 hourly approach volumes. The remaining warrants (Warrants 4 through 8) were not reviewed since most of them do not apply or there was not enough existing data to perform adequate analysis. A summary of the MMUTCD warrant analysis is shown in Table 4.1.

<b>Table 4.1 – MMUTCD Signal Warrant Analysis Results Summary: TH 14/TH 111 Intersection</b>					
MMUTCD Warrant	Hours Required	Existing Year 2013 Conditions		Forecast Year 2033 Conditions	
		Hours Met	Warrant Met? (Yes or No)	Hours Met	Warrant Met? (Yes or No)
#1A	8	6	No	13	Yes
#1B	8	3	No	13	Yes
#1C	8	1	No	12	Yes
#2	4	3	No	13	Yes
#3	1	0	No	12	Yes

As shown in Table 4.1, the TH 14/TH 111 intersection currently does not meet Warrants 1, 2, or 3 under the existing year 2013 traffic volumes. However, when considering the forecast year 2033 traffic volumes, MMUTCD Warrants 1, 2, and 3 are all met at the TH 14/TH 111 intersection.

Warrants are typically used to determine if an all-way stop control or a traffic signal should be considered at a particular intersection. The MMUTCD contains warrants for all-way stop control and traffic signals. While there are currently no nationally accepted warrants for the installation of roundabouts, MnDOT generally considers roundabouts to be warranted if traffic volumes meet the criteria for either all-way stop control or traffic signals.

A summary of the traffic signal warrant analyses is included in the appendix.

### C. SAFETY ANALYSIS

A safety analysis was conducted in order to determine the anticipated number of crashes at the TH 14/TH 111 intersection under each of the build alternatives. In order to estimate the number of crashes under each build alternative, crash modification factors were obtained from the Federal Highway Administration (FHWA) nationwide Crash Modification Factor Clearinghouse. A crash modification factor (CMF) is a multiplicative factor used to calculate the anticipated number of crashes after a selected countermeasure is implemented at a specific site. Table 4.2 contains the crash modification factors for each of the build alternatives.

Alternative	Crash Modification Factor*
Alt No. 1: Traffic Signal	0.40 – 0.77 (23% - 60% reduction All Crashes)
Alt No. 2: Roundabout	0.45 – 0.73 (27% - 55% reduction All Crashes)
Alt No. 3: RCI	0.56 (44% reduction All Crashes)
Alt No. 4: Diamond Interchange with Local Access	0.18 – 0.58 (42% - 82% reduction in All Injury Crashes)**
Alt No. 5: Diamond Interchange with Limited Local Access	0.18 – 0.43 (57% - 82% reduction in All Injury Crashes)**

*\*Crash Modification Factors (CMF) were selected from the FHWA's Crash Modification Factors Clearinghouse*

*\*\*A 0.18 CMF (which corresponds to the anticipated reduction in injury crashes at a roundabout versus a side-street stop control intersection) was selected for the proposed interchange alternatives since roundabouts were assumed at the ramp terminal intersections.*

## D. TRAFFIC OPERATIONS ANALYSIS

Highway Capacity analysis results identify a level of service (LOS), which indicates how well an intersection is operating. The LOS results at an intersection are based on average delay per vehicle. The LOS system rates the intersection using the letters A through F, with LOS A being least congested and LOS F being most congested. At LOS C, roads remain safely below, but are approaching capacity and posted speed is often maintained. LOS D is a common design goal for urban streets during future peak hours. While MnDOT does not currently have an accepted limit for LOS, LOS E is a common design goal in larger urban areas where some roadway congestion is inevitable. However, for the purposes of this ICE, the threshold for acceptable traffic operations used in this analysis was LOS C. A summary of the LOS thresholds from the Highway Capacity Manual is shown in Table 4.3.

<b>Table 4.3 –Highway Capacity Manual Levels of Service and Control Delay</b>			
<b>Signalized Intersection</b>		<b>Unsignalized Intersection</b>	
<u>Level of Service</u>	<u>Control Delay per Vehicle (seconds)</u>	<u>Level of Service</u>	<u>Control Delay per Vehicle (seconds)</u>
A	≤ 10	A	≤ 10
B	> 10 and ≤ 20	B	> 10 and ≤ 15
C	> 20 and ≤ 35	C	> 15 and ≤ 25
D	> 35 and ≤ 55	D	> 25 and ≤ 35
E	> 55 and ≤ 80	E	> 35 and ≤ 50
F	> 80	F	> 50

This study analyzed the key intersections using the Synchro/SimTraffic and RODEL (for the roundabout alternatives) software. The analysis examined existing traffic conditions using the existing year 2013 and forecast year 2033 traffic volumes (assuming a 3.5 percent annual growth rate). In order to account for the fact that TH 99 will no longer connect directly with TH 14 in the future, traffic volumes from the TH 14/TH 99 intersection were shifted to the future TH 14/TH 111 intersection. The analysis results are based on an average of five (5) SimTraffic model runs and are presented in terms of overall intersection level of service LOS and average delay per vehicle. For the purposes of this analysis, LOS C was considered the limit of acceptable traffic operations during the peak hours. A summary of the traffic operations results are shown in Table 4.4.

**Table 4.4 – Year 2013 & 2033 Peak Hour Capacity Analysis Results  
TH 14/TH 111 Intersection**

Alternative	MOE	Existing Year 2013		Forecast Year 2035	
		AM Peak	PM Peak	AM Peak	PM Peak
No-Build	LOS*	A	A	<b>E</b>	<b>F</b>
	Delay* (seconds)	5.9	4.9	<b>43.0</b>	<b>105.5</b>
Alt No. 1: Traffic Signal	LOS*	A	A	B	B
	Delay* (seconds)	8.6	9.8	13.9	17.1
Alt No. 2: Roundabout	LOS*	A	A	A	A
	Delay* (seconds)	3.0	3.1	4.5	5.5
Alt No. 3: RCI	LOS*	A	A	A	B
	Delay* (seconds)	3.6	4.0	9.8	11.9
Alt No. 4: Interchange with Local Access	LOS*	A	A	A	A
	Delay* (seconds)	3.8	3.6	4.7	4.8
Alt No. 5: Interchange with Limited Local Access	LOS*	A	A	A	A
	Delay* (seconds)	3.8	3.9	5.0	5.7

\*Represents total intersection LOS

\*\*Represents total intersection delay

Based on the results shown in Table 4.4, the following summarizes the results of the traffic operations analysis at the TH 14/TH 111 intersection:

- The existing side-street stop-controlled intersection of TH 14/TH 111 currently operates at an acceptable LOS A during the a.m. and p.m. peak hour.
- Under year 2033 (high-growth rate) traffic conditions, the existing side-street stop control at the TH 14/TH 111 intersection breaks down and the intersection will operate at an LOS E during the a.m. and LOS F during the p.m. peak hours.
- Each of the five build alternatives (traffic signal, roundabout, RCI, and both Diamond Interchange alternatives) operate at acceptable LOS B or better under the existing and forecast year 2033 (high growth rate) traffic conditions.

Detailed SimTraffic and RODEL outputs are included in the Appendix.



## E. PRELIMINARY ESTIMATED CONSTRUCTION COSTS

Preliminary construction cost estimates were developed for each of the build alternatives. These concept cost estimates were based on the State of Minnesota average bid prices for the year 2012. For quantities that were not defined at this concept level (such as drainage work), a percentage of the total construction cost was used. Contingency costs (15 percent) were also added to the construction costs.

The preliminary estimated construction costs for each alternative are shown in Table 4.5. It should be noted that right-of-way costs are not included, but would be similar for all alternatives due to the interchange footprint being acquired under any alternative pursued

<b>Table 4.5 – Preliminary Estimated Construction Costs TH 14/TH 111 Intersection</b>	
Alternative	Estimated Construction Costs
No-Build	None
Alt No. 1: Traffic Signal	\$1.3 – \$1.8 million
Alt No. 2: Roundabout	\$0.6 – \$0.9 million
Alt No. 3: RCI	\$0.7 – \$1.0 million
Alt No. 4: Diamond Interchange with Local Access	\$6.1 – \$8.5 million
Alt No. 5: Diamond Interchange with Limited Local Access	\$5.2 – \$7.3 million

Preliminary cost estimates for each of the build alternatives are provided in the Appendix.

## F. PRELIMINARY BENEFIT-COST ANALYSIS

To aid in the selection of a recommended alternative, a preliminary benefit-cost analysis was completed. The analysis provides a monetary measure of the relative economic desirability of each alternative concept. A benefit-cost analysis is a systematic evaluation of the advantages (benefits) and disadvantages (costs) of each alternative concept. Typically, a benefit-cost analysis compares a “base case” (e.g. – the No-Build Alternative) to a range of alternatives that provide significant improvements when compared to the base case. A benefit-cost analysis tries to answer the question: “What additional benefits will result if this alternative is undertaken, and what additional costs are needed to bring it about?”

The benefits of a transportation improvement project are typically estimated by comparing differences in travel time/delay, vehicle-miles, and/or crash reduction potential. Since there were very little differences in the traffic operations between each build alternative, the primary source of measurable difference between build alternatives was the crash reduction potential.

The costs of a transportation improvement project are the value of resources that must be consumed to bring the project to reality. For the purposes of this benefit-cost analysis, the mid-range estimated construction costs shown in Table 4.5 were used for each build alternative. It should be noted that since most of the costs associated with a transportation improvement project are incurred in the initial years, while the benefits often accrue over many future years, it is necessary to account for the time value of money by converting the benefits and costs into a common year or present value. This process is called discounting.

The results of a benefit-cost analysis are typically shown as a benefit-cost (B/C) ratio. If the resultant B/C ratio is greater than 1.0, then the improvement alternative is generally considered to be economically justified. The higher the B/C ratio of a given alternative, the greater the public benefit of the project compared to the costs.

The preliminary benefit-cost analysis that was completed as part of this study closely followed the standard procedures and values provided from the State of Minnesota Office of Investment Management. Since the benefit-cost analysis is specific to the proposed improvements to the TH 14/TH 111 intersection and the benefit-cost data consists of crash reduction potential and estimated construction costs, MnDOT’s Hazard Elimination Safety (HES) worksheet was used calculate the resultant B/C ratio for each build alternative. Table 4.6 shows the recommended standard values that were used in the benefit-cost analysis. The values shown in Table 4.6 are provided by the MnDOT Office of Capital Programs and Performance Measures.

Table 4.6 – Standard Values used in the Benefit-Cost Analysis	
Variable	Current Value
Discount Rate	2.2%
MnDOT Crash Values:	
Fatal	\$1,080,000
Injury Type A	\$540,000
Injury Type B	\$160,000
Injury Type C	\$80,000
Property Damage Only	\$3,300

Source: MnDOT Office of Capital Programs and Performance Measures – July 2013.

Using the existing crash data (Table 2.1), anticipated crash reduction factors (Table 4.2), estimated construction costs (Table 4.5), and the standard benefit-cost analysis values Table 4.6), a B/C value was calculated for each build alternative. The resultant B/C ratios for each of the five (5) build alternatives are shown in Table 4.7.

<b>Table 4.7 – Summary of Benefit/Cost (B/C) Ratios: TH 14/TH 111 Intersection</b>		
Alternative	Estimated Construction Costs	Benefit/Cost Ratio
No-Build	None	N/A
Alt No. 1: Traffic Signal	\$1.3 – \$1.8 million	2.2
Alt No. 2: Roundabout	\$0.6 – \$0.9 million	4.3
Alt No. 3: RCI	\$0.7 – \$1.0 million	3.6
Alt No. 4: Diamond Interchange with Local Access	\$6.1 – \$8.5 million	0.9
Alt No. 5: Diamond Interchange with Limited Local Access	\$5.2 – \$7.3 million	1.1

As mentioned in the summary of each build alternative, TH 99 will not connect directly with TH 14 in the future, but instead will end at the existing TH 99/TH 111 intersection in downtown Nicollet. This will likely result in a decrease in traffic volumes and crashes at the future TH 14/471st Avenue intersection located to the west of the City of Nicollet when compared to the existing TH 14/TH 99 intersection; particularly under the two interchange alternatives (Alternatives 4 and 5) when more traffic will likely shift to the new TH 14/TH 111 intersection versus the traffic signal, roundabout, or the RCI alternatives. However, since it is difficult to quantify the crash reduction benefit of the TH 14/TH 111 build alternatives on adjacent TH 14 intersections as a result of changing traffic patterns in the area, the B/C ratios shown in Table 4.7 only included crash reduction benefits for the TH 14/TH 111 intersection.

As shown in Table 4.7, Alternatives 2 and 3 (Roundabout and the RCI) have the highest B/C ratios of the five build alternatives. The traffic signal (Alternative No. 1) had the next highest B/C ratio; the two interchange alternatives had the worst B/C ratios, with the Diamond Interchange with Local Access (Alternative 4) B/C ratio just below 1.0 and the Diamond Interchange with Limited Local Access (Alternative 5) B/C ratio just above 1.0.

Copies of the benefit-cost worksheets for each build alternative are included in the appendix.

## **G. OTHER CONSIDERATIONS**

On December 16, 2013, a public meeting was held in the City of Nicollet to review the range of build alternatives and present the preliminary findings of the Intersection Control Evaluation. Approximately 100 people attended the public meeting. There was a good cross-section of the public represented at the meeting including residents, business owners, local and State public officials, representatives from the local schools, public safety personnel, as well as commuters that use TH 14 within the study area. There was general support for the proposed TH 14 bypass. However, when it came to the improvement options for the new TH 14/TH 111 intersection there was considerable support for the either of the interchange options (Alternatives 4 and 5) and little support for the RCI (Alternative No. 3). Highlights of the meeting and the oral or written submitted comments are included below:

- A majority of the verbal comments received during the meeting were in support of an interchange at the TH 14/TH 111 intersection
- Very few attendees realized the potential of an RCI from a benefit-cost standpoint.
- All of the written comments (over 20) were either in favor, or strongly in favor of an interchange alternative.
- Formal comments from Representative Johnson and Nicollet Mayor Froehlich were in strong favor of an interchange alternative and viewed any other alternative unfavorably.

Based on comments received from the December 16, 2013 public meeting (both verbal and written), there is strong local support for either of the interchange concepts (Alternatives 4 or 5) and little to no support for the other at-grade intersection concepts (Alternatives 1, 2, or 3).

## **H. SELECTION OF THE RECOMMENDED ALTERNATIVE**

The selection of the recommended traffic control alternative for the new TH 14/TH 111 intersection was selected based on thorough review of the intersection control evaluation and considered the following:

- Safety analysis
- Results of the traffic operations analysis
- Preliminary estimated construction costs
- Preliminary benefit-cost analysis
- Other considerations (local support)
- Discussions with project team

Based on the analysis, a reduced conflict intersection (RCI) is the recommended intersection control at the new TH 14/TH 111 intersection. Since all of the build alternatives will be able to accommodate the future year 2033 traffic volumes, the selection of the RCI (Alternative No. 3) was based on the following:

- The traffic operations analysis revealed that the side-street stop control will not be able to accommodate the future traffic volumes at the new TH 14/TH 111 intersection and a change in traffic control is needed.

- With the exception of the roundabout option, the RCI has the lowest cost and also has the highest benefit-cost ratio of the five build alternatives. Only the roundabout has a lower estimated construction cost and a higher benefit-cost ratio.
- Since TH 14 is a medium priority interregional corridor, future traffic control alternatives should minimize delay and preserve mobility along the TH 14 mainline. The roundabout (Alternative No. 2) does neither since it will require all traffic entering the intersection to slow down to approximately 15 – 25 mph to safely travel through the circulatory roadway. Furthermore, since there are high design speeds along TH 14 leading to this new TH 14/TH 111 intersection and MnDOT has no direct experience with roundabouts on high speed facilities. The roundabout alternative was ruled out.
- The traffic signal (Alternative No. 1) was not recommended since MnDOT generally tries to reduce the number of traffic signals along interregional corridors such as TH 14, not add them. Similar to the discussion above for the roundabout, a traffic signal will require some of the TH 14 traffic to slow or stop at the TH 14/TH 111 intersection. Furthermore, MnDOT crash data for traffic signals along higher-speed rural highways does not seem to support the crash reduction benefits that a typical intersection under traffic signal control may experience in urban areas. For these reasons, the traffic signal is not recommended.
- While the interchange alternatives (Alternatives 4 and 5) may have the potential for the highest crash reduction potential as well as the greatest public support, they are more than four times as expensive as the next less expensive alternative. Furthermore, only one of the interchange alternatives has a benefit-cost ratio greater than 1.0 (which is generally considered the threshold when an improvement alternative is considered to be economically justified). For these reasons, the interchange alternatives are not recommended.



## V. Findings and Recommendations

This study examined intersection control alternatives for the TH 14/TH 111 intersection.

TH 14 is classified by MnDOT as a medium priority interregional corridor. It is a critical east-west transportation corridor that connects points in southern Minnesota. Previous scoping studies identified the future need for a four-lane TH 14 corridor between New Ulm and Mankato/North Mankato. As part of the Corridors of Commerce program, the 2.5 mile bypass of the City of Nicollet was added to the larger TH 14 improvement project that will expand TH 14 from two to four lanes between North Mankato to Nicollet, and the overall TH 14 project was advanced two years from 2018 to 2016 construction.

In order to determine the appropriate control at the new intersection of the proposed TH 14 bypass with TH 111, this intersection control evaluation was completed. Existing 13-hour turning movement counts were collected in October 2013 at the TH 14/TH 111 intersection as well as adjacent key intersections. These existing 2013 traffic volumes were used in the existing conditions analysis and signal warrant analysis in this report. Projected year 2033 traffic volumes were developed by applying the both a 1.0 and 3.5 annual growth rates to the existing year 2013 traffic volumes. However, the high-growth (3.5 percent growth rate) was used for the future conditions analysis since it is comparable to recent growth rates in other communities just outside of the Mankato/North Mankato area. In order to account for the fact that TH 99 will not connect directly to TH 14 in the future, traffic volumes from TH 14/TH 99 intersection were added to the future TH 14/TH 111 intersection.

The traffic operations analysis revealed that traffic currently operates at an acceptable level of service under existing conditions.

The year 2033 no-build traffic analysis revealed that the existing side-street stop control at the TH 14/TH 111 intersection cannot accommodate the future year 2033 traffic volumes.

The following traffic control alternatives were considered at the TH 14/TH 111 intersection:

- Existing conditions (No-build Alternative)
- Traffic signal at the new TH 14/TH 111 intersection (Alternative No. 1)
- Roundabout at the new TH 14/TH 111 intersection (Alternative No. 2)
- Reduced Conflict Intersection (RCI) at the new TH 14/TH 111 intersection (Alternative No. 3)
- Diamond Interchange at the new TH 14/TH 111 intersection, with local access (Alternative No. 4)
- Diamond Interchange at the new TH 14/TH 111 intersection, with limited local access (Alternative No. 5)

The existing conditions analysis revealed that the existing side-street stop-controlled intersection of TH 14/TH 111 currently operates at an acceptable LOS A during the a.m. and p.m. peak hour.

Under year 2033 (high-growth rate) traffic conditions, the existing side-street stop control at the TH 14/TH 111 intersection breaks down and the intersection will operate at an unacceptable LOS E during the a.m. and LOS F during the p.m. peak hours.

Each of the five build alternatives (traffic signal, roundabout, RCI, and both Diamond Interchange alternatives) will be able to accommodate the forecast year 2033 (high growth rate) traffic conditions at acceptable LOS B or better.

Analysis of crash statistics revealed that the crash and severity rates at the TH 14/TH 111 intersection are currently above the statewide averages, and as recently as 2012 the crash rate at the intersection was above the critical crash rate. Therefore, the TH 14/TH 111 intersection should be considered for safety improvements because there is statistically significant evidence that the intersection crash rate is higher than the statewide average for similar intersections.

A review of the MMUTCD traffic signal warrants revealed that the TH 14/TH 111 intersection does not currently meet traffic signal warrants; however, as traffic volumes continue to grow at the intersection, traffic signal warrants will likely be met by the year 2033. While there are currently no nationally accepted warrants for the installation of roundabouts, MnDOT generally considers roundabouts to be warranted if traffic volumes meet the criteria for either all-way stop control or traffic signals.

A review of the preliminary construction cost estimates and preliminary benefit-cost analysis found that with the exception of the roundabout alternative, the RCI alternative has the lowest cost and the highest benefit-cost ratio of the five build alternatives. Only the roundabout has a lower estimated construction cost and a higher benefit-cost ratio. The roundabout alternative will add undesirable delay to the mainline TH 14 (which is a medium priority interregional corridor) and the RCI alternative will not. Local opinion is heavily in favor of an interchange option (Alternatives 4 or 5); however, the interchange alternatives are neither operationally necessary nor economically justifiable. Therefore, the RCI (Alternative No. 3) is the recommended traffic control option for the new TH 14/TH 111 intersection.

In addition to the recommended improvements to the future TH 14/TH 111 intersection, the following recommendations are offered for consideration at selected area intersections:

- Since each of the future build alternatives will provide access to TH 14 west of the City of Nicollet at a new full access at 471st Avenue, it is recommended that TH 99 no longer connect directly with TH 14, but rather end at the existing TH 99/TH 111 intersection in downtown Nicollet.
- In order to accommodate the shift in traffic patterns as a result of the proposed TH 14 Nicollet Bypass, the following traffic control changes are recommended:
  - The existing traffic control at the TH 111/TH 99 intersection should be swapped so that the side-street stop control will ultimately be placed on the TH 99/3rd Street approaches once the new TH 14/TH 111 intersection is open to traffic. In addition, the traffic operations at the TH 111/TH 99 intersection should be monitored in the future, as the traffic control at the intersection may need to be upgraded to at least an all-way stop by the year 2033.
  - The existing traffic control at the TH 111/Old TH 14 intersection should be swapped so that the side-street stop control will ultimately be placed on the old TH 14 approaches once the new TH 14/TH 111 intersection is open to traffic.

# Appendix

Traffic Volumes

Crash Data

Signal Warrant Analysis Results

Synchro/SimTraffic and RODEL Analysis Output

Preliminary Construction Cost Estimates

Benefit-Cost Worksheets

# **Traffic Volumes**



File Name : C - TH 14 & TH 111 (Main), 10-16-13, 6am-7pm  
 Site Code : C  
 Start Date : 10/16/2013  
 Page No : 1

File Name : C - TH 14 & TH 111 (Main), 10-16-13, 6am-7pm  
 Site Code : C  
 Start Date : 10/16/2013  
 Page No : 1

Groups Printed- Cars + - Trucks																										
TH 111 (main)							TH 14							TH 111 (main)						TH 14						
From North							From East							From South							From West					
Start Time	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Int. Total	
06:00 AM 06:15 AM 06:30 AM 06:45 AM	0	4	7	0	0	11	7	10	0	0	0	17	0	6	0	0	0	0	6	2	19	2	0	0	23	57
	0	2	18	0	0	20	9	28	0	0	0	37	0	8	0	0	0	0	8	1	33	0	0	0	34	99
	1	4	26	0	0	31	10	37	1	0	0	48	0	6	0	0	0	0	6	0	38	1	0	0	39	124
	0	4	22	0	0	26	9	21	0	0	0	30	1	11	0	0	0	0	12	1	50	4	0	0	55	123
Total	1	14	73	0	0	88	35	96	1	0	0	132	1	31	0	0	0	0	32	4	140	7	0	0	151	403
07:00 AM 07:15 AM 07:30 AM 07:45 AM	0	2	23	0	0	25	10	25	1	0	0	36	1	4	0	0	0	0	5	0	41	1	0	0	42	108
	3	7	14	0	0	24	10	48	1	0	0	59	0	15	0	0	0	0	15	0	69	2	0	0	71	169
	0	8	43	0	0	51	17	34	2	0	0	53	4	13	0	0	0	0	17	2	83	4	0	0	89	210
	2	13	19	0	0	34	15	40	1	0	0	56	1	14	2	0	0	0	17	1	55	1	0	0	57	164
Total	5	30	99	0	0	134	52	147	5	0	0	204	6	46	2	0	0	0	54	3	248	8	0	0	259	651
08:00 AM 08:15 AM 08:30 AM 08:45 AM	0	5	10	0	0	15	12	36	3	0	0	51	2	7	1	0	0	0	10	0	46	0	0	0	46	122
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	1	3	12	0	0	16	19	31	1	0	0	51	2	4	0	0	0	0	6	0	36	1	0	0	37	110
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09:00 AM 09:15 AM 09:30 AM 09:45 AM	1	10	17	0	0	28	17	31	0	0	0	48	0	7	0	0	0	0	7	1	33	0	0	0	34	117
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	0	9	11	0	0	20	15	37	1	0	0	53	3	6	0	0	0	0	9	2	44	2	0	0	48	130
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11:00 AM 11:15 AM 11:30 AM 11:45 AM	0	7	14	0	0	21	16	28	2	0	0	46	2	4	0	0	0	0	6	2	41	0	0	0	43	116
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Total	1	27	61	0	0	89	55	120	3	0	0	178	3	29	2	0	0	0	34	4	153	2	0	0	159	460
12:00 PM 12:15 PM 12:30 PM 12:45 PM	0	6	19	0	0	25	25	33	3	0	0	61	3	9	1	0	0	0	13	1	27	0	0	0	28	127
	2	6	24	0	0	32	20	42	0	0	0	62	3	5	1	0	0	0	9	1	36	0	0	0	37	140
	2	7	21	0	0	30	10	39	0	0	0	49	1	4	1	0	0	0	6	2	46	2	0	0	50	135
	0	9	17	0	0	26	15	28	2	0	0	45	2	9	1	0	0	0	12	0	32	0	0	0	32	115
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01:00 PM 01:15 PM 01:30 PM 01:45 PM	3	13	12	0	0	28	16	50	1	0	0	67	0	4	0	0	0	0	4	0	41	0	0	0	41	140
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Total	5	33	62	0	1	101	69	172	6	0	0	247	5	34	1	0	0	0	40	0	183	2	0	0	185	573





File Name : C - TH 14 & TH 111 (Main), 10-16-13, 6am-7pm

Site Code : C

Start Date : 10/16/2013

Page No : 2

Groups Printed- Cars + - Trucks

TH 111 (main)										TH 14										TH 111 (main)										TH 14									
From North					From East					From South					From West					From North					From East					From South					From West				
Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Int. Total									
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Total																																							
06:00 PM																																							
0	12	16	0	0	28	21	45	3	0	0	69	4	11	0	0	0	15	151	0	38	1	0	0	39															
06:00 PM																																							
0	6	16	0	0	22	22	61	1	0	0	84	3	14	1	0	0	18	165	0	41	0	0	0	41															
06:15 PM																																							
0	12	13	0	0	25	20	35	2	0	0	57	4	7	2	0	0	13	145	0	49	1	0	0	50															
06:30 PM																																							
0	4	18	0	0	22	18	47	2	0	0	67	1	12	1	0	0	14	137	0	34	0	0	0	34															
06:45 PM																																							
Total																																							
0	34	63	0	0	97	81	188	8	0	0	277	12	44	4	0	0	60	598	0	162	2	0	0	164															
Total																																							
Grand Total																																							
Apprch %	57	436	902		1398	921	2193	81	0	0	3195	74	463	36	0	1	574	7641	36	2379	59	0	0	2474															
Total %	4.1	31.2	64.5	0	0.2	28.8	68.6	2.5	0	0		12.9	80.7	6.3	0	0.2	7.5		1.5	96.2	2.4	0	0																
	0.7	5.7	11.8	0		12.1	28.7	1.1	0	0	41.8	1	6.1	0.5	0		7.5		0.5	31.1	0.8	0	0																
Cars +	54	305	681	0	3	1043	722	1893	75	0	2690	68	332	29	0	1	430	6283	29	2035	56	0	0	2120															
% Cars +	94.7	70	75.5	0	100	74.6	86.3	92.6	0	0	84.2	91.9	71.7	80.6	0	100	74.9		80.6	85.5	94.9	0	0	2120															
Trucks	3	131	221	0	0	355	199	300	6	0	505	6	131	7	0	0	144	1358	7	344	3	0	0	354															
% Trucks	5.3	30	24.5	0	0	25.4	21.6	13.7	7.4	0	15.8	8.1	28.3	19.4	0	0	25.1		19.4	14.5	5.1	0	0	14.3															

File Name : C - TH 14 & TH 111 (Main), 10-16-13, 6am-7pm

Site Code : C

Start Date : 10/16/2013

Page No : 3

		TH 111 (main) From North					TH 14 From East					TH 111 (main) From South					TH 14 From West				
Start Time	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Int. Total		
Peak Hour Analysis From 04:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	7	14	0	0	24	10	48	1	0	0	59	0	15	0	0	0	69	71		
07:30 AM	0	8	43	0	0	51	17	34	2	0	0	53	4	13	0	0	0	83	89		
07:45 AM	2	13	19	0	0	34	15	40	1	0	0	56	1	14	2	0	0	55	57		
08:00 AM	0	5	10	0	0	15	12	36	3	0	0	51	2	7	1	0	0	46	46		
Total Volume	5	33	86	0	0	124	54	158	7	0	0	219	7	49	3	0	0	253	263		
% App. Total	4	26.6	69.4	0	0	608	24.7	72.1	3.2	0	0	928	11.9	83.1	5.1	0	0	96.2	96.2		
PHF	.417	.635	.500	.000	.000	.608	.794	.823	.583	.000	.000	.928	.438	.817	.375	.000	.000	.762	.739		
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	3	13	12	0	0	28	16	50	1	0	0	67	0	4	0	0	0	41	41		
01:15 PM	0	8	13	0	0	21	16	40	1	0	0	57	3	15	0	0	0	45	46		
01:30 PM	0	5	17	0	0	22	17	36	2	0	0	55	2	5	0	0	0	41	41		
01:45 PM	2	7	20	0	1	30	20	46	2	0	0	68	0	10	1	0	0	56	57		
Total Volume	5	33	62	0	1	101	69	172	6	0	0	247	5	34	1	0	0	183	185		
% App. Total	5	32.7	61.4	0	1	842	27.9	69.6	2.4	0	0	908	12.5	85	2.5	0	0	98.9	98.9		
PHF	.417	.635	.775	.000	.250	.842	.863	.860	.750	.000	.000	.908	.417	.567	.250	.000	.000	.817	.811		
Peak Hour Analysis From 02:00 PM to 11:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	2	15	17	0	0	34	30	60	4	0	0	94	3	17	0	0	0	46	49		
04:45 PM	0	12	13	0	1	26	25	59	2	0	0	86	0	13	2	0	0	55	57		
05:00 PM	2	9	25	0	0	36	26	67	5	0	0	98	0	15	1	0	0	38	45		
05:15 PM	4	14	17	0	0	35	42	90	0	0	0	132	3	9	4	0	0	64	66		
Total Volume	8	50	72	0	1	131	123	276	11	0	0	410	6	54	7	0	0	203	217		
% App. Total	6.1	38.2	55	0	0.8	910	30	67.3	2.7	0	0	777	9	80.6	10.4	0	0	93.5	93.5		
PHF	.500	.833	.720	.000	.250	.910	.732	.767	.550	.000	.000	.777	.500	.794	.438	.000	.000	.793	.822		



# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : A - TH 14 & TH 99, 10-16-13, 6am-7pm  
Site Code : A  
Start Date : 10/16/2013  
Page No : 1

TH 14 & TH 99  
Nicollet, MN

## Groups Printed- Cars + - Trucks

Start Time	TH 99 From North					TH 14 From East					TH 99 From South					TH 14 From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total	Int.	Total
06:00 AM	7	0	0	0	7	0	9	0	0	9	0	0	0	0	0	0	18	8	0	26
06:15 AM	10	0	1	0	11	0	26	0	0	26	0	0	0	0	0	0	38	18	0	56
06:30 AM	10	0	1	0	11	0	39	0	0	39	0	0	0	0	0	0	36	18	0	54
06:45 AM	11	0	0	0	11	1	19	0	0	20	0	0	0	0	0	0	51	13	0	64
Total	38	0	2	0	40	1	93	0	0	94	0	0	0	0	0	0	143	57	0	200
07:00 AM	13	0	0	0	13	0	25	0	0	25	0	0	0	0	0	0	47	21	0	68
07:15 AM	19	0	1	0	20	1	50	0	0	51	0	0	0	0	0	0	71	21	0	92
07:30 AM	22	0	0	0	22	0	34	0	0	34	0	0	0	0	0	0	89	27	0	116
07:45 AM	15	0	0	0	15	0	43	0	0	43	0	0	0	0	0	0	53	20	0	73
Total	69	0	1	0	70	1	152	0	0	153	0	0	0	0	0	0	260	89	0	349
08:00 AM	22	0	0	0	22	0	37	0	0	37	0	0	0	0	0	0	49	9	0	58
08:15 AM	13	0	1	0	14	0	38	0	0	38	0	0	0	0	0	0	39	15	0	54
08:30 AM	19	0	0	0	19	0	40	0	0	40	0	0	0	0	0	0	39	15	0	54
08:45 AM	16	0	0	0	16	1	31	0	0	32	0	0	0	0	0	0	38	12	0	50
Total	70	0	1	0	71	1	146	0	0	147	0	0	0	0	0	0	165	51	0	216
09:00 AM	12	0	0	0	12	0	33	0	0	33	0	0	0	0	0	0	35	16	0	51
09:15 AM	13	0	0	0	13	0	32	0	0	32	0	0	0	0	0	0	53	14	0	67
09:30 AM	18	0	0	0	18	0	31	0	0	31	0	0	0	0	0	0	54	16	0	70
09:45 AM	18	0	0	0	18	0	41	0	0	41	0	0	0	0	0	0	35	14	0	49
Total	61	0	0	0	61	0	137	0	0	137	0	0	0	0	0	0	177	60	0	237
10:00 AM	19	0	0	0	19	0	37	0	0	37	0	0	0	0	0	0	41	10	0	51
10:15 AM	13	0	0	0	13	0	35	0	0	35	0	0	0	0	0	0	51	14	0	65
10:30 AM	17	0	0	0	17	0	37	0	0	37	0	0	0	0	0	0	66	10	0	76
10:45 AM	18	0	1	0	19	0	42	0	0	42	0	0	0	0	0	0	35	13	0	48
Total	67	0	1	0	68	0	151	0	0	151	0	0	0	0	0	0	193	47	0	240
11:00 AM	15	0	0	0	15	0	28	0	0	28	0	0	0	0	0	0	38	13	0	51
11:15 AM	20	0	0	0	20	1	28	0	0	29	0	0	0	0	0	0	42	9	0	51
11:30 AM	13	0	1	0	14	0	27	0	0	27	0	0	0	0	0	0	37	18	0	55
11:45 AM	20	0	2	0	22	0	34	0	0	34	0	0	0	0	0	0	36	14	0	50
Total	68	0	3	0	71	1	117	0	0	118	0	0	0	0	0	0	153	54	0	207
12:00 PM	12	0	0	0	12	0	35	0	0	35	0	0	0	0	0	0	23	15	0	38
12:15 PM	18	0	0	0	18	0	41	0	0	41	0	0	0	0	0	0	44	18	0	62
12:30 PM	20	0	0	0	20	1	41	0	0	42	0	0	0	0	0	0	42	18	0	60



# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : A - TH 14 & TH 99, 10-16-13, 6am-7pm  
Site Code : A  
Start Date : 10/16/2013  
Page No : 2

## Groups Printed- Cars + - Trucks

Start Time	TH 99 From North						TH 14 From East						TH 99 From South						TH 14 From West					
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	Int. Total
	12:45 PM	24	0	1	0	25	0	30	0	0	30		0	0	0	0	0	0	0	31	14	0	45	100
Total	74	0	1	0	75		1	147	0	0	148		0	0	0	0	0	0	0	140	65	0	205	428
01:00 PM	17	0	0	0	17		0	54	0	0	54		0	0	0	0	0	0	0	42	15	0	57	128
01:15 PM	14	0	0	0	14		0	42	0	0	42		0	0	0	0	0	0	0	48	12	0	60	116
01:30 PM	21	0	0	0	21		0	34	0	0	34		0	0	0	0	0	0	0	42	26	0	68	123
01:45 PM	17	0	0	0	17		1	44	0	0	45		0	0	0	0	0	0	0	61	14	0	75	137
Total	69	0	0	0	69		1	174	0	0	175		0	0	0	0	0	0	0	193	67	0	260	504
02:00 PM	19	0	0	0	19		0	34	0	0	34		0	0	0	0	0	0	0	41	18	0	59	112
02:15 PM	22	0	0	0	22		1	52	0	0	53		0	0	0	0	0	0	0	67	16	0	83	158
02:30 PM	19	0	1	0	20		0	46	0	0	46		0	0	0	0	0	0	0	46	25	0	71	137
02:45 PM	18	0	0	0	18		0	34	0	0	34		0	0	0	0	0	0	0	52	11	0	63	115
Total	78	0	1	0	79		1	166	0	0	167		0	0	0	0	0	0	0	206	70	0	276	522
03:00 PM	25	0	0	0	25		0	56	0	0	56		0	0	0	0	0	0	0	54	18	0	72	153
03:15 PM	24	0	0	0	24		0	48	0	0	48		0	0	0	0	0	0	0	67	24	0	91	163
03:30 PM	25	0	0	0	25		1	72	0	0	73		0	0	0	0	0	0	0	61	29	0	90	188
03:45 PM	21	0	0	0	21		0	70	0	0	70		0	0	0	0	0	0	0	49	18	0	67	158
Total	95	0	0	0	95		1	246	0	0	247		0	0	0	0	0	0	0	231	89	0	320	662
04:00 PM	26	0	1	0	27		1	65	0	0	66		0	0	0	0	0	0	0	67	25	0	92	185
04:15 PM	30	0	0	0	30		0	49	0	0	49		0	0	0	0	0	0	0	61	12	0	73	152
04:30 PM	17	0	0	0	17		2	57	0	0	59		0	0	0	0	0	0	0	40	18	0	58	134
04:45 PM	25	0	0	0	25		0	60	0	0	60		0	0	0	0	0	0	0	59	18	0	77	162
Total	98	0	1	0	99		3	231	0	0	234		0	0	0	0	0	0	0	227	73	0	300	633
05:00 PM	28	0	0	0	28		0	69	0	0	69		0	0	0	0	0	0	0	49	17	0	66	163
05:15 PM	12	0	0	0	12		0	89	0	0	89		0	0	0	0	0	0	0	60	18	0	78	179
05:30 PM	24	0	1	0	25		0	63	0	0	63		0	0	0	0	0	0	0	50	15	0	65	153
05:45 PM	12	0	0	0	12		0	54	0	0	54		0	0	0	0	0	0	0	33	17	0	50	116
Total	76	0	1	0	77		0	275	0	0	275		0	0	0	0	0	0	0	192	67	0	259	611
06:00 PM	17	0	0	0	17		0	40	0	0	40		0	0	0	0	0	0	0	42	16	0	58	115
06:15 PM	11	0	0	0	11		0	50	0	0	50		0	0	0	0	0	0	0	47	13	0	60	121
06:30 PM	16	0	0	0	16		0	29	0	0	29		0	0	0	0	0	0	0	39	19	0	58	103
06:45 PM	8	0	0	0	8		0	35	0	0	35		0	0	0	0	0	0	0	33	8	0	41	84
Total	52	0	0	0	52		0	154	0	0	154		0	0	0	0	0	0	0	161	56	0	217	423
Grand Total	915	0	12	0	927		11	2189	0	0	2200		0	0	0	0	0	0	0	2441	845	0	3286	6413
Approach %	98.7	0	1.3	0			0.5	99.5	0	0			0	0	0	0	0	0	0	74.3	25.7	0		
Total %	14.3	0	0.2	0	14.5		0.2	34.1	0	0	34.3		0	0	0	0	0	0	0	38.1	13.2	0	51.2	
Cars +	771	0	11	0	782		9	1888	0	0	1897		0	0	0	0	0	0	0	2112	706	0	2818	5497
% Cars +	84.3	0	91.7	0	84.4		81.8	86.2	0	0	86.2		0	0	0	0	0	0	0	86.5	83.6	0	85.8	85.7





# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : A - TH 14 & TH 99, 10-16-13, 6am-7pm  
Site Code : A  
Start Date : 10/16/2013  
Page No : 3

## Groups Printed- Cars + - Trucks

	TH 99 From North						TH 14 From East						TH 99 From South						TH 14 From West					
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total		
Trucks	144	0	1	0	145		2	301	0	0	303	0	0	0	0	0	0	329	139	0	0	468	916	
% Trucks	15.7	0	8.3	0	15.6		18.2	13.8	0	0	13.8	0	0	0	0	0	0	13.5	16.4	0	0	14.2	14.3	
	TH 99 From North						TH 14 From East						TH 99 From South						TH 14 From West					
Start Time	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total		
Peak Hour Analysis From 04:00 AM to 09:45 AM - Peak 1 of 1																								
Peak Hour for Entire Intersection Begins at 07:15 AM																								
07:15 AM	19	0	1	0	20		1	50	0	0	51	0	0	0	0	0	0	71	21	0	0	92	163	
07:30 AM	22	0	0	0	22		0	34	0	0	34	0	0	0	0	0	0	89	27	0	0	116	172	
07:45 AM	15	0	0	0	15		0	43	0	0	43	0	0	0	0	0	0	53	20	0	0	73	131	
08:00 AM	22	0	0	0	22		0	37	0	0	37	0	0	0	0	0	0	49	9	0	0	58	117	
Total Volume	78	0	1	0	79		1	164	0	0	165	0	0	0	0	0	0	262	77	0	0	339	583	
% App. Total	98.7	0	1.3	0			0.6	99.4	0	0		0	0	0	0	0	0	77.3	22.7	0	0			
PHF	.886	.000	.250	.000	.898		.250	.820	.000	.000	.809	.000	.000	.000	.000	.000	.000	.736	.713	.000	.000	.731	.847	
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																								
Peak Hour for Entire Intersection Begins at 01:00 PM																								
01:00 PM	17	0	0	0	17		0	54	0	0	54	0	0	0	0	0	0	42	15	0	0	57	128	
01:15 PM	14	0	0	0	14		0	42	0	0	42	0	0	0	0	0	0	48	12	0	0	60	116	
01:30 PM	21	0	0	0	21		0	34	0	0	34	0	0	0	0	0	0	42	26	0	0	68	123	
01:45 PM	17	0	0	0	17		1	44	0	0	45	0	0	0	0	0	0	61	14	0	0	75	137	
Total Volume	69	0	0	0	69		1	174	0	0	175	0	0	0	0	0	0	193	67	0	0	260	504	
% App. Total	100	0	0	0			0.6	99.4	0	0		0	0	0	0	0	0	74.2	25.8	0	0			
PHF	.821	.000	.000	.000	.821		.250	.806	.000	.000	.810	.000	.000	.000	.000	.000	.000	.791	.644	.000	.000	.867	.920	
Peak Hour Analysis From 02:00 PM to 07:45 PM - Peak 1 of 1																								
Peak Hour for Entire Intersection Begins at 03:15 PM																								
03:15 PM	24	0	0	0	24		0	48	0	0	48	0	0	0	0	0	0	67	24	0	0	91	163	
03:30 PM	25	0	0	0	25		1	72	0	0	73	0	0	0	0	0	0	61	29	0	0	90	188	
03:45 PM	21	0	0	0	21		0	70	0	0	70	0	0	0	0	0	0	49	18	0	0	67	158	
04:00 PM	26	0	1	0	27		1	65	0	0	66	0	0	0	0	0	0	67	25	0	0	92	185	
Total Volume	96	0	1	0	97		2	255	0	0	257	0	0	0	0	0	0	244	96	0	0	340	694	
% App. Total	99	0	1	0			0.8	99.2	0	0		0	0	0	0	0	0	71.8	28.2	0	0			
PHF	.923	.000	.250	.000	.898		.500	.885	.000	.000	.880	.000	.000	.000	.000	.000	.000	.910	.828	.000	.000	.924	.923	



# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : D - TH 14 & CR 72, 10-16-13, 6am-7pm  
Site Code : D  
Start Date : 10/16/2013  
Page No : 1

TH 14 & CR 72  
Nicollet, MN

## Groups Printed- Cars + - Trucks

	CR 72												TH 111						CR 72						TH 111					
Start Time	From North						From East						From South						From West											
	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Int. Total					
04:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
04:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
04:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
04:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
05:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
05:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
06:00 AM	0	0	2	0	0	2	2	18	0	0	0	0	20	0	0	0	0	0	0	29	1	0	0	0	30	52				
06:15 AM	1	0	4	0	0	5	1	38	0	0	0	0	39	0	0	0	0	0	57	1	0	0	0	58	102					
06:30 AM	0	0	2	0	0	2	0	48	0	0	0	0	48	0	0	0	0	0	63	1	0	0	0	64	114					
06:45 AM	0	0	5	0	0	5	5	37	0	0	0	0	42	0	0	0	0	0	70	0	0	0	0	70	117					
Total	1	0	13	0	0	14	8	141	0	0	0	0	149	0	0	0	0	0	219	3	0	0	0	222	385					
07:00 AM	0	1	3	0	0	4	4	37	0	0	0	0	41	1	0	0	0	0	71	0	0	0	0	71	117					
07:15 AM	0	0	6	0	0	6	9	58	0	0	0	0	67	0	1	0	0	0	103	0	0	0	0	103	177					
07:30 AM	0	0	23	0	0	23	8	62	0	0	0	0	70	0	0	0	0	0	154	1	0	0	0	155	248					
07:45 AM	0	0	18	0	0	18	12	55	0	0	0	0	67	0	0	0	0	0	80	1	0	0	0	81	166					
Total	0	1	50	0	0	51	33	212	0	0	0	0	245	1	1	0	0	2	408	2	0	0	0	410	708					
08:00 AM	0	0	11	0	0	11	7	50	0	0	0	0	57	0	0	0	0	0	60	1	0	0	0	61	129					
08:15 AM	0	0	5	0	0	5	3	63	0	0	0	0	66	0	0	0	0	0	71	0	0	0	0	71	142					
08:30 AM	1	0	2	0	0	3	1	55	0	0	0	0	56	0	0	0	0	0	66	0	0	0	0	66	125					
08:45 AM	1	0	10	0	0	11	0	59	0	0	0	0	59	0	0	0	0	0	62	0	0	0	0	62	132					
Total	2	0	28	0	0	30	11	227	0	0	0	0	238	0	0	0	0	0	259	1	0	0	0	260	528					
09:00 AM	0	0	3	0	0	3	4	52	0	0	0	0	56	0	0	0	0	0	48	0	0	0	0	48	107					
09:15 AM	0	0	3	0	0	3	2	46	0	0	0	0	48	0	0	0	0	0	67	0	0	0	0	67	118					
09:30 AM	0	0	3	0	0	3	5	50	0	0	0	0	55	0	0	0	0	0	77	1	0	0	0	78	136					
09:45 AM	0	0	5	0	0	5	5	45	0	0	0	0	50	0	0	0	0	0	66	0	0	0	0	66	121					
Total	0	0	14	0	0	14	16	193	0	0	0	0	209	0	0	0	0	0	258	1	0	0	0	259	482					
10:00 AM	1	0	5	0	0	6	2	62	0	0	0	0	64	0	0	0	0	0	61	0	0	0	0	61	131					
10:15 AM	0	0	2	0	0	2	7	50	0	0	0	0	57	0	0	0	0	0	66	0	0	0	0	66	125					
10:30 AM	0	0	2	0	0	2	8	55	0	0	0	0	63	0	0	0	0	0	87	0	0	0	0	87	152					
10:45 AM	0	0	6	0	0	6	6	52	0	0	0	0	58	0	0	0	0	0	49	0	0	0	0	49	113					
Total	1	0	15	0	0	16	23	219	0	0	0	0	242	0	0	0	0	0	263	0	0	0	0	263	521					
11:00 AM	1	0	6	0	0	7	3	56	0	0	0	0	59	0	0	0	0	0	70	1	0	0	0	71	137					
11:15 AM	0	0	5	0	1	6	5	48	0	0	0	0	53	0	0	0	0	0	62	0	0	0	0	62	121					
11:30 AM	0	0	3	0	0	3	2	38	1	0	0	0	41	0	0	0	0	0	58	0	0	0	0	58	102					
11:45 AM	1	0	2	0	0	3	1	45	0	0	0	0	46	0	0	0	0	0	59	0	0	0	0	59	108					
Total	2	0	16	0	1	19	11	187	1	0	0	0	199	0	0	0	0	0	249	0	0	0	0	250	468					



# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : D - TH 14 & CR 72, 10-16-13, 6am-7pm  
Site Code : D  
Start Date : 10/16/2013  
Page No : 2

## Groups Printed- Cars + - Trucks

		CR 72						TH 111						CR 72						TH 111						
		From North			From East			From South			From West			From North			From East			From South			From West			
Start Time	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Int. Total	
12:00 PM	0	0	3	0	0	3	4	69	0	0	0	73	0	0	0	0	0	0	0	0	41	0	0	0	41	117
12:15 PM	0	0	4	0	0	4	2	68	0	0	0	70	0	0	0	0	0	0	0	1	63	0	0	0	64	138
12:30 PM	0	0	6	0	0	6	5	53	0	0	0	58	0	0	0	0	0	0	0	0	75	0	0	0	75	139
12:45 PM	1	0	2	0	0	3	3	51	0	0	0	54	0	0	0	0	0	0	0	0	51	0	0	0	51	108
Total	1	0	15	0	0	16	14	241	0	0	0	255	0	0	0	0	0	0	0	1	230	0	0	0	231	502
01:00 PM	0	0	6	0	0	6	6	77	0	0	0	83	0	0	0	0	0	0	0	0	64	0	0	0	64	153
01:15 PM	0	0	4	0	0	4	6	56	0	0	0	62	0	0	0	0	0	0	0	0	65	1	0	0	66	132
01:30 PM	1	0	5	0	0	6	1	52	0	0	0	53	0	0	0	0	0	0	0	0	68	0	0	0	68	127
01:45 PM	2	0	7	0	0	9	4	73	0	0	0	77	0	0	0	0	0	0	0	0	83	0	0	1	84	170
Total	3	0	22	0	0	25	17	258	0	0	0	275	0	0	0	0	0	0	0	0	280	1	0	1	282	582
02:00 PM	0	0	4	0	0	4	3	62	0	0	0	65	0	0	0	0	0	0	0	0	65	0	0	0	65	134
02:15 PM	0	0	8	0	0	8	5	72	0	0	0	77	0	0	0	0	0	0	0	0	97	0	0	0	97	182
02:30 PM	0	0	6	0	0	6	1	69	0	0	0	70	0	0	0	0	0	0	0	0	68	0	0	0	68	144
02:45 PM	0	0	7	0	0	7	5	63	0	0	0	68	0	0	0	0	0	0	0	0	68	0	0	0	68	143
Total	0	0	25	0	0	25	14	266	0	0	0	280	0	0	0	0	0	0	0	0	298	0	0	0	298	603
03:00 PM	0	0	12	0	0	12	7	85	0	0	0	92	0	0	0	0	0	0	0	0	81	0	0	0	81	185
03:15 PM	0	0	8	0	0	8	5	63	0	0	0	68	0	0	0	0	0	0	0	0	79	0	0	0	79	155
03:30 PM	1	0	4	0	0	5	7	93	0	0	0	100	0	0	0	0	0	0	0	0	91	0	0	0	91	196
03:45 PM	2	0	2	0	0	4	13	116	0	0	0	129	0	0	0	0	0	0	0	0	84	0	0	0	84	217
Total	3	0	26	0	0	29	32	357	0	0	0	389	0	0	0	0	0	0	0	0	335	0	0	0	335	753
04:00 PM	1	0	9	0	0	10	8	86	0	0	0	94	0	0	0	0	0	0	0	0	91	0	0	0	91	195
04:15 PM	1	1	8	0	0	10	10	101	0	0	0	111	2	0	0	0	0	2	0	0	75	0	0	0	75	198
04:30 PM	0	0	6	0	0	6	8	119	1	0	0	128	0	0	0	0	0	0	0	0	71	0	0	0	71	205
04:45 PM	0	0	3	0	0	3	7	102	0	0	0	109	0	1	0	0	0	1	0	0	87	0	0	0	87	200
Total	2	1	26	0	0	29	33	408	1	0	0	442	2	1	0	0	0	3	0	324	0	0	0	0	324	798
05:00 PM	0	2	10	0	0	12	9	111	0	0	0	120	0	0	0	0	0	0	0	0	72	0	0	0	72	204
05:15 PM	0	0	9	0	0	9	9	149	1	0	0	159	0	0	0	0	0	0	0	0	92	1	0	0	93	261
05:30 PM	0	0	11	0	0	11	8	104	0	0	0	112	0	0	0	0	0	0	0	0	80	0	0	0	80	203
05:45 PM	0	0	4	0	0	4	4	106	0	0	0	110	0	0	0	0	0	0	0	0	50	0	0	0	50	164
Total	0	2	34	0	0	36	30	470	1	0	0	501	0	0	0	0	0	0	0	0	294	1	0	0	295	832
06:00 PM	1	0	2	0	0	3	9	86	0	0	0	95	0	1	0	0	0	0	1	0	73	0	0	0	73	172
06:15 PM	1	2	7	0	0	10	4	75	0	0	0	79	0	0	0	0	0	0	0	0	68	0	0	0	68	157
06:30 PM	0	0	1	0	0	1	9	64	0	0	0	73	0	1	0	0	0	1	0	60	0	0	0	60	135	
06:45 PM	0	0	0	0	0	0	8	62	0	0	0	70	0	0	0	0	0	0	0	66	0	0	0	66	136	
Total	2	2	10	0	0	14	30	287	0	0	0	317	0	2	0	0	0	2	0	267	0	0	0	0	267	600
07:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	17	6	294	0	1	318	272	3466	3	0	0	3741	3	4	0	0	0	7	1	3684	10	0	1	3696	7762	
Approch %	5.3	1.9	92.5	0	0.3		7.3	92.6	0.1	0	0		42.9	57.1	0	0	0		0	99.7	0.3	0	0			
Total %	0.2	0.1	3.8	0	0	4.1	3.5	44.7	0	0	0	48.2	0	0.1	0	0	0	0.1	0	47.5	0.1	0	0	47.6		

File Name : D - TH 14 & CR 72, 10-16-13, 6am-7pm  
Site Code : D  
Start Date : 10/16/2013  
Page No : 3

## Groups Printed- Cars + - Trucks

	CR 72						CR 72						TH 111						TH 111					
	From North			From East			From South			From West			From North			From East			From South			From West		
	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total
Cars +	16	5	279	0	1	301	256	2966	3	0	0	3225	2	4	0	0	0	6	1	3101	10	0	1	3113
% Cars +	94.1	83.3	94.9	0	100	94.7	94.1	85.6	100	0	0	86.2	66.7	100	0	0	0	85.7	100	84.2	100	0	100	84.2
Trucks	1	1	15	0	0	17	16	500	0	0	0	516	1	0	0	0	0	1	0	583	0	0	0	583
% Trucks	5.9	16.7	5.1	0	0	5.3	5.9	14.4	0	0	0	13.8	33.3	0	0	0	0	14.3	0	15.8	0	0	0	15.8

	CR 72						TH 111						CR 72						TH 111					
	From North			From East			From South			From West			From North			From East			From South			From West		
	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total	Right	Thru	Left	UTrn	Peds	App. Total
Start Time	07:15 AM	0	0	6	0	6	9	58	0	0	0	67	0	1	0	0	0	1	0	103	0	0	0	103
Peak Hour Analysis From 04:00 AM to 09:45 AM - Peak 1 of 1	0	0	0	0	0	0	8	62	0	0	0	70	0	0	0	0	0	0	0	154	1	0	0	155
Peak Hour for Entire Intersection Begins at 07:15 AM	0	0	18	0	0	18	12	55	0	0	0	67	0	0	0	0	0	0	0	80	1	0	0	81
07:30 AM	0	0	11	0	0	11	7	50	0	0	0	57	0	0	0	0	0	0	0	60	1	0	0	61
07:45 AM	0	0	58	0	0	58	36	225	0	0	0	261	0	1	0	0	0	1	0	397	3	0	0	400
08:00 AM	0	0	100	0	0	100	13.8	86.2	0	0	0	0	0	100	0	0	0	0	0	99.2	0.8	0	0	0
Total Volume	0	0	630	0	0	630	750	907	0	0	0	932	0	250	0	0	0	250	0	644	750	0	0	645
% App. Total	.000	.000	.630	.000	.000	.630	.750	.907	.000	.000	.000	.932	.000	.250	.000	.000	.000	.250	.000	.644	.750	.000	.000	.645
PHF	.000	.000	.786	.000	.000	.694	.708	.838	.000	.000	.000	.828	.000	.000	.000	.000	.000	.000	.000	.843	.250	.000	.250	.839

## Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1

### Peak Hour for Entire Intersection Begins at 01:00 PM

01:00 PM	0	0	6	0	0	6	6	77	0	0	0	83	0	0	0	0	0	0	0	64	0	0	0	64
01:15 PM	0	0	4	0	0	4	6	56	0	0	0	62	0	0	0	0	0	0	0	65	1	0	0	66
01:30 PM	1	0	5	0	0	6	1	52	0	0	0	53	0	0	0	0	0	0	0	68	0	0	0	68
01:45 PM	2	0	7	0	0	9	4	73	0	0	0	77	0	0	0	0	0	0	0	83	0	0	1	84
Total Volume	3	0	22	0	0	25	17	258	0	0	0	275	0	0	0	0	0	0	0	280	1	0	1	282
% App. Total	12	0	88	0	0	0	6.2	93.8	0	0	0	0	0	0	0	0	0	0	0	99.3	0.4	0	0.4	0
PHF	.375	.000	.786	.000	.000	.694	.708	.838	.000	.000	.000	.828	.000	.000	.000	.000	.000	.000	.000	.843	.250	.000	.250	.839

## Peak Hour Analysis From 02:00 PM to 07:45 PM - Peak 1 of 1

### Peak Hour for Entire Intersection Begins at 04:30 PM

04:30 PM	0	0	6	0	0	6	8	119	1	0	0	128	0	0	0	0	0	0	0	71	0	0	0	71
04:45 PM	0	0	3	0	0	3	7	102	0	0	0	109	0	1	0	0	0	1	0	87	0	0	0	87
05:00 PM	0	2	10	0	0	12	9	111	0	0	0	120	0	0	0	0	0	0	0	72	0	0	0	72
05:15 PM	0	0	9	0	0	9	9	149	1	0	0	159	0	0	0	0	0	0	0	92	1	0	0	93
Total Volume	0	2	28	0	0	30	33	481	2	0	0	516	0	1	0	0	0	1	0	322	1	0	0	323
% App. Total	0	6.7	93.3	0	0	0	6.4	93.2	0.4	0	0	0	0	100	0	0	0	0	0	99.7	0.3	0	0	0
PHF	.000	.250	.700	.000	.000	.625	.917	.807	.500	.000	.000	.811	.000	.250	.000	.000	.000	.250	.000	.875	.250	.000	.000	.868





# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : B - TH 99 & TH 111, 10-16-13, 6 am-7pm  
Site Code : B  
Start Date : 10/16/2013  
Page No : 1

TH 99 & TH 111  
Nicollet, MN

## Groups Printed- Cars + - Trucks

Start Time	TH 111 (Main) From North					TH 99 From East					TH 111 (Main) From South					TH 99 From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
	Int.	Total	Int.	Total	Int.	Int.	Total	Int.	Total	Int.	Int.	Total	Int.	Total	Int.	Int.	Total	Int.	Total	Int.
06:00 AM	3	28	3	0	34	2	14	1	0	17	5	12	2	0	19	0	12	0	0	12
06:15 AM	2	22	1	0	25	4	9	1	0	14	4	17	2	0	23	3	19	4	0	26
06:30 AM	1	24	3	0	28	4	13	1	0	18	3	11	0	1	15	0	16	2	0	18
06:45 AM	3	16	4	0	23	2	14	3	0	19	5	17	2	0	24	2	24	4	0	30
Total	9	90	11	0	110	12	50	6	0	68	17	57	6	1	81	5	71	10	0	86
07:00 AM	5	38	7	0	50	4	21	2	0	27	8	22	2	0	32	4	35	3	0	42
07:15 AM	3	26	5	0	34	3	19	8	0	30	9	21	3	0	33	3	25	4	0	32
07:30 AM	5	12	5	0	22	6	15	4	0	25	4	14	4	0	22	1	21	2	0	24
07:45 AM	1	24	2	0	27	1	17	1	0	19	5	19	2	0	26	3	11	2	0	16
Total	14	100	19	0	133	14	72	15	0	101	26	76	11	0	113	11	92	11	0	114
08:00 AM	1	24	4	0	29	6	18	4	0	28	2	19	3	0	24	2	12	3	0	17
08:15 AM	0	14	10	0	24	6	17	3	0	26	3	20	2	0	25	2	15	2	0	19
08:30 AM	1	15	3	0	19	4	13	9	1	27	5	17	5	0	22	5	16	0	1	22
08:45 AM	2	13	2	0	17	4	11	2	0	17	3	12	0	0	15	0	16	3	0	19
Total	4	66	19	0	89	20	59	18	1	98	13	68	10	0	91	9	59	8	1	77
09:00 AM	4	22	4	0	30	2	17	2	0	21	1	12	1	0	14	5	11	2	0	18
09:15 AM	1	25	7	0	33	4	17	1	0	22	1	15	1	0	17	1	15	6	0	22
09:30 AM	2	23	1	0	26	4	19	1	0	24	6	24	3	0	33	1	7	1	1	10
09:45 AM	3	14	5	0	22	6	13	3	0	22	4	19	2	0	25	2	14	1	0	17
Total	10	84	17	0	111	16	66	7	0	89	12	70	7	0	89	9	47	10	1	67
10:00 AM	2	22	1	0	25	7	14	3	0	24	3	17	5	0	25	4	11	2	0	17
10:15 AM	4	11	4	0	19	1	15	2	0	18	3	14	2	0	19	1	11	3	0	15
10:30 AM	0	16	6	1	23	4	16	2	1	23	2	20	0	0	22	1	10	3	0	14
10:45 AM	2	23	6	0	31	6	17	4	0	27	1	14	2	0	17	1	12	3	0	16
Total	8	72	17	1	98	18	62	11	1	92	9	65	9	0	83	7	44	11	0	62
11:00 AM	1	19	5	0	25	2	19	0	0	21	2	14	1	0	17	0	17	5	0	22
11:15 AM	2	13	6	0	21	7	17	2	0	26	6	22	3	0	31	0	17	3	2	22
11:30 AM	1	15	5	0	21	3	17	4	0	24	3	22	5	0	30	5	20	1	0	26
11:45 AM	3	17	3	0	23	6	15	1	2	24	3	21	2	0	26	2	18	2	0	22
Total	7	64	19	0	90	18	68	7	2	95	14	79	11	0	104	7	72	11	2	92
12:00 PM	4	22	4	0	30	6	16	4	0	26	3	15	0	2	20	2	10	3	2	17
12:15 PM	6	21	5	0	32	3	21	4	0	28	2	15	4	0	21	1	15	2	0	18
12:30 PM	2	18	5	0	25	4	18	7	0	29	3	21	3	0	27	4	22	0	0	26



# Traffic Data Inc

PO Box 16296  
St. Louis Park, MN

File Name : B - TH 99 & TH 111, 10-16-13, 6 am-7pm  
Site Code : B  
Start Date : 10/16/2013  
Page No : 2

## Groups Printed- Cars + - Trucks

	TH 111 (Main)										TH 99										TH 111 (Main)										TH 99										
	From North					From East					From South					From West						From North					From East					From South					From West				
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total															
12:45 PM	1	13	2	0	16	8	20	2	0	30	7	22	0	0	29	3	17	1	1	22	3	17	1	1	22	97															
Total	13	74	16	0	103	21	75	17	0	113	15	73	7	2	97	10	64	6	3	83						396															
01:00 PM	4	20	5	0	29	1	22	2	2	27	2	24	0	2	28	1	24	3	1	29						113															
01:15 PM	5	25	5	0	35	6	14	1	1	22	4	14	5	2	25	0	18	4	0	22						104															
01:30 PM	2	24	8	0	34	10	18	3	0	31	4	23	0	0	27	2	17	4	0	23						115															
01:45 PM	3	20	5	0	28	5	20	4	0	29	3	21	3	1	28	2	19	5	0	26						111															
Total	14	89	23	0	126	22	74	10	3	109	13	82	8	5	108	5	78	16	1	100						443															
02:00 PM	3	11	4	0	18	7	21	4	0	32	5	16	3	0	24	4	17	3	0	24						98															
02:15 PM	1	18	3	0	22	5	18	3	0	26	5	17	4	0	26	4	16	1	0	21						95															
02:30 PM	7	15	6	0	28	3	18	3	0	24	4	15	2	0	21	3	13	1	3	20						93															
02:45 PM	5	14	4	1	24	3	23	7	0	33	6	18	2	1	27	6	23	4	0	33						117															
Total	16	58	17	1	92	18	80	17	0	115	20	66	11	1	98	17	69	9	3	98						403															
03:00 PM	1	17	4	1	23	5	20	3	0	28	7	24	2	1	34	6	27	1	0	34						119															
03:15 PM	0	17	5	0	22	2	24	6	0	32	3	30	1	0	34	5	20	2	0	27						115															
03:30 PM	2	23	5	0	30	2	24	5	1	32	2	20	3	0	25	3	21	1	0	25						112															
03:45 PM	4	16	5	0	25	9	33	3	0	45	1	32	4	4	41	3	18	1	0	22						133															
Total	7	73	19	1	100	18	101	17	1	137	13	106	10	5	134	17	86	5	0	108						479															
04:00 PM	2	20	5	0	27	10	22	5	0	37	9	35	2	0	46	9	22	5	0	36						146															
04:15 PM	4	18	7	0	29	8	26	5	0	39	6	28	3	0	37	3	20	2	0	25						130															
04:30 PM	2	22	9	0	33	5	29	8	0	42	3	28	7	0	38	8	18	5	0	31						144															
04:45 PM	1	26	9	0	36	9	16	5	0	30	6	35	5	1	47	6	21	2	0	29						142															
Total	9	86	30	0	125	32	93	23	0	148	24	126	17	1	168	26	81	14	0	121						562															
05:00 PM	0	19	7	0	26	5	34	7	0	46	9	31	6	0	46	3	14	4	0	21						139															
05:15 PM	1	26	7	0	34	6	13	4	2	25	6	31	7	0	44	3	17	0	0	20						123															
05:30 PM	5	18	3	0	26	2	19	6	0	27	4	21	2	0	27	5	20	1	0	26						106															
05:45 PM	2	17	3	0	22	8	15	7	0	30	5	22	5	0	32	1	12	5	0	18						102															
Total	8	80	20	0	108	21	81	24	2	128	24	105	20	0	149	12	63	10	0	85						470															
06:00 PM	3	17	1	0	21	0	17	6	0	23	4	27	0	3	34	4	22	6	0	32						110															
06:15 PM	1	19	3	0	23	6	13	1	0	20	6	23	2	0	31	0	10	2	0	12						86															
06:30 PM	3	10	2	0	15	5	18	5	0	28	4	8	5	0	17	2	13	1	0	16						76															
06:45 PM	2	8	2	0	12	3	22	1	0	26	0	17	0	0	17	2	16	1	0	19						74															
Total	9	54	8	0	71	14	70	13	0	97	14	75	7	3	99	8	61	10	0	79						346															
Grand Total	128	990	235	3	1356	244	951	185	10	1390	214	1048	134	18	1414	143	887	131	11	1172						5332															
Approch %	9.4	73	17.3	0.2		17.6	68.4	13.3	0.7		15.1	74.1	9.5	1.3		12.2	75.7	11.2	0.9																						
Total %	2.4	18.6	4.4	0.1	25.4	4.6	17.8	3.5	0.2	26.1	4	19.7	2.5	0.3	26.5	2.7	16.6	2.5	0.2	22																					
Cars +	114	693	228	3	1038	230	832	175	9	1246	204	752	112	18	1086	108	774	108	11	1001						4371															
% Cars +	89.1	70	97	100	76.5	94.3	87.5	94.6	90	89.6	95.3	71.8	83.6	100	76.8	75.5	87.3	82.4	100	85.4						82															

File Name : B - TH 99 & TH 111, 10-16-13, 6 am-7pm  
Site Code : B  
Start Date : 10/16/2013  
Page No : 3

Groups Printed- Cars + - Trucks																							
TH 111 (Main)						TH 99						TH 111 (Main)						TH 99					
From North						From East						From South						From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total		
Trucks	14	297	7	0	318	14	119	10	1	144	10	296	22	0	328	35	113	23	0	171	961		
% Trucks	10.9	30	3	0	23.5	5.7	12.5	5.4	10	10.4	4.7	28.2	16.4	0	23.2	24.5	12.7	17.6	0	14.6	18		
TH 111 (Main)						TH 99						TH 111 (Main)						TH 99					
From North						From East						From South						From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total		
Peak Hour Analysis From 04:00 AM to 09:45 AM - Peak 1 of 1																							
Peak Hour for Entire Intersection Begins at 06:45 AM																							
06:45 AM	3	16	4	0	23	2	14	3	0	19	5	17	2	0	24	2	24	4	0	30	96		
07:00 AM	5	38	7	0	50	4	21	2	0	27	8	22	2	0	32	4	35	3	0	42	151		
07:15 AM	3	26	5	0	34	3	19	8	0	30	9	21	3	0	33	3	25	4	0	32	129		
07:30 AM	5	12	5	0	22	6	15	4	0	25	4	14	4	0	22	1	21	2	0	24	93		
Total Volume	16	92	21	0	129	15	69	17	0	101	26	74	11	0	111	10	105	13	0	128	469		
% App. Total	12.4	71.3	16.3	0		14.9	68.3	16.8	0		23.4	66.7	9.9	0		7.8	82	10.2	0				
PHF	.800	.605	.750	.000	.645	.625	.821	.531	.000	.842	.722	.841	.688	.000	.841	.625	.750	.813	.000	.762	.776		
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																							
Peak Hour for Entire Intersection Begins at 01:00 PM																							
01:00 PM	4	20	5	0	29	1	22	2	2	27	2	24	0	2	28	1	24	3	1	29	113		
01:15 PM	5	25	5	0	35	6	14	1	1	22	4	14	5	2	25	0	18	4	0	22	104		
01:30 PM	2	24	8	0	34	10	18	3	0	31	4	23	0	0	27	2	17	4	0	23	115		
01:45 PM	3	20	5	0	28	5	20	4	0	29	3	21	3	1	28	2	19	5	0	26	111		
Total Volume	14	89	23	0	126	22	74	10	3	109	13	82	8	5	108	5	78	16	1	100	443		
% App. Total	11.1	70.6	18.3	0		20.2	67.9	9.2	2.8		12	75.9	7.4	4.6		5	78	16	1				
PHF	.700	.890	.719	.000	.900	.550	.841	.625	.375	.879	.813	.854	.400	.625	.964	.625	.813	.800	.250	.862	.963		
Peak Hour Analysis From 02:00 PM to 08:00 PM - Peak 1 of 1																							
Peak Hour for Entire Intersection Begins at 04:00 PM																							
04:00 PM	2	20	5	0	27	10	22	5	0	37	9	35	2	0	46	9	22	5	0	36	146		
04:15 PM	4	18	7	0	29	8	26	5	0	39	6	28	3	0	37	3	20	2	0	25	130		
04:30 PM	2	22	9	0	33	5	29	8	0	42	3	28	7	0	38	8	18	5	0	31	144		
04:45 PM	1	26	9	0	36	9	16	5	0	30	6	35	5	1	47	6	21	2	0	29	142		
Total Volume	9	86	30	0	125	32	93	23	0	148	24	126	17	1	168	26	81	14	0	121	562		
% App. Total	7.2	68.8	24	0		21.6	62.8	15.5	0		14.3	75	10.1	0.6		21.5	66.9	11.6	0				
PHF	.563	.827	.833	.000	.868	.800	.802	.719	.000	.88	.667	.900	.607	.250	.894	.722	.920	.700	.000	.840	.962		

## **Crash Data**





# Crash Detail Report

TH 14 and Hwy 111

Report Version 1.0 March 2010

Crash ID: 080880237

Date: 03/26/2008

Time: 1430

Sys: 02-US

County: NICOLLET

City: NICOLLET

Route: 00000014

118+00.515

Severity: PROPERTY DAMAGE

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: STRAIGHT AND LEVEL

Crash Type: COLL W/MV IN TRANSPORT

Surf Cond: DRY

Light Cond: DAYLIGHT

Weather 1: CLEAR

Weather 2: NOT SPECIFIED

First Event: ON ROADWAY

To Junction: 4-LEGGED INTERSECTION

Traffic Device: NOT APPLICABLE

Speed Limit: 50

Diagram: REAR END

Officer:

Reliability: CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

W

Veh Act:

RIGHT TURN

Veh Type:

SPORT UTILITY VEHICLE

Age:

33

Gender:

F

Cond:

NORMAL

Cont Fact

NO IMPROPER DRIVING

Cont Fact

NOT SPECIFIED

## Unit 2

W

STRAIGHT AHEAD

PASSENGER CAR

23

M

NORMAL

DISTRACTION

NOT SPECIFIED

## Unit 3

Crash ID: 082390168

Date: 08/25/2008

Time: 1443

Sys: 02-US

County: NICOLLET

City: NICOLLET

Route: 00000014

118+00.609

Severity: PROPERTY DAMAGE

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: STRAIGHT AND GRADE

Crash Type: COLL W/MV IN TRANSPORT

Surf Cond: DEBRIS

Light Cond: DAYLIGHT

Weather 1: CLEAR

Weather 2: CLEAR

First Event: ON ROADWAY

To Junction: NON-JUNCTION

Traffic Device: OTHER

Speed Limit: 50

Diagram: REAR END

Officer:

Reliability: LESS CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

EAST

Veh Act:

STRAIGHT AHEAD

Veh Type:

PASSENGER CAR

Age:

17

Gender:

M

Cond:

NORMAL

Cont Fact

IMPROPER LANE

Cont Fact

IMPROPERLY PARKED

## Unit 2

E

BIKE SLOWING/STOPPING/START

PASSENGER CAR

23

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

## Unit 3

**Crash ID:** 091520248**Date:** 05/12/2009**Time:** 1738**Sys:** 02-US**County:** NICOLLET**City:** NICOLLET**Route:** 00000014

118+00.515

**Severity:** NON-INCAPACITATING INJURY**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLOUDY**Weather 2:** SEVERE CROSS WINDS**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 55**Diagram:** LEFT TURN INTO TRAFFIC**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

LEFT TURN

**Veh Type:**

PICKUP TRUCK

**Age:**

25

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

FAIL TO YIELD ROW

**Cont Fact**

NOT SPECIFIED

**Unit 2**

W

STRAIGHT AHEAD

SPORT UTILITY VEHICLE

23

F

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3****Crash ID:** 102500189**Date:** 08/31/2010**Time:** 1723**Sys:** 03-MN**County:** NICOLLET**City:** NICOLLET**Route:** 00000111

000+00.001

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLOUDY**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** REAR END**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

SPORT UTILITY VEHICLE

**Age:**

31

**Gender:**

F

**Cond:**

NORMAL

**Cont Fact**

DISTRACTION

**Cont Fact**

NOT SPECIFIED

**Unit 2**

S

STOPPED TRAFFIC

PASSENGER CAR

47

F

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3**

**Crash ID:** 110040451**Date:** 01/03/2011**Time:** 1113**Sys:** 02-US**County:** NICOLLET**City:** NICOLLET**Route:** 00000014

118+00.515

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/SIGN POLE**Surf Cond:** WET**Light Cond:** DAYLIGHT**Weather 1:** SNOW**Weather 2:** NOT SPECIFIED**First Event:** OFF ROADWAY ON ROADSIDE**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 50**Diagram:** NOT APPLICABLE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

W

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

VAN OR MINIVAN

**Age:**

29

**Gender:**

F

**Cond:**

PHYSICAL DISABILITY

**Cont Fact**

OTHER HUMAN FACTOR

**Cont Fact**

NOT SPECIFIED

**Unit 2****Unit 3****Crash ID:** 110780094**Date:** 03/15/2011**Time:** 1900**Sys:** 02-US**County:** NICOLLET**City:** NICOLLET**Route:** 00000014

118+00.515

**Severity:** POSSIBLE INJURY**Road Type:** FREEWAY MAINLINE**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 50**Diagram:** OTHER**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

PED. CROSSING WITH SIGNAL

**Veh Type:**

PASSENGER CAR

**Age:**

16

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

FAIL TO YIELD ROW

**Cont Fact**

VISION OBSCURED - SUN OR H

**Unit 2****Unit 3**

E

STRAIGHT AHEAD

2-AXLE TRUCK/SETP VAN

20

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED



**Crash ID:** 112380249**Date:** 08/22/2011**Time:** 1338**Sys:** 02-US**County:** NICOLLET**City:** NICOLLET**Route:** 00000014

118+00.515

**Severity:** FATAL**Road Type:** OTHER**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 50**Diagram:** RIGHT ANGLE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:** MC**Veh Act:** UNKNOWN**Veh Type:** PASSENGER CAR**Age:** 85**Gender:** F**Cond:** UNKNOWN**Cont Fact** FAIL TO YIELD ROW**Cont Fact** NOT SPECIFIED**Unit 2**

E

STRAIGHT AHEAD

TRUCK W/ SEMI TRAILER

68

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3****Selection Filter:**

WORK AREA: COUNTY\_CODE('52') - FILTER: CRASH\_YEAR('2008','2009','2010','2011','2012') - SPATIAL FILTER APPLIED

**Analyst:**

Bryan Benjamin

**Notes:**



# Crash Detail Report

Hwy 99 and old TH 14

Report Version 1.0 March 2010

Crash ID: 081550244

Date: 05/29/2008

Time: 2345

Sys: 03-MN

County: NICOLLET

City:

Route: 00000099

000+00.018

Severity: NON-INCAPACITATING INJURY

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: CURVE AND LEVEL

Crash Type: COLL W/BANK/DITCH/CURB

Surf Cond: WET

Light Cond: DARK - NO STREET LIGHTS

Weather 1: CLOUDY

Weather 2: NOT SPECIFIED

First Event: OFF ROADWAY ON ROADSIDE

To Junction: T-INTERSECTION

Traffic Device: STOP SIGN OTHER

Speed Limit: 30

Diagram: RAN OFF ROAD - RIGHT SIDE

Officer:

Reliability: LESS CONFIDENT

# of Vehicles: 1.00

## Unit 1

Trav Dir:

S

Veh Act:

STRAIGHT AHEAD

Veh Type:

PICKUP TRUCK

Age:

45

Gender:

M

Cond:

UNDER THE INFLUENCE

Cont Fact

CHEMICAL IMPAIRMENT

Cont Fact

DISREGARD TRAFFIC DEVICE

## Unit 2

## Unit 3

Crash ID: 082340236

Date: 08/17/2008

Time: 0724

Sys: 02-US

County: NICOLLET

City:

Route: 00000014

117+00.958

Severity: PROPERTY DAMAGE

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: STRAIGHT AND LEVEL

Crash Type: COLL W/MV IN TRANSPORT

Surf Cond: DRY

Light Cond: DAYLIGHT

Weather 1: CLEAR

Weather 2: NOT SPECIFIED

First Event: ON ROADWAY

To Junction: NON-JUNCTION

Traffic Device: NOT APPLICABLE

Speed Limit: 55

Diagram: REAR END

Officer:

Reliability: BEST GUESS

# of Vehicles: 2.00

## Unit 1

Trav Dir:

EAST

Veh Act:

STRAIGHT AHEAD

Veh Type:

PASSENGER CAR

Age:

66

Gender:

M

Cond:

NORMAL

Cont Fact

NO IMPROPER DRIVING

Cont Fact

NOT SPECIFIED

## Unit 2

## Unit 3

E

STRAIGHT AHEAD

PASSENGER CAR

17

M

SLEEPING

FOLLOWING TOO CLOSELY

OTHER HUMAN FACTOR

**Crash ID:** 082800193**Date:** 07/25/2008**Time:** 2242**Sys:** 03-MN**County:** NICOLLET**City:****Route:** 00000099

000+00.034

**Severity:** POSSIBLE INJURY**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** OTHER**Surf Cond:** DRY**Light Cond:** DARK - NO STREET LIGHTS**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** OFF ROADWAY ON ROADSIDE**To Junction:** T-INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

W

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

MOTORCYCLE

**Age:**

32

**Gender:**

M

**Cond:**

UNDER THE INFLUENCE

**Cont Fact**

CHEMICAL IMPAIRMENT

**Cont Fact**

ILLEGAL SPEED

**Unit 2****Unit 3****Crash ID:** 090070530**Date:** 12/22/2008**Time:** 1026**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE**Road Type:** 3 LANES UNDIVIDED**Road Char:** CURVE AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** SNOW**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** Y-INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 55**Diagram:** SIDESWIPE PASSING**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

EAST

**Veh Act:**

LEFT TURN

**Veh Type:**

PASSENGER CAR

**Age:**

20

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

ILLEGAL SPEED

**Cont Fact**

SKIDDING

**Unit 2****Unit 3**

E

STRAIGHT AHEAD

TRUCK WITH 1 TRAILER

52

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED



**Crash ID:** 091090125**Date:** 02/26/2009**Time:** 2015**Sys:** 03-MN**County:** NICOLLET**City:****Route:** 00000099

000+00.028

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** COLL W/TREE OR SHRUB**Surf Cond:** ICE/PACKED SNOW**Light Cond:** DARK - NO STREET LIGHTS**Weather 1:** CLOUDY**Weather 2:** SNOW**First Event:** OFF ROADWAY ON ROADSIDE**To Junction:** NON-JUNCTION**Traffic Device:** NOT APPLICABLE**Speed Limit:** 30**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

W

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

46

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

ILLEGAL SPEED

**Cont Fact**

WEATHER

**Unit 2****Unit 3****Crash ID:** 091270266**Date:** 05/07/2009**Time:** 2130**Sys:** 03-MN**County:** NICOLLET**City:****Route:** 00000099

000+00.000

**Severity:** NON-INCAPACITATING INJURY**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** COLL W/LIGHT POLE**Surf Cond:** DRY**Light Cond:** SUNSET**Weather 1:** CLEAR**Weather 2:** CLEAR**First Event:** OFF ROADWAY ON SHOULDER**To Junction:** T-INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 35**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

SW

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

69

**Gender:**

F

**Cond:**

NORMAL

**Cont Fact**

ILLEGAL SPEED

**Cont Fact**

IMPROPER LANE

**Unit 2****Unit 3**

**Crash ID:** 100550145**Date:** 02/23/2010**Time:** 1600**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** OVERTURN / ROLLOVER**Surf Cond:** ICE/PACKED SNOW**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** OFF ROADWAY ON SHOULDER**To Junction:** NON-JUNCTION**Traffic Device:** NOT APPLICABLE**Speed Limit:** 50**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** LESS CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:** EAST**Veh Act:** STRAIGHT AHEAD**Veh Type:** PICKUP TRUCK**Age:** 23**Gender:** M**Cond:** NORMAL**Cont Fact** ILLEGAL SPEED**Cont Fact** NOT SPECIFIED**Unit 2****Unit 3****Crash ID:** 100610095**Date:** 01/25/2010**Time:** 2300**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE**Road Type:** NOT SPECIFIED**Road Char:** NOT SPECIFIED**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** SNOW**Light Cond:** DAYLIGHT**Weather 1:** BLOWING SAND/DUST/SNOW**Weather 2:** NOT SPECIFIED**First Event:** NOT SPECIFIED**To Junction:** NOT SPECIFIED**Traffic Device:** NOT APPLICABLE**Speed Limit:** 55**Diagram:** REAR END**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:** W**Veh Act:** AVID UNIT/OBJECT IN ROAD**Veh Type:** PASSENGER CAR**Age:** 28**Gender:** M**Cond:** NOT SPECIFIED**Cont Fact** NOT SPECIFIED**Cont Fact** NOT SPECIFIED**Unit 2****Unit 3**

W

00

VAN OR MINIVAN

66

M

NOT SPECIFIED

NOT SPECIFIED

NOT SPECIFIED

**Crash ID:** 100610245  
**County:** NICOLLET

**Date:** 02/27/2010  
**City:**

**Time:** 0058

**Sys:** 02-US  
**Route:** 00000014

117+00.958

**Severity:** FATAL  
**Road Type:** 2 LANES UNDIV 2\_WAY  
**Road Char:** CURVE AND GRADE  
**Crash Type:** COLL W/MV IN TRANSPORT  
**Surf Cond:** DRY  
**Light Cond:** DARK - STREET LIGHTS ON  
**Weather 1:** CLEAR  
**Weather 2:** NOT SPECIFIED

**First Event:** ON ROADWAY  
**To Junction:** 4-LEGGED INTERSECTION  
**Traffic Device:** STOP SIGN OTHER  
**Speed Limit:** 55  
**Diagram:** RIGHT ANGLE  
**Officer:**  
**Reliability:** CONFIDENT  
**# of Vehicles:** 2.00

	Unit 1
<b>Trav Dir:</b>	S
<b>Veh Act:</b>	RIGHT TURN
<b>Veh Type:</b>	PASSENGER CAR
<b>Age:</b>	28
<b>Gender:</b>	M
<b>Cond:</b>	HAD BEEN DRINKING
<b>Cont Fact</b>	CHEMICAL IMPAIRMENT
<b>Cont Fact</b>	ILLEGAL SPEED

	Unit 2
<b>Trav Dir:</b>	W
<b>Veh Act:</b>	STRAIGHT AHEAD
<b>Veh Type:</b>	2-AXLE TRUCK/SETP VAN
<b>Age:</b>	24
<b>Gender:</b>	M
<b>Cond:</b>	NORMAL
<b>Cont Fact</b>	NO IMPROPER DRIVING
<b>Cont Fact</b>	NOT SPECIFIED

Unit 3
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**Crash ID:** 102080220  
**County:** NICOLLET

**Date:** 06/26/2010  
**City:**

**Time:** 1559

**Sys:** 02-US  
**Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE  
**Road Type:** OTHER  
**Road Char:** CURVE AND LEVEL  
**Crash Type:** COLL W/SIGN POLE  
**Surf Cond:** DRY  
**Light Cond:** DAYLIGHT  
**Weather 1:** CLEAR  
**Weather 2:** NOT SPECIFIED

**First Event:** ON ROADWAY  
**To Junction:** INTERSECTION-RELATED  
**Traffic Device:** STOP SIGN OTHER  
**Speed Limit:** 30  
**Diagram:** OTHER  
**Officer:**  
**Reliability:** CONFIDENT  
**# of Vehicles:** 1.00

	Unit 1
<b>Trav Dir:</b>	W
<b>Veh Act:</b>	STRAIGHT AHEAD
<b>Veh Type:</b>	PASSENGER CAR
<b>Age:</b>	83
<b>Gender:</b>	F
<b>Cond:</b>	NORMAL
<b>Cont Fact</b>	DISTRACTION
<b>Cont Fact</b>	OTHER HUMAN FACTOR

Unit 2
--------

Unit 3
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**Crash ID:** 103570329**Date:** 12/18/2010**Time:** 1530**Sys:** 03-MN**County:** NICOLLET**City:****Route:** 00000099

000+00.007

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** ICE/PAKED SNOW**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** INTERSECTION-RELATED**Traffic Device:** STOP SIGN 4-WAY**Speed Limit:** 30**Diagram:** REAR END**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:** EAST**Veh Act:** STRAIGHT AHEAD**Veh Type:** PICKUP TRUCK**Age:** 49**Gender:** M**Cond:** UNDER THE INFLUENCE**Cont Fact** SKIDDING**Cont Fact** CHEMICAL IMPAIRMENT**Unit 2****Trav Dir:** E**Veh Act:** STOPPED TRAFFIC**Veh Type:** PICKUP TRUCK**Age:** 33**Gender:** M**Cond:** NORMAL**Cont Fact** NO IMPROPER DRIVING**Cont Fact** NOT SPECIFIED**Unit 3****Crash ID:** 120470174**Date:** 02/15/2012**Time:** 0602**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** NON-INCAPACITATING INJURY**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** OVERTURN / ROLLOVER**Surf Cond:** DRY**Light Cond:** DARK - NO STREET LIGHTS**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** NO PASSING ZONE**Speed Limit:** 30**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:** W**Veh Act:** STRAIGHT AHEAD**Veh Type:** TRUCK W/ SEMI TRAILER**Age:** 32**Gender:** M**Cond:** NORMAL**Cont Fact** ILLEGAL SPEED**Cont Fact** NOT SPECIFIED**Unit 2****Unit 3**

**Crash ID:** 121110164**Date:** 04/14/2012**Time:** 2317**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** CURVE AND LEVEL**Crash Type:** COLL W/LIGHT POLE**Surf Cond:** WET**Light Cond:** DARK - STREET LIGHTS ON**Weather 1:** CLOUDY**Weather 2:** RAIN**First Event:** OFF ROADWAY ON ROADSIDE**To Junction:** T-INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 35**Diagram:** RAN OFF ROAD - RIGHT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

SW

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

18

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

ILLEGAL SPEED

**Cont Fact**

DISTRACTION

**Unit 2****Unit 3****Crash ID:** 122700198**Date:** 09/21/2012**Time:** 2350**Sys:** 02-US**County:** NICOLLET**City:****Route:** 00000014

117+00.958

**Severity:** PROPERTY DAMAGE**Road Type:** OTHER DIVIDED HIGHWAY**Road Char:** CURVE AND LEVEL**Crash Type:** COLL W/SIGN POLE**Surf Cond:** DRY**Light Cond:** DARK - STREET LIGHTS ON**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** T-INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** RAN OFF ROAD - LEFT SIDE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 1.00**Unit 1****Trav Dir:**

SW

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

28

**Gender:**

F

**Cond:**

NORMAL

**Cont Fact**

DISTRACTION

**Cont Fact**

ILLEGAL SPEED

**Unit 2****Unit 3**

**Selection Filter:**

WORK AREA: COUNTY\_CODE('52') - FILTER: CRASH\_YEAR('2008','2009','2010','2011','2012') - SPATIAL FILTER APPLIED

**Analyst:**

Bryan Benjamin

**Notes:**





# Crash Detail Report

TH 14 and Birch Street

Report Version 1.0 March 2010

Crash ID: 090050313

Date: 10/19/2008

Time: 2015

Sys: 02-US

County: NICOLLET

City:

Route: 00000014

119+00.092

Severity: NON-INCAPACITATING INJURY

Road Type: NOT SPECIFIED

Road Char: NOT SPECIFIED

Crash Type: COLL W/MV IN TRANSPORT

Surf Cond: DRY

Light Cond: DARK - UNKNOWN LIGHTING

Weather 1: CLEAR

Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED

To Junction: NOT SPECIFIED

Traffic Device: STOP SIGN OTHER

Speed Limit: 55

Diagram: RIGHT ANGLE

Officer:

Reliability: CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

W

Veh Act:

STRAIGHT AHEAD

Veh Type:

PASSENGER CAR

Age:

19

Gender:

F

Cond:

NOT SPECIFIED

Cont Fact

NOT SPECIFIED

Cont Fact

NOT SPECIFIED

## Unit 2

S

STRAIGHT AHEAD

PICKUP TRUCK

39

M

NOT SPECIFIED

NOT SPECIFIED

NOT SPECIFIED

## Unit 3

Crash ID: 110550438

Date: 02/22/2011

Time: 0931

Sys: 02-US

County: NICOLLET

City:

Route: 00000014

119+00.132

Severity: POSSIBLE INJURY

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: STRAIGHT AND LEVEL

Crash Type: COLL W/PARKED MV

Surf Cond: ICE/PACKED SNOW

Light Cond: DAYLIGHT

Weather 1: FOG/SMOG/SMOKE

Weather 2: CLOUDY

First Event: OFF ROADWAY ON SHOULDER

To Junction: NON-JUNCTION

Traffic Device: NOT APPLICABLE

Speed Limit: 55

Diagram: SIDESWIPE PASSING

Officer:

Reliability: CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

EAST

Veh Act:

STRAIGHT AHEAD

Veh Type:

TRUCK W/ DOUBLE TRAILER

Age:

28

Gender:

M

Cond:

NORMAL

Cont Fact

IMPROPER LANE

Cont Fact

OTHER

## Unit 2

E

OTHER

PASSENGER CAR

25

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

## Unit 3

**Selection Filter:**

WORK AREA: COUNTY\_CODE('52') - FILTER: CRASH\_YEAR('2008','2009','2010','2011','2012') - SPATIAL FILTER APPLIED

**Analyst:**

Bryan Benjamin

**Notes:**



# Crash Detail Report

TH 1444 and 14th Reppe

o p r t y e l p s i t n 14.01 Maych 12040

Crash ID: 090070529

Date: 12/21/2008

Time: 1039

Sys: 03-MN

County: NICOLLET

City: NICOLLET

Route: 00000099

000+00.520

Severity: PROPERTY DAMAGE

Road Type: 5 LANES UNDIVIDED

Road Char: STRAIGHT AND LEVEL

Crash Type: COLL W/MV IN TRANSPORT

Surf Cond: SNOW

Light Cond: DAYLIGHT

Weather 1: CLOUDY

Weather 2: NOT SPECIFIED

First Event: ON ROADWAY

To Junction: 4-LEGGED INTERSECTION

Traffic Device: STOP SIGN OTHER

Speed Limit: 30

Diagram: RIGHT ANGLE

Officer:

Reliability: CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

S

Veh Act:

START TRAFFIC

Veh Type:

PICKUP TRUCK

Age:

20

Gender:

M

Cond:

NORMAL

Cont Fact

FAIL TO YIELD ROW

Cont Fact

SKIDDING

## Unit 2

E

STRAIGHT AHEAD

SPORT UTILITY VEHICLE

17

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

## Unit 3

Crash ID: 090840319

Date: 03/24/2009

Time: 0022

Sys: 03-MN

County: NICOLLET

City: NICOLLET

Route: 00000099

000+00.520

Severity: PROPERTY DAMAGE

Road Type: 2 LANES UNDIV 2\_WAY

Road Char: STRAIGHT AND LEVEL

Crash Type: COLL W/PARKED MV

Surf Cond: WET

Light Cond: DARK - STREET LIGHTS ON

Weather 1: CLOUDY

Weather 2: NOT SPECIFIED

First Event: OFF ROADWAY ON SHOULDER

To Junction: 4-LEGGED INTERSECTION

Traffic Device: NOT APPLICABLE

Speed Limit: 35

Diagram: REAR END

Officer:

Reliability: CONFIDENT

# of Vehicles: 2.00

## Unit 1

Trav Dir:

W

Veh Act:

OTHER

Veh Type:

PASSENGER CAR

Age:

37

Gender:

M

Cond:

UNDER THE INFLUENCE

Cont Fact

CHEMICAL IMPAIRMENT

Cont Fact

NOT SPECIFIED

## Unit 2

## Unit 3



**Crash ID:** 100080397**Date:** 01/04/2010**Time:** 1600**Sys:** 03-MN**County:** NICOLLET**City:** NICOLLET**Route:** 00000111

000+00.329

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** RIGHT ANGLE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

63

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

FAIL TO YIELD ROW

**Cont Fact**

NOT SPECIFIED

**Unit 2**

E

STRAIGHT AHEAD

PASSENGER CAR

27

F

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3****Crash ID:** 103070275**Date:** 10/31/2010**Time:** 0853**Sys:** 03-MN**County:** NICOLLET**City:** NICOLLET**Route:** 00000111

000+00.407

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** LEFT TURN INTO TRAFFIC**Officer:****Reliability:** LESS CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

W

**Veh Act:**

LEFT TURN

**Veh Type:**

PASSENGER CAR

**Age:**

22

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

FAIL TO YIELD ROW

**Cont Fact**

NOT SPECIFIED

**Unit 2**

S

STRAIGHT AHEAD

PASSENGER CAR

55

F

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3**

**Crash ID:** 113470185  
**County:** NICOLLET

**Date:** 12/10/2011  
**City:** NICOLLET

**Time:** 1741

**Sys:** 03-MN  
**Route:** 00000099

000+00.520

**Severity:** NON-INCAPACITATING INJURY  
**Road Type:** 2 LANES UNDIV 2\_WAY  
**Road Char:** STRAIGHT AND LEVEL  
**Crash Type:** COLL W/MV IN TRANSPORT  
**Surf Cond:** DRY  
**Light Cond:** DARK - STREET LIGHTS ON  
**Weather 1:** CLEAR  
**Weather 2:** NOT SPECIFIED

**First Event:** ON ROADWAY  
**To Junction:** 4-LEGGED INTERSECTION  
**Traffic Device:** STOP SIGN OTHER  
**Speed Limit:** 30  
**Diagram:** RIGHT ANGLE  
**Officer:**  
**Reliability:** CONFIDENT  
**# of Vehicles:** 2.00

**Unit 1**

**Trav Dir:** N  
**Veh Act:** STRAIGHT AHEAD  
**Veh Type:** PASSENGER CAR  
**Age:** 49  
**Gender:** F  
**Cond:** NORMAL  
**Cont Fact** FAIL TO YIELD ROW  
**Cont Fact** NOT SPECIFIED

**Unit 2**

W  
STRAIGHT AHEAD  
PASSENGER CAR  
29  
F  
NORMAL  
NO IMPROPER DRIVING  
NOT SPECIFIED

**Unit 3**

**Crash ID:** 120670088  
**County:** NICOLLET

**Date:** 03/04/2012  
**City:** NICOLLET

**Time:** 1401

**Sys:** 03-MN  
**Route:** 00000111

000+00.331

**Severity:** POSSIBLE INJURY  
**Road Type:** 2 LANES UNDIV 2\_WAY  
**Road Char:** STRAIGHT AND LEVEL  
**Crash Type:** COLL W/MV IN TRANSPORT  
**Surf Cond:** SNOW  
**Light Cond:** DAYLIGHT  
**Weather 1:** SNOW  
**Weather 2:** NOT SPECIFIED

**First Event:** ON ROADWAY  
**To Junction:** 4-LEGGED INTERSECTION  
**Traffic Device:** STOP SIGN OTHER  
**Speed Limit:** 30  
**Diagram:** REAR END  
**Officer:**  
**Reliability:** CONFIDENT  
**# of Vehicles:** 2.00

**Unit 1**

**Trav Dir:** S  
**Veh Act:** BIKE SLOWING/STOPPING/STAR  
**Veh Type:** SPORT UTILITY VEHICLE  
**Age:** 24  
**Gender:** M  
**Cond:** NORMAL  
**Cont Fact** NO IMPROPER DRIVING  
**Cont Fact** NOT SPECIFIED

**Unit 2**

S  
STRAIGHT AHEAD  
PASSENGER CAR  
56  
F  
NORMAL  
SKIDDING  
WEATHER

**Unit 3**

**Crash ID:** 121380154**Date:** 05/16/2012**Time:** 1636**Sys:** 03-MN**County:** NICOLLET**City:** NICOLLET**Route:** 00000099

000+00.520

**Severity:** POSSIBLE INJURY**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** DRY**Light Cond:** DAYLIGHT**Weather 1:** CLEAR**Weather 2:** NOT SPECIFIED**First Event:** ON ROADWAY**To Junction:** 4-LEGGED INTERSECTION**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** RIGHT ANGLE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

PASSENGER CAR

**Age:**

21

**Gender:**

M

**Cond:**

NORMAL

**Cont Fact**

FAIL TO YIELD ROW

**Cont Fact**

DISTRACTION

**Unit 2**

E

STRAIGHT AHEAD

PASSENGER CAR

42

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3****Crash ID:** 122400176**Date:** 08/25/2012**Time:** 0935**Sys:** 03-MN**County:** NICOLLET**City:** NICOLLET**Route:** 00000111

000+00.329

**Severity:** PROPERTY DAMAGE**Road Type:** 2 LANES UNDIV 2\_WAY**Road Char:** STRAIGHT AND LEVEL**Crash Type:** COLL W/MV IN TRANSPORT**Surf Cond:** WET**Light Cond:** DAYLIGHT**Weather 1:** CLOUDY**Weather 2:** RAIN**First Event:** ON ROADWAY**To Junction:** INTERSECTION-RELATED**Traffic Device:** STOP SIGN OTHER**Speed Limit:** 30**Diagram:** RIGHT ANGLE**Officer:****Reliability:** CONFIDENT**# of Vehicles:** 2.00**Unit 1****Trav Dir:**

S

**Veh Act:**

STRAIGHT AHEAD

**Veh Type:**

SPORT UTILITY VEHICLE

**Age:**

28

**Gender:**

F

**Cond:**

NORMAL

**Cont Fact**

DISTRACTION

**Cont Fact**

FAIL TO YIELD ROW

**Unit 2**

E

STRAIGHT AHEAD

PASSENGER CAR

47

M

NORMAL

NO IMPROPER DRIVING

NOT SPECIFIED

**Unit 3**



Selection Filter:

OKoAEo: EOUKNY\_D( UK' : 5V2)-FI LS\_: oOUoERT( D: Eo 52008),2009),2040),2044),2042)-PRPE\_IES1 LS\_: o EPPSL: '

Analyst:

Notes:

By anBpnjamin

## **Signal Warrant Analysis Results**

# Traffic Signal Warrant Analysis

Count Date: 2013 Existing Volumes

Project No.: 193802557

## Major Street Approaches:

Eastbound: TH 14  
 Number of Lanes: 1  
 Approach Speed: 50  
 Total App. Vehicles: 2,474  
 Rt Turn Percentage: 100%

Westbound: TH 14  
 Number of Lanes: 1  
 Approach Speed: 50  
 Total App. Vehicles: 3,195  
 Rt Turn Percentage: 100%

## Minor Street Approaches:

Northbound: CSAH 23  
 Number of Lanes: 1  
 Approach Speed: 55  
 Total App. Vehicles: 499  
 Rt Turn Percentage: 100%

Southbound: Highway 111  
 Number of Lanes: 1  
 Approach Speed: 30  
 Total App. Vehicles: 1,338  
 Rt Turn Percentage: 100%

## Analysis of Warrant 1: 8-Hour Volumes

Hour Begin	Major (Total)	Minor Street Volume	Direction	Rank	Condition A Meets Criteria?	Condition B Meets Criteria?	Condition A+B Meets Criteria?
12 AM	0	0	NB	14			
1 AM	0	0	NB	14			
2 AM	0	0	NB	14			
3 AM	0	0	NB	14			
4 AM	0	0	NB	14			
5 AM	0	0	NB	14			
6 AM	283	87	SB	13		Minor St	
7 AM	463	129	SB	2	-- BOTH --	Minor St	A ONLY
8 AM	383	89	SB	11	Major St	Minor St	
9 AM	359	96	SB	8	Major St	Minor St	
10 AM	407	90	SB	10	Major St	Minor St	
11 AM	337	88	SB	12		Minor St	
12 PM	364	109	SB	4	-- BOTH --	Minor St	
1 PM	432	95	SB	9	Major St	Minor St	
2 PM	450	106	SB	6	-- BOTH --	Minor St	
3 PM	573	107	SB	5	-- BOTH --	-- BOTH --	
4 PM	571	111	SB	3	-- BOTH --	-- BOTH --	
5 PM	606	134	SB	1	-- BOTH --	-- BOTH --	-- A + B --
6 PM	441	97	SB	7	Major St	Minor St	
7 PM	0	0	NB	14			
8 PM	0	0	NB	14			
9 PM	0	0	NB	14			
10 PM	0	0	NB	14			
11 PM	0	0	NB	14			

Condition A is the Minimum Vehicular Volume Warrant.

Condition B is the Interruption of Continuous Traffic Warrant.

Condition A+B is the combination of Conditions A and B at 80%.

# Traffic Signal Warrant Analysis

Traffic Signal Warrant Summary: 2013 Existing Volumes Project No.: 193802557

## Warrant 1 - Eight Hour Vehicular Volume

Condition A: **Not satisfied.** Required values reached for 6 hours. Eight hours required.

Criteria - Major Street 350 Minor Street 105

Condition B: **Not satisfied.** Required values reached for 3 hours. Eight hours required.

Criteria - Major Street 525 Minor Street 53

Condition A+B: **Not satisfied.** Required values reached for 1 hour. Requires volumes to meet 80 percent of requirement of A and of B for eight hours, not necessary the same eight hours.

Criteria - Major Street 400 600 Minor Street 120 60

## Warrant 2 - Four Hour Vehicular Volume

**Not satisfied.** Required values reached for 3 hours. Four hours required.

See chart for criteria.

## Warrant 3 - Peak Hour Vehicular Volume

Condition A: **Not examined.**

Criteria - Total Approach Volume: 800

- Minor Street High Side Volume: 150

- Minor Street High Side Delay: 5 vehicle-hours

Condition B: **Not satisfied.** Required values reached for 0 hours. One hour required.

See chart for criteria.

## Warrant 4 - Pedestrian Volume

**Not examined.**

Criteria - Pedestrian volume crossing the major street is at least 100 per hour for any 4 hours or at least 190 during any one hour.

## Warrant 5 - School Crossing

**Not examined.**

Criteria - At least 20 students crossing during the highest crossing hour.

- Consider implementing other measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

- Do not apply at locations where distance to nearest signal is less than 300 feet.

## Warrant 6 - Coordinated Signal System

**Not examined**

Criteria - Adjacent traffic control signals do not provide the necessary degree of platooning.

- Proposed and adjacent traffic control signals will collectively provide a progressive operation.

- Warrant should not be used where resultant spacing of traffic control signals would be less than 1,000 feet.



# Traffic Signal Warrant Analysis

Traffic Signal Warrant Summary: 2013 Existing Volumes Project No.: 193802557

## Warrant 7 - Crash Experience

### **Not examined.**

Criteria - 5 or more correctable crashes, and

- Vehicular volumes meeting 80 percent of Warrant 1 condition A or B, or.
- Pedestrian volumes meeting 80 percent of Warrant 4 conditions.

## Warrant 8 - Roadway Network

### **Not examined.**

Criteria - Total existing entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday.

- 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.
- Common intersection of two or more major routes.

## Multiway Stop Warrant Summary

### Warrant Condition A - Traffic Signal Warrant

#### **Traffic signal warrants are not met.**

Criteria - One or more traffic signal warrants are satisfied.

- Multiway stop may be used as an interim control before traffic signal installation if this warrant is met.

### Warrant Condition B - Crash Experience

#### **Not Examined.**

Criteria - 5 or more correctable crashes in a twelve month period.

### Warrant Condition C - Intersection Volume & Delay

#### **Delay and volume criteria not satisfied.**

Criteria - Average delay to minor street vehicular traffic of at least 21 seconds per vehicle during the highest hour.

- Total volume from the major approaches of at least 210 vehicles per hour and total volume from the minor approaches of at least 140 vehicles per hour for any 8 hours of an average day.

### Warrant Condition D - Combination Volume, Crash Experience, & Delay

#### **Volume, crash, and delay criteria not satisfied.**

Criteria - 4 or more correctable crashes in a twelve month period.

- Average delay to minor street vehicular traffic of at least 24 seconds per vehicle during the highest hour.
- Total volume from the major approaches of at least 240 vehicles per hour and total volume from the minor approaches of at least 160 vehicles per hour for any 8 hours of an average day.

# Traffic Signal Warrant Analysis

Traffic Signal Warrant Graphs: 2013 Existing Volumes

Project No.: 193802557

Figure 4C-2

Warrant 2 - Four-Hour Vehicular Volume

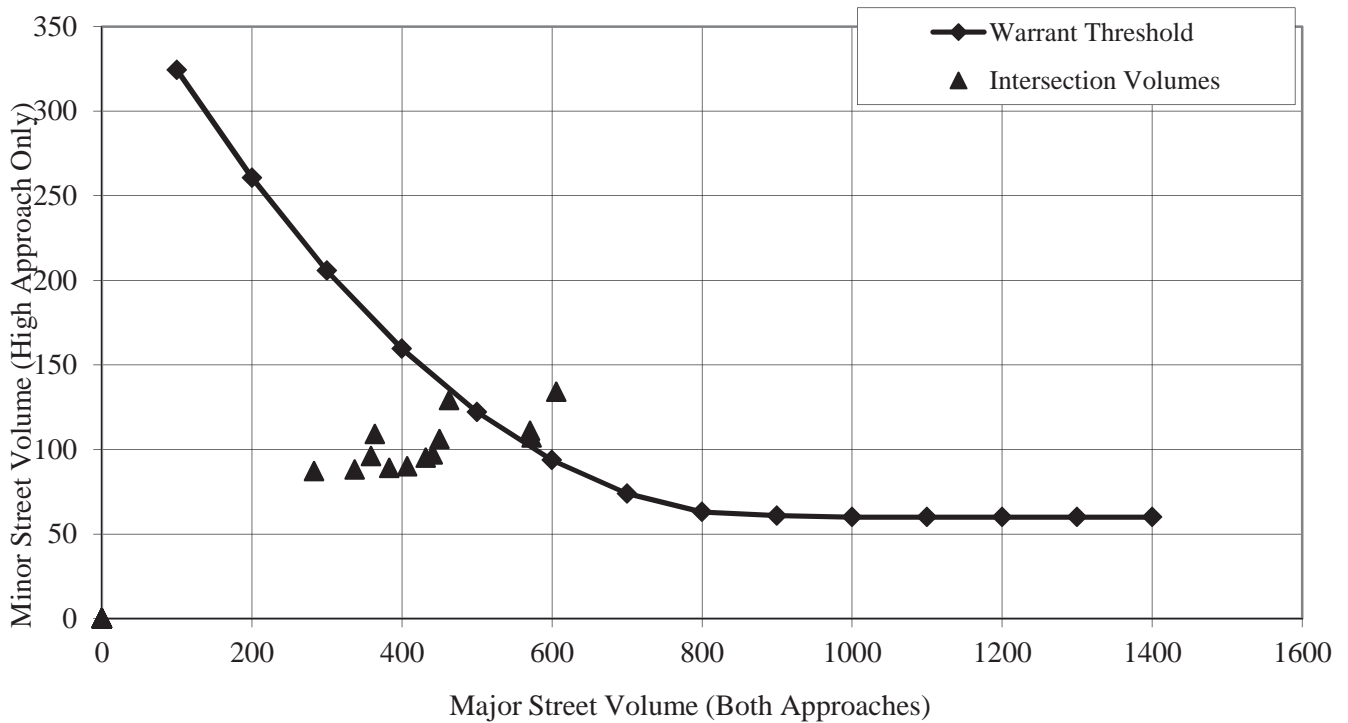
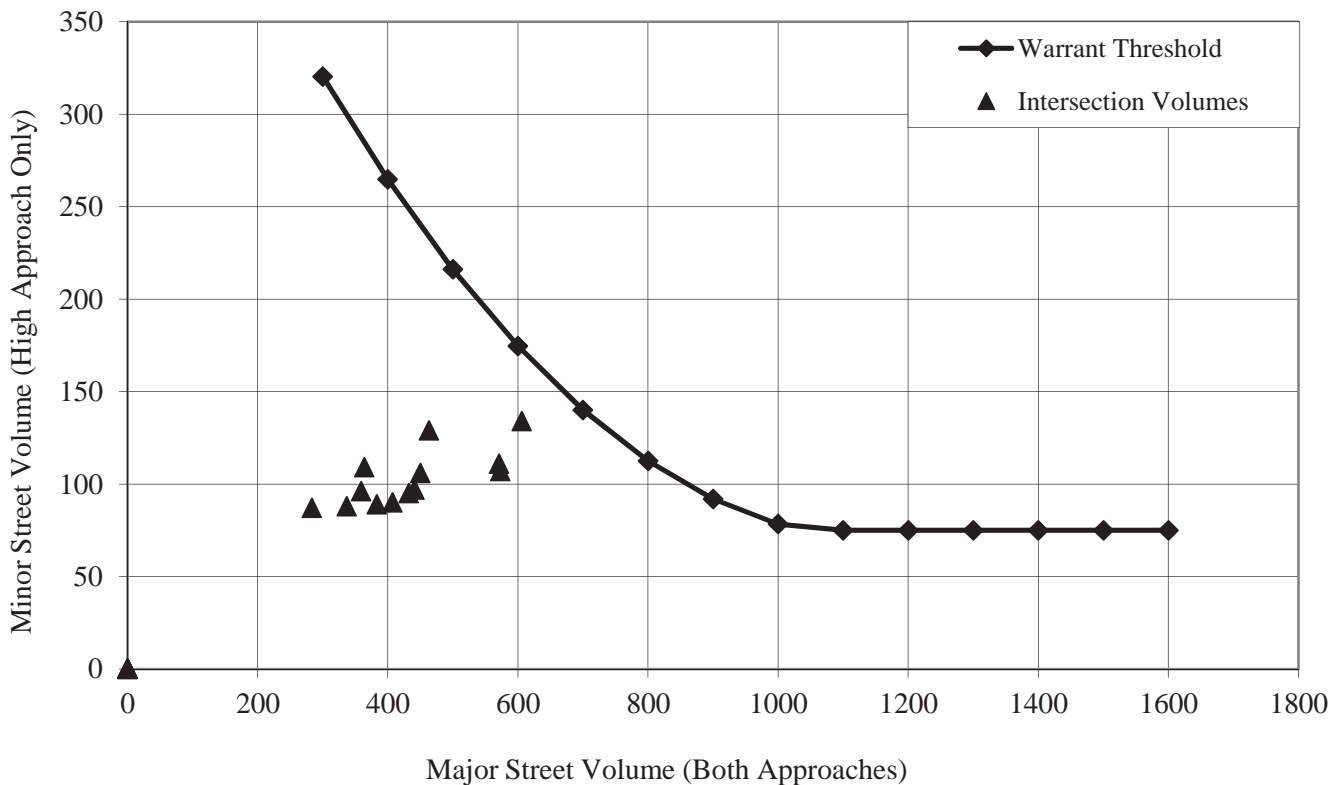


Figure 4C-4

Warrant 3 - Peak-Hour Vehicular Volume



# Traffic Signal Warrant Analysis

Count Date: Future Year 2033 (High-Growth Rate) Volumes

Project No.: 193802557

## Major Street Approaches:

Eastbound: TH 14  
 Number of Lanes: 1  
 Approach Speed: 50  
 Total App. Vehicles: 4,923  
 Rt Turn Percentage: 100%

Westbound: TH 14  
 Number of Lanes: 1  
 Approach Speed: 50  
 Total App. Vehicles: 6,358  
 Rt Turn Percentage: 100%

## Minor Street Approaches:

Northbound: CSAH 23  
 Number of Lanes: 1  
 Approach Speed: 55  
 Total App. Vehicles: 993  
 Rt Turn Percentage: 100%

Southbound: Highway 111  
 Number of Lanes: 1  
 Approach Speed: 30  
 Total App. Vehicles: 2,663  
 Rt Turn Percentage: 100%

## Analysis of Warrant 1: 8-Hour Volumes

Hour Begin	Major (Total)	Minor Street Volume	Direction	Rank	Condition A Meets Criteria?	Condition B Meets Criteria?	Condition A+B Meets Criteria?
12 AM	0	0	NB	14			
1 AM	0	0	NB	14			
2 AM	0	0	NB	14			
3 AM	0	0	NB	14			
4 AM	0	0	NB	14			
5 AM	0	0	NB	14			
6 AM	563	173	SB	13	-- BOTH --	-- BOTH --	A ONLY
7 AM	921	257	SB	2	-- BOTH --	-- BOTH --	-- A + B --
8 AM	762	177	SB	11	-- BOTH --	-- BOTH --	-- A + B --
9 AM	714	191	SB	8	-- BOTH --	-- BOTH --	-- A + B --
10 AM	810	179	SB	10	-- BOTH --	-- BOTH --	-- A + B --
11 AM	671	175	SB	12	-- BOTH --	-- BOTH --	-- A + B --
12 PM	724	217	SB	4	-- BOTH --	-- BOTH --	-- A + B --
1 PM	860	189	SB	9	-- BOTH --	-- BOTH --	-- A + B --
2 PM	896	211	SB	6	-- BOTH --	-- BOTH --	-- A + B --
3 PM	1140	213	SB	5	-- BOTH --	-- BOTH --	-- A + B --
4 PM	1136	221	SB	3	-- BOTH --	-- BOTH --	-- A + B --
5 PM	1206	267	SB	1	-- BOTH --	-- BOTH --	-- A + B --
6 PM	878	193	SB	7	-- BOTH --	-- BOTH --	-- A + B --
7 PM	0	0	NB	14			
8 PM	0	0	NB	14			
9 PM	0	0	NB	14			
10 PM	0	0	NB	14			
11 PM	0	0	NB	14			

Condition A is the Minimum Vehicular Volume Warrant.

Condition B is the Interruption of Continuous Traffic Warrant.

Condition A+B is the combination of Conditions A and B at 80%.

# Traffic Signal Warrant Analysis

Traffic Signal Warrant Summary: Future Year 2033 (High-Growth Rate) Project No.: 193802557

## Warrant 1 - Eight Hour Vehicular Volume

Condition A: **Satisfied.** Required values reached for 13 hours. Eight hours required.

Criteria - Major Street 350 Minor Street 105

Condition B: **Satisfied.** Required values reached for 13 hours. Eight hours required.

Criteria - Major Street 525 Minor Street 53

Condition A+B: **Satisfied.** Required values reached for 12 hours. Requires volumes to meet 80 percent of requirement of A and of B for eight hours, not necessary the same eight hours.

Criteria - Major Street 400 600 Minor Street 120 60

## Warrant 2 - Four Hour Vehicular Volume

**Satisfied.** Required values reached for 13 hours. Four hours required.

See chart for criteria.

## Warrant 3 - Peak Hour Vehicular Volume

Condition A: **Not examined.**

Criteria - Total Approach Volume: 800

- Minor Street High Side Volume: 150

- Minor Street High Side Delay: 5 vehicle-hours

Condition B: **Satisfied.** Required values reached for 12 hours. One hour required.

See chart for criteria.

## Warrant 4 - Pedestrian Volume

**Not examined.**

Criteria - Pedestrian volume crossing the major street is at least 100 per hour for any 4 hours or at least 190 during any one hour.

## Warrant 5 - School Crossing

**Not examined.**

Criteria - At least 20 students crossing during the highest crossing hour.

- Consider implementing other measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

- Do not apply at locations where distance to nearest signal is less than 300 feet.

## Warrant 6 - Coordinated Signal System

**Not examined**

Criteria - Adjacent traffic control signals do not provide the necessary degree of platooning.

- Proposed and adjacent traffic control signals will collectively provide a progressive operation.

- Warrant should not be used where resultant spacing of traffic control signals would be less than 1,000 feet.



# Traffic Signal Warrant Analysis

Traffic Signal Warrant Summary: Future Year 2033 (High-Growth Rate) Project No.: 193802557

## Warrant 7 - Crash Experience

### **Not examined.**

Criteria - 5 or more correctable crashes, and

- Vehicular volumes meeting 80 percent of Warrant 1 condition A or B, or.
- Pedestrian volumes meeting 80 percent of Warrant 4 conditions.

## Warrant 8 - Roadway Network

### **Not examined.**

Criteria - Total existing entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday.

- 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.
- Common intersection of two or more major routes.

## Multiway Stop Warrant Summary

### Warrant Condition A - Traffic Signal Warrant

#### **Satisfied.**

Criteria - One or more traffic signal warrants are satisfied.

- Multiway stop may be used as an interim control before traffic signal installation if this warrant is met.

### Warrant Condition B - Crash Experience

#### **Not Examined.**

Criteria - 5 or more correctable crashes in a twelve month period.

### Warrant Condition C - Intersection Volume & Delay

#### **Delay criteria not satisfied.**

Criteria - Average delay to minor street vehicular traffic of at least 21 seconds per vehicle during the highest hour.

- Total volume from the major approaches of at least 210 vehicles per hour and total volume from the minor approaches of at least 140 vehicles per hour for any 8 hours of an average day.

### Warrant Condition D - Combination Volume, Crash Experience, & Delay

#### **Delay and crash criteria not satisfied.**

Criteria - 4 or more correctable crashes in a twelve month period.

- Average delay to minor street vehicular traffic of at least 24 seconds per vehicle during the highest hour.
- Total volume from the major approaches of at least 240 vehicles per hour and total volume from the minor approaches of at least 160 vehicles per hour for any 8 hours of an average day.

# Traffic Signal Warrant Analysis

Traffic Signal Warrant Graphs: Future Year 2033 (High-Growth Rate) Volumes Project No.: 193802557

Figure 4C-2

Warrant 2 - Four-Hour Vehicular Volume

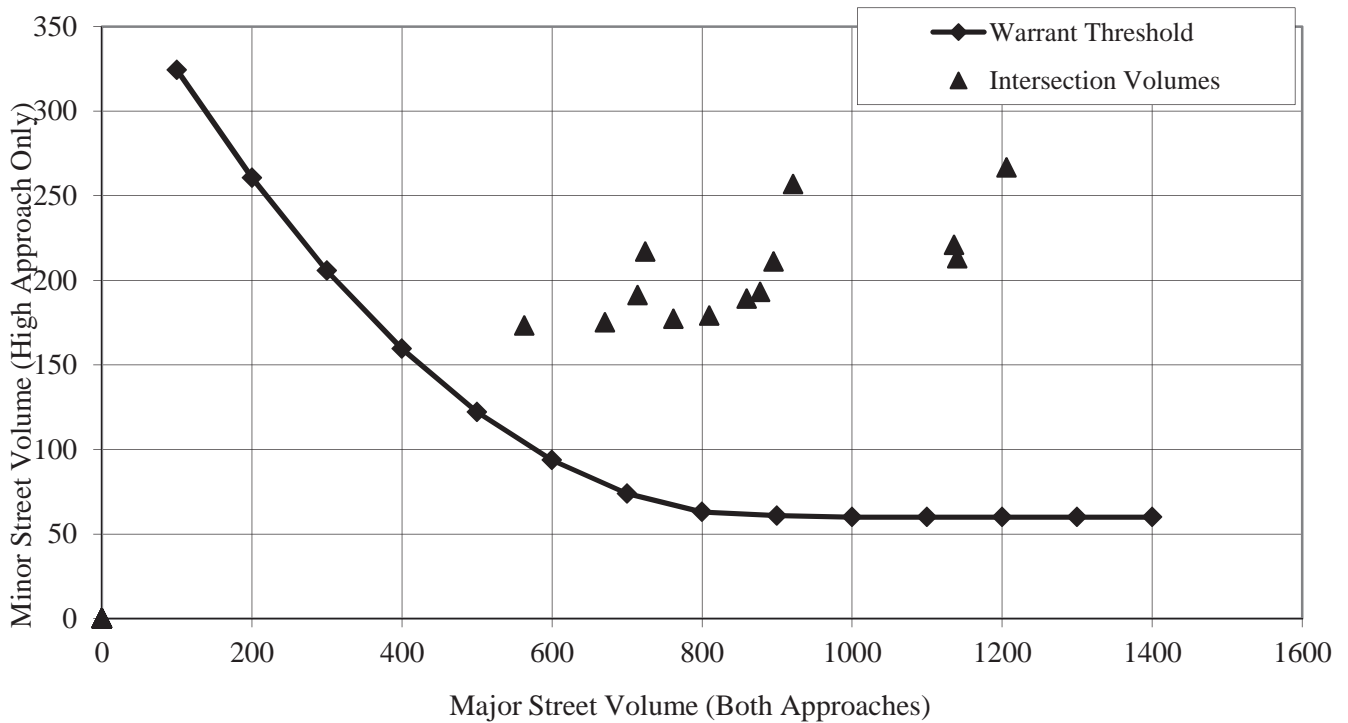
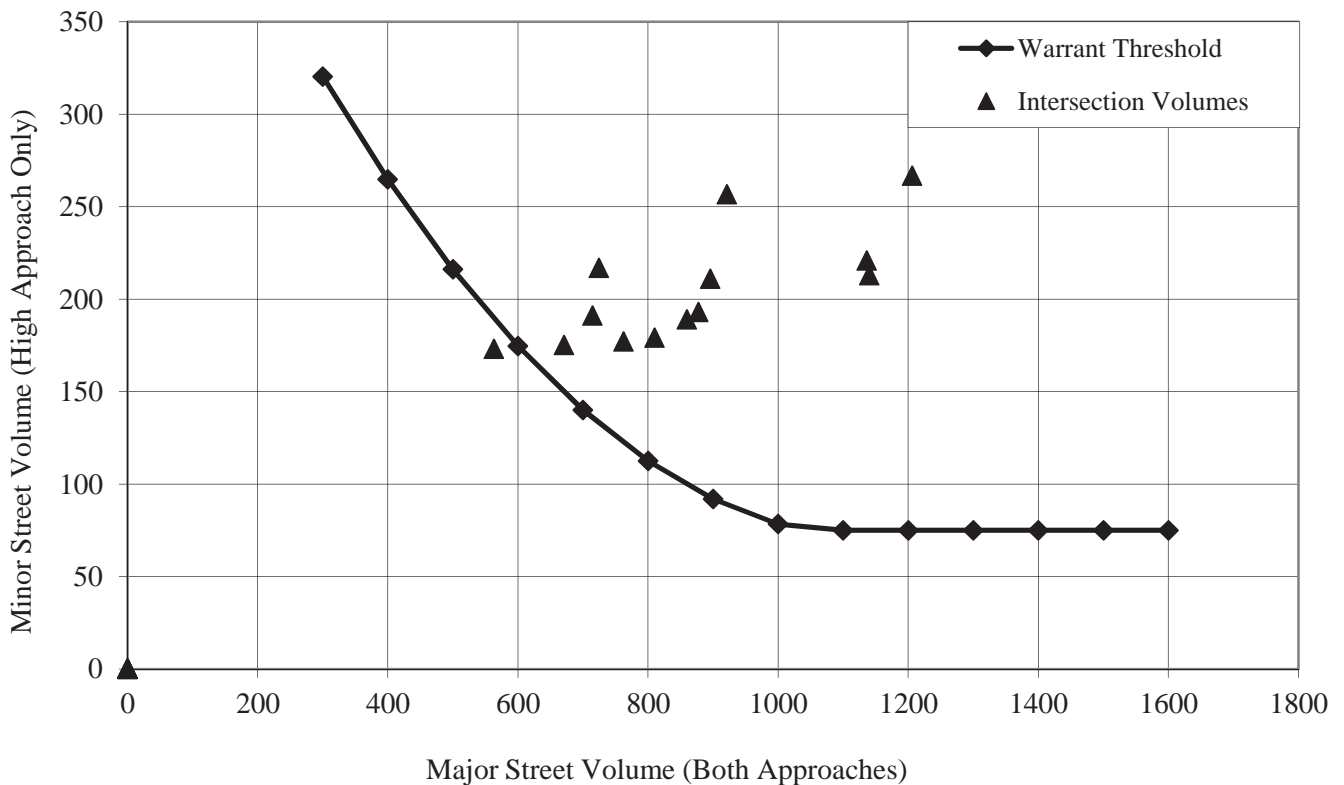


Figure 4C-4

Warrant 3 - Peak-Hour Vehicular Volume



## **Synchro/SimTraffic and RODEL Output**

## **Existing Conditions Analysis**



1: TH 14 & Birch St (CSAH 42) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.7	0.1	0.5
Total Del/Veh (s)	1.0	0.7	9.9	1.6

4: CSAH 23/TH 111 (Main Street) & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.1	0.1	0.0	0.4
Total Del/Veh (s)	2.3	0.7	12.0	20.0	5.9

6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.4	0.0	0.2	0.3
Total Del/Veh (s)	0.7	0.9	7.5	7.8	4.4

7: TH 14 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.7	0.0	0.1	0.4
Total Del/Veh (s)	2.0	2.7	3.7	2.4

Total Network Performance

Denied Del/Veh (s)			0.5	
Total Del/Veh (s)			6.1	

Intersection: 1: TH 14 & Birch St (CSAH 42)

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	14	79
Average Queue (ft)	1	29
95th Queue (ft)	8	61
Link Distance (ft)	1404	2149
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 23/TH 111 (Main Street) & TH 14

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	L	T	R	LTR	LTR
Maximum Queue (ft)	20	4	7	4	19	80	249
Average Queue (ft)	1	0	0	0	1	32	67
95th Queue (ft)	10	2	4	3	9	67	160
Link Distance (ft)		2868		1436		2365	1653
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350		275		300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	42	18	35	12	93	125
Average Queue (ft)	3	1	2	0	47	54
95th Queue (ft)	20	8	16	5	78	97
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Existing AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: TH 14 & TH 99 (3rd Street)

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	66	80
Average Queue (ft)	14	32
95th Queue (ft)	44	61
Link Distance (ft)	1373	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0
---------------------------------

1: TH 14 & Birch St (CSAH 42) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.6	0.1	0.5
Total Del/Veh (s)	0.7	1.0	7.8	1.1

4: CSAH 23/TH 111 (Main Street) & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.4	0.2	0.0	0.7
Total Del/Veh (s)	1.9	1.3	16.9	15.0	4.9

6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.4	0.0	0.2	0.2
Total Del/Veh (s)	0.8	1.2	7.8	7.8	4.6

7: TH 14 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.7	0.0	0.2	0.3
Total Del/Veh (s)	2.2	3.4	5.0	3.0

Total Network Performance

Denied Del/Veh (s)			0.6	
Total Del/Veh (s)			6.2	



Queuing and Blocking Report  
Existing PM Peak

Average of 5 Runs

1/15/2014

Intersection: 1: TH 14 & Birch St (CSAH 42)

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	15	53
Average Queue (ft)	1	16
95th Queue (ft)	7	41
Link Distance (ft)	1404	2149
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 23/TH 111 (Main Street) & TH 14

Movement	EB	WB	WB	WB	NB	SB
Directions Served	L	L	T	R	LTR	LTR
Maximum Queue (ft)	23	26	1	24	128	162
Average Queue (ft)	3	2	0	1	42	65
95th Queue (ft)	14	12	0	12	93	123
Link Distance (ft)			1436		2365	1653
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	350	275		300		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	43	4	31	9	107	115
Average Queue (ft)	4	0	4	0	60	55
95th Queue (ft)	22	3	21	5	93	92
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Existing PM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: TH 14 & TH 99 (3rd Street)

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	76	94
Average Queue (ft)	24	39
95th Queue (ft)	60	72
Link Distance (ft)	1373	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

## **Year 2033 No-Build Analysis**

1: TH 14 & Birch St (CSAH 42) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.7	0.9	0.2	0.7
Total Del/Veh (s)	2.2	1.3	37.5	4.8

4: CSAH 23/TH 111 (Main Street) & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.2	0.2	1.2	0.6
Total Del/Veh (s)	4.0	1.6	42.2	199.5	43.0

6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.5	0.0	0.3	0.3
Total Del/Veh (s)	1.2	1.6	11.3	12.6	6.8

7: TH 14 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.2	0.6
Total Del/Veh (s)	3.8	4.2	6.8	4.3

Total Network Performance

Approach	EB	WB	SB	All
Denied Del/Veh (s)			0.8	
Total Del/Veh (s)			22.8	



Queuing and Blocking Report  
Year 2033 AM Peak (High-Growth Scenario)

Average of 5 Runs  
1/15/2014

Intersection: 1: TH 14 & Birch St (CSAH 42)

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	52	183
Average Queue (ft)	4	74
95th Queue (ft)	23	157
Link Distance (ft)	1404	2149
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 23/TH 111 (Main Street) & TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	31	15	1	30	6	23	208	924
Average Queue (ft)	3	1	0	3	0	1	80	484
95th Queue (ft)	17	8	1	16	5	12	170	1023
Link Distance (ft)		2868			1436		2365	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	53	23	48	21	153	194
Average Queue (ft)	6	1	11	2	70	93
95th Queue (ft)	30	11	36	13	116	160
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

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Intersection: 7: TH 14 & TH 99 (3rd Street)

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Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	89	130
Average Queue (ft)	34	51
95th Queue (ft)	70	95
Link Distance (ft)	1373	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

---

Network Summary

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Network wide Queuing Penalty: 0

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1: TH 14 & Birch St (CSAH 42) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.5	1.6	0.1	1.1
Total Del/Veh (s)	1.4	2.4	42.6	3.4

4: CSAH 23/TH 111 (Main Street) & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.7	0.2	0.0	0.8
Total Del/Veh (s)	3.7	2.7	121.4	647.5	105.5

6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	29.0	0.5	0.0	12.3	9.0
Total Del/Veh (s)	82.9	4.5	17.0	198.3	66.3

7: TH 14 & TH 99 (3rd Street) Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.2	0.5
Total Del/Veh (s)	6.5	5.8	14.3	7.3

Total Network Performance

Denied Del/Veh (s)	3.3
Total Del/Veh (s)	63.7

Queuing and Blocking Report  
Year 2033 PM Peak (High-Growth Scenario)

Average of 5 Runs  
1/15/2014

Intersection: 1: TH 14 & Birch St (CSAH 42)

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	54	126
Average Queue (ft)	2	43
95th Queue (ft)	22	97
Link Distance (ft)	1404	2149
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 23/TH 111 (Main Street) & TH 14

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	L	T	R	LTR	LTR
Maximum Queue (ft)	40	11	34	3	45	396	1659
Average Queue (ft)	8	1	4	0	4	181	1298
95th Queue (ft)	26	5	17	2	25	388	2007
Link Distance (ft)		2868		1436		2365	1653
Upstream Blk Time (%)							27
Queuing Penalty (veh)							70
Storage Bay Dist (ft)	350		275		300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: TH 111 (Main Street)/TH 111 & TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	132	665	94	38	269	1407
Average Queue (ft)	13	182	23	4	124	438
95th Queue (ft)	59	765	67	23	218	1351
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)		6				4
Queuing Penalty (veh)		0				0
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)		19				
Queuing Penalty (veh)		5				

Queuing and Blocking Report  
Year 2033 PM Peak (High-Growth Scenario)

Average of 5 Runs  
1/15/2014

Intersection: 7: TH 14 & TH 99 (3rd Street)

Movement	EB	EB	WB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	194	99	12	206
Average Queue (ft)	70	7	1	76
95th Queue (ft)	148	74	8	152
Link Distance (ft)		3105	2868	1373
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	250			
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	2	0		

Network Summary

Network wide Queuing Penalty: 78



## **Year 2013 Build Analysis**

## 2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.0	0.3
Total Del/Veh (s)	0.6	4.2	2.6	2.1

## 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.8	0.0	0.1	0.2
Total Del/Veh (s)	0.6	0.4	10.7	9.4	8.6

## 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.2	0.4
Total Del/Veh (s)	0.8	2.0	9.3	7.9	5.5

## 7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	0.9	0.1	3.5	1.2

## 12: CSAH 23/CSAH 23/TH 111 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.7	0.8	0.3
Total Del/Veh (s)	8.7	8.1	12.4	10.4	9.3

## Total Network Performance

Denied Del/Veh (s)		0.6	
Total Del/Veh (s)		14.7	

Queuing and Blocking Report  
Signal - Ex AM Peak (Alternative No. 1)

Average of 5 Runs  
12/5/2013

Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	39	9	30
Average Queue (ft)	5	0	9
95th Queue (ft)	23	5	25
Link Distance (ft)	1647		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500		300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	WB	NB	SB
Directions Served	L	R	LTR	LTR
Maximum Queue (ft)	4	3	98	146
Average Queue (ft)	0	0	50	68
95th Queue (ft)	3	2	81	112
Link Distance (ft)			1932	1650
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	350	300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	18	29	58	4	119	128
Average Queue (ft)	1	1	9	0	56	57
95th Queue (ft)	12	12	36	3	93	100
Link Distance (ft)		1194		1832	1650	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Signal - Ex AM Peak (Alternative No. 1)

Average of 5 Runs  
12/5/2013

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	48
Average Queue (ft)	0	13
95th Queue (ft)	4	34
Link Distance (ft)	1272	2986
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	79	68	68	7	22	67	76	56	23	58	22	106
Average Queue (ft)	25	17	21	1	4	27	16	16	2	19	2	45
95th Queue (ft)	58	47	53	7	17	55	51	41	11	47	13	85
Link Distance (ft)		5650	5650			4997	4997			1944		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			500	500			500	300		300	300
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	53	57
Average Queue (ft)	16	20
95th Queue (ft)	44	44
Link Distance (ft)	1932	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.1	0.3
Total Del/Veh (s)	0.5	5.4	3.0	3.1

4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.6	1.1	0.0	0.0	0.2
Total Del/Veh (s)	0.8	0.9	12.4	9.9	9.8

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.7	0.0	0.2	0.3
Total Del/Veh (s)	0.8	2.0	10.0	8.7	6.4

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.1
Total Del/Veh (s)	0.9	0.1	3.7	1.9

12: CSAH 23/CSAH 23/TH 111 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.8	0.7	0.3
Total Del/Veh (s)	10.4	8.5	14.9	11.2	10.1

Total Network Performance

Denied Del/Veh (s)			0.5	
Total Del/Veh (s)			16.9	



Queuing and Blocking Report  
Signal - Ex PM Peak (Alternative No. 1)

Average of 5 Runs  
12/5/2013

Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	33	9	35
Average Queue (ft)	5	0	12
95th Queue (ft)	23	5	28
Link Distance (ft)	1647		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500		300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	NB	SB
Directions Served	L	T	R	L	LTR	LTR
Maximum Queue (ft)	14	6	12	8	139	155
Average Queue (ft)	1	0	0	0	67	69
95th Queue (ft)	6	4	9	5	107	118
Link Distance (ft)	2986				1932	1650
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	350		325	275		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	19	15	67	22	153	121
Average Queue (ft)	1	1	12	1	71	57
95th Queue (ft)	9	7	43	10	121	98
Link Distance (ft)	1194			1832	1650	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Signal - Ex PM Peak (Alternative No. 1)

Average of 5 Runs  
12/5/2013

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	52
Average Queue (ft)	0	18
95th Queue (ft)	4	41
Link Distance (ft)	1272	2986
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	99	65	75	15	36	118	98	78	32	72	20	89
Average Queue (ft)	37	14	18	1	6	41	34	28	5	22	2	45
95th Queue (ft)	73	42	52	6	24	82	78	62	22	54	13	80
Link Distance (ft)		5650	5650			4997	4997			1944		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			500	500			500	300		300	300
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	69	60
Average Queue (ft)	22	23
95th Queue (ft)	55	49
Link Distance (ft)	1932	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

## RODEL: Alternative No. 2 – Existing AM Peak Hour Conditions

C:\>RODEL194.EXE

6:12:13NICOLLET TH 14 BYP AND TH 111 EX.7

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## RODEL: Alternative No. 2 – Existing PM Peak Hour Conditions

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MODEL194.EXE
6:12:13          NICOLLET TH 14 BYP AND TH 111 EX.          6
E   <m>      - 4.00    7.80    4.00    7.80             TIME PERIOD      min     90
L'  <m>      10.00   10.00   10.00   10.00             TIME SLICE       min     15
U   <m>      3.60    7.20    3.60    7.20             RESULTS PERIOD   min    15 75
RAD <m>      30.00   30.00   30.00   30.00             TIME COST        $/hr   15.00
PHI <d>      22.00   22.00   22.00   22.00             FLOW PERIOD      min    15 75
DIA <m>      54.80   54.80   54.80   54.80             FLOW TYPE        pcu/veh  UEH
GRAD SEP      0         0         0         0             FLOW PEAK        am/op/pm  PM

LEG NAME  PCU    UEH TURNS <1st exit, 2nd..U>  FLOF  CL  FLOW RATIO  FLOW TIME
SB        1.05   145 120 165 0           0.50 85 0.75 0.891 0.75 15 45 75
EB        1.05   10 455 150 0           0.50 85 0.75 0.891 0.75 15 45 75
NB        1.05   10 105 15 0            0.50 85 0.75 0.891 0.75 15 45 75
WB        1.05  270 550 20 0            0.50 85 0.75 0.891 0.75 15 45 75

MODE 2
FLOW      veh      215      308      65      420              AVEDEL s      3.1
CAPACITY  veh      843     2012      796     2025              LOS SIG      A
AVE DELAY mins    0.09    0.03    0.08    0.04              LOS UNSIG    A
MAX DELAY mins    0.11    0.04    0.09    0.04
AVE QUEUE  veh      0         0         0         0              UEHIC HRS    0.9
MAX QUEUE  veh      0         0         0         0              COST $      13

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

**1: WB Median U-Turn & TH 14 Performance by approach**

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.5	1.3	1.4

**2: 471st Street Performance by approach**

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.1	0.3
Total Del/Veh (s)	0.5	1.0	2.9	0.8

**3: EB Median U-Turn Performance by approach**

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.1	0.0
Total Del/Veh (s)	0.5	0.8	0.6

**4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach**

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	1.7	0.0	0.0	0.2
Total Del/Veh (s)	8.2	6.6	1.8	2.6	3.1

**6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach**

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.2	0.3
Total Del/Veh (s)	5.5	6.1	5.5	6.6	5.9

**7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach**

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.0	0.1	7.5	2.3

**12: CSAH 23/TH 111 & TH 14 Performance by approach**

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0
Total Del/Veh (s)	0.8	0.6	3.0	4.4	1.6

**Total Network Performance**

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	8.3

## Queuing and Blocking Report

RCI (Alternative No. 3) - Ex AM Peak

Average of 5 Runs

1/15/2014

### Intersection: 1: WB Median U-Turn & TH 14

Movement	WB
Directions Served	U
Maximum Queue (ft)	83
Average Queue (ft)	30
95th Queue (ft)	67
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	1000
Storage Blk Time (%)	
Queuing Penalty (veh)	

### Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	53	10	57
Average Queue (ft)	7	1	15
95th Queue (ft)	30	8	40
Link Distance (ft)	1642		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500	300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 3: EB Median U-Turn

Movement	EB
Directions Served	U
Maximum Queue (ft)	51
Average Queue (ft)	8
95th Queue (ft)	32
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	805
Storage Blk Time (%)	
Queuing Penalty (veh)	



# Queuing and Blocking Report

RCI (Alternative No. 3) - Ex AM Peak

Average of 5 Runs

1/15/2014

## Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	21	46	5	30	39	13	9	74
Average Queue (ft)	3	13	0	2	6	1	0	7
95th Queue (ft)	13	35	2	13	23	7	3	40
Link Distance (ft)	2994			1436			1926	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	50	82	77	87	88	105
Average Queue (ft)	6	41	36	41	49	49
95th Queue (ft)	31	71	67	74	78	85
Link Distance (ft)	1194		1832		1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	48
Average Queue (ft)	11
95th Queue (ft)	35
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

## Queuing and Blocking Report

RCI (Alternative No. 3) - Ex AM Peak

Average of 5 Runs

1/15/2014

Intersection: 12: CSAH 23/TH 111 & TH 14

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	R	R	R
Maximum Queue (ft)	40	29	12	67	98
Average Queue (ft)	8	2	0	22	46
95th Queue (ft)	29	14	7	51	77
Link Distance (ft)				1935	1926
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	500	500	500		
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Network Summary

Network wide Queuing Penalty: 0

1: WB Median U-Turn & TH 14 Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.9	1.2

2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	2.1	0.3
Total Del/Veh (s)	0.6	1.9	3.1	1.4

3: EB Median U-Turn Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.1	0.1
Total Del/Veh (s)	0.6	1.3	1.0

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.7	1.3	0.0	0.0	0.2
Total Del/Veh (s)	9.1	9.7	2.2	2.8	3.6

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.8	0.0	0.2	0.3
Total Del/Veh (s)	4.9	6.2	6.0	7.0	6.1

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	0.9	0.1	8.1	3.4

12: CSAH 23/TH 111 & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	1.3	0.8	2.5	4.4	1.8

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	9.1

## Queuing and Blocking Report

RCI (Alternative No. 3) - Ex PM Peak

Average of 5 Runs

1/15/2014

### Intersection: 1: WB Median U-Turn & TH 14

Movement	WB
Directions Served	U
Maximum Queue (ft)	97
Average Queue (ft)	24
95th Queue (ft)	65
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	1000
Storage Blk Time (%)	
Queuing Penalty (veh)	

### Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	42	15	53
Average Queue (ft)	10	1	16
95th Queue (ft)	33	7	40
Link Distance (ft)	1642		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500	300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 3: EB Median U-Turn

Movement	EB
Directions Served	U
Maximum Queue (ft)	50
Average Queue (ft)	13
95th Queue (ft)	38
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	805
Storage Blk Time (%)	
Queuing Penalty (veh)	

# Queuing and Blocking Report

RCI (Alternative No. 3) - Ex PM Peak

Average of 5 Runs

1/15/2014

## Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	54	62	18	27	49	18	18	82
Average Queue (ft)	8	12	2	3	10	1	0	5
95th Queue (ft)	31	37	9	13	33	9	6	34
Link Distance (ft)	2994			1436			1926	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	49	78	88	94	104	102
Average Queue (ft)	4	38	35	43	60	51
95th Queue (ft)	24	67	70	75	90	86
Link Distance (ft)	1194		1832		1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	67
Average Queue (ft)	18
95th Queue (ft)	46
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	



## Queuing and Blocking Report

RCI (Alternative No. 3) - Ex PM Peak

Average of 5 Runs

1/15/2014

Intersection: 12: CSAH 23/TH 111 & TH 14

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	R	R	R
Maximum Queue (ft)	71	42	15	50	100
Average Queue (ft)	22	3	0	21	47
95th Queue (ft)	54	21	7	42	80
Link Distance (ft)				1935	1926
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	500	500	500		
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Network Summary

Network wide Queuing Penalty: 0

2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.7	3.5	4.3	3.8

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	1.9	0.0	0.0	0.2
Total Del/Veh (s)	8.3	6.8	2.0	2.4	3.1

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	1.0	0.0	0.2	0.4
Total Del/Veh (s)	5.7	5.9	5.9	6.8	6.1

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	0.9	0.2	7.1	2.4

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.9	4.7	3.0	3.3

Total Network Performance

Approach	EB	NB	SB	All
Denied Del/Veh (s)				0.4
Total Del/Veh (s)				11.9

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - Ex AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	61	25	61
Average Queue (ft)	8	1	2
95th Queue (ft)	37	13	22
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	30	56	6	22	37	24	8	53
Average Queue (ft)	4	13	1	2	6	2	0	3
95th Queue (ft)	18	35	3	11	23	13	4	22
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	44	92	80	78	112	100
Average Queue (ft)	7	43	34	39	55	46
95th Queue (ft)	31	75	64	67	86	77
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - Ex AM Peak

Average of 5 Runs

1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	43
Average Queue (ft)	10
95th Queue (ft)	30
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	65	61	42
Average Queue (ft)	8	6	3
95th Queue (ft)	36	32	22
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
---------------------------------

2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	3.0	3.5	4.0	3.6

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.7	1.4	0.0	0.0	0.2
Total Del/Veh (s)	9.0	8.6	2.3	3.2	3.6

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.8	0.0	0.2	0.3
Total Del/Veh (s)	5.1	6.4	6.2	7.1	6.2

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.0	0.2	7.7	3.2

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.9	4.6	3.1	3.4

Total Network Performance

Denied Del/Veh (s)			0.4	
Total Del/Veh (s)			12.1	



Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - Ex PM Peak

Average of 5 Runs

1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	70	32	63
Average Queue (ft)	11	1	3
95th Queue (ft)	45	15	26
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	39	56	6	22	48	25	37	100
Average Queue (ft)	7	13	1	2	9	2	2	11
95th Queue (ft)	24	38	4	13	29	16	16	53
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	38	94	88	87	96	104
Average Queue (ft)	5	40	33	43	60	51
95th Queue (ft)	25	72	71	74	90	87
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - Ex PM Peak

Average of 5 Runs

1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	47
Average Queue (ft)	15
95th Queue (ft)	38
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	54	48	48
Average Queue (ft)	8	4	3
95th Queue (ft)	34	23	22
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
---------------------------------

2: TH 111/CSAH 23/TH 111 & EB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.8	3.6	4.3	3.8

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	3.6	0.0	0.0	0.1
Total Del/Veh (s)	2.5	4.0	2.0	2.4	2.3

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	1.1	0.0	0.2	0.4
Total Del/Veh (s)	5.9	6.3	7.2	6.8	6.7

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	0.8	0.1	4.7	1.3

13: CSAH 23/TH 111/CSAH 23 & WB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	3.1	4.7	2.9	3.3

Total Network Performance

Denied Del/Veh (s)			0.5	
Total Del/Veh (s)			12.6	

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & EB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	45	27	39
Average Queue (ft)	5	1	2
95th Queue (ft)	28	15	21
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	7	9	42	14	8	21	9	50
Average Queue (ft)	0	1	4	2	1	1	0	4
95th Queue (ft)	4	6	21	10	4	9	6	24
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	46	100	83	79	123	100
Average Queue (ft)	7	48	43	37	64	49
95th Queue (ft)	30	83	73	66	101	83
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	5
95th Queue (ft)	21
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & WB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	79	55	36
Average Queue (ft)	11	7	3
95th Queue (ft)	44	30	19
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
---------------------------------

2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	3.4	3.7	4.4	3.9

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.0	1.2	0.0	0.1	0.3
Total Del/Veh (s)	7.9	12.6	2.6	2.5	3.7

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.4	0.0	0.2	0.2
Total Del/Veh (s)	4.9	6.2	7.3	6.7	6.6

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0
Total Del/Veh (s)	0.7	0.0	6.4	4.3

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.1
Total Del/Veh (s)	3.2	5.1	3.2	3.6

Total Network Performance

Denied Del/Veh (s)		0.4	
Total Del/Veh (s)		13.5	



Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex PM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	82	36	65
Average Queue (ft)	18	1	4
95th Queue (ft)	59	13	28
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	56	53	44	32	57	16	29	65
Average Queue (ft)	7	11	6	3	11	1	2	7
95th Queue (ft)	31	33	23	15	37	7	15	36
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	43	84	56	99	134	91
Average Queue (ft)	6	47	21	51	69	47
95th Queue (ft)	28	75	51	82	109	75
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex PM Peak

Average of 5 Runs

1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	42
Average Queue (ft)	10
95th Queue (ft)	30
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	75	60	42
Average Queue (ft)	16	7	5
95th Queue (ft)	56	33	26
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
---------------------------------

## **Year 2033 Build Analysis**

## 2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	1.9	0.3
Total Del/Veh (s)	0.9	6.3	3.5	3.1

## 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	1.5	0.1	0.1	0.2
Total Del/Veh (s)	1.4	1.1	15.8	28.2	19.5

## 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	1.0	0.0	0.3	0.4
Total Del/Veh (s)	1.4	3.0	30.3	35.3	19.6

## 7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.3	0.2	4.6	1.8

## 12: CSAH 23/CSAH 23/TH 111 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.8	0.8	0.3
Total Del/Veh (s)	13.6	11.8	22.2	14.3	13.9

## Total Network Performance

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)			0.6		
Total Del/Veh (s)			28.9		

Queuing and Blocking Report  
Signal - AM Peak (Alternative No. 1)

Average of 5 Runs  
1/14/2014

Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	70	18	44
Average Queue (ft)	15	1	17
95th Queue (ft)	49	9	34
Link Distance (ft)	1647		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500	300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	15	8	26	7	5	16	209	649
Average Queue (ft)	1	0	1	0	0	1	87	182
95th Queue (ft)	8	4	15	3	4	9	163	505
Link Distance (ft)	2986			1429			1932	1650
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350	325		275	300			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	42	26	82	21	432	527
Average Queue (ft)	3	2	26	1	155	153
95th Queue (ft)	20	14	66	12	384	410
Link Distance (ft)	1194		1832		1650	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Signal - AM Peak (Alternative No. 1)

Average of 5 Runs  
1/14/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	54
Average Queue (ft)	21
95th Queue (ft)	44
Link Distance (ft)	2986
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	143	134	136	11	51	114	123	91	27	100	29	177
Average Queue (ft)	56	44	53	1	10	49	49	34	3	43	7	93
95th Queue (ft)	105	102	105	6	35	89	99	71	17	83	24	158
Link Distance (ft)		5650	5650			4997	4997			1944		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			500	500			500	300		300	300
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	99	69
Average Queue (ft)	36	31
95th Queue (ft)	76	57
Link Distance (ft)	1932	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0



## 2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	2.1	0.3
Total Del/Veh (s)	1.2	9.0	5.3	5.2

## 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.7	1.2	0.0	0.0	0.2
Total Del/Veh (s)	23.9	25.4	5.8	4.3	8.3

## 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.2	0.3
Total Del/Veh (s)	7.3	9.3	14.0	10.9	11.3

## 7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.1	0.3	8.9	4.1

## 12: CSAH 23/CSAH 23/TH 111 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.9	0.0	0.1
Total Del/Veh (s)	16.5	16.0	26.7	17.2	17.1

## Total Network Performance

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)			0.5		
Total Del/Veh (s)			26.2		

Queuing and Blocking Report  
Signal - Build Year PM Peak (3.5% GF) (Alternative No. 1)

Average of 5 Runs  
12/8/2013

Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	78	9	78
Average Queue (ft)	24	1	25
95th Queue (ft)	61	7	59
Link Distance (ft)	1647		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500		300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 23/TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	63	86	37	39	106	30	75	133
Average Queue (ft)	14	23	4	6	26	2	7	32
95th Queue (ft)	40	61	19	26	66	14	38	105
Link Distance (ft)	2986			1429			1932	1650
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	40	112	90	127	274	138
Average Queue (ft)	10	58	49	66	123	76
95th Queue (ft)	35	92	78	106	222	120
Link Distance (ft)	1194		1832		1650	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Signal - Build Year PM Peak (3.5% GF) (Alternative No. 1)

Average of 5 Runs  
12/8/2013

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	56
Average Queue (ft)	25
95th Queue (ft)	47
Link Distance (ft)	2986
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	216	120	142	27	80	175	186	147	45	129	42	191
Average Queue (ft)	87	44	56	2	16	88	95	56	10	59	7	86
95th Queue (ft)	164	94	116	13	50	146	159	115	32	112	28	154
Link Distance (ft)		5650	5650			4997	4997			1944		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			500	500			500	300		300	300
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: CSAH 23/CSAH 23/TH 111

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	130	123
Average Queue (ft)	55	48
95th Queue (ft)	110	93
Link Distance (ft)	1932	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

```

*****
*
* 26:11:13 NICOLLET TH 14 BYP AND TH 111 - Alt 2 (YEAR 2033) - AM
*
*****
*
* E (m) 4.00 7.80 4.00 7.80 * TIME PERIOD min 90 *
* L' (m) 10.00 10.00 10.00 10.00 * TIME SLICE min 15 *
* V (m) 3.60 7.20 3.60 7.20 * RESULTS PERIOD min 15 75 *
* RAD (m) 30.00 30.00 30.00 30.00 * TIME COST $/hr 15.00 *
* PHI (d) 22.00 22.00 22.00 22.00 * FLOW PERIOD min 15 75 *
* DIA (m) 54.80 54.80 54.80 54.80 * FLOW TYPE pcu/veh VEH *
* GRAD SEP 0 0 0 0 * FLOW PEAK am/op/pm AM *
*
*****
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL* FLOW RATIO *FLOW TIME*
* * * * *
*SB *1.05* 115 80 215 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*EB *1.05* 5 505 110 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*NB *1.05* 15 95 5 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*WB *1.05* 135 315 15 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
* * * * *
* * * * *
*
*****
* FLOW veh 410 620 115 465 * AVEDEL s 4.5 *
* CAPACITY veh 822 1897 566 1970 * LOS SIG A *
* AVE DELAY mins 0.14 0.05 0.13 0.04 * LOS UNSIG A *
* MAX DELAY mins 0.17 0.05 0.15 0.04 *
* AVE QUEUE veh 1 0 0 0 * VEHIC HRS 2.0 *
* MAX QUEUE veh 1 1 0 0 * COST $ 30 *
*
*****
*****
*
* 26:11:13 NICOLLET TH 14 BYP AND TH 111 - Alt 2 (YEAR 2033) - PM
*
*****
*
* E (m) 4.00 7.80 4.00 7.80 * TIME PERIOD min 90 *
* L' (m) 10.00 10.00 10.00 10.00 * TIME SLICE min 15 *
* V (m) 3.60 7.20 3.60 7.20 * RESULTS PERIOD min 15 75 *
* RAD (m) 30.00 30.00 30.00 30.00 * TIME COST $/hr 15.00 *
* PHI (d) 22.00 22.00 22.00 22.00 * FLOW PERIOD min 15 75 *
* DIA (m) 54.80 54.80 54.80 54.80 * FLOW TYPE pcu/veh VEH *
* GRAD SEP 0 0 0 0 * FLOW PEAK am/op/pm PM *
*
*****
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL* FLOW RATIO *FLOW TIME*
* * * * *
*SB *1.05* 145 120 165 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*EB *1.05* 10 455 150 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*NB *1.05* 10 105 15 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
*WB *1.05* 270 550 20 0 *1.00*85*0.75 0.891 0.75*15 45 75 *
* * * * *
* * * * *
*
*****
* FLOW veh 430 615 130 840 * AVEDEL s 5.5 *
* CAPACITY veh 693 1901 597 1926 * LOS SIG A *
* AVE DELAY mins 0.22 0.05 0.13 0.05 * LOS UNSIG A *
* MAX DELAY mins 0.28 0.05 0.15 0.06 *
* AVE QUEUE veh 2 0 0 1 * VEHIC HRS 3.1 *
* MAX QUEUE veh 2 1 0 1 * COST $ 46 *
*
*****

```

### 1: WB Median U-Turn & TH 14 Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.4	4.1	3.8

### 2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.1	0.3
Total Del/Veh (s)	0.9	2.3	3.9	1.6

### 3: EB Median U-Turn Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.1	0.1
Total Del/Veh (s)	1.0	1.5	1.2

### 4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	1.7	0.0	0.1	0.2
Total Del/Veh (s)	13.3	11.7	2.9	3.7	4.8

### 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.2	0.4
Total Del/Veh (s)	8.6	8.1	8.9	9.3	8.7

### 7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.3	0.2	7.5	2.6

### 12: CSAH 23/TH 111 & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0
Total Del/Veh (s)	2.1	1.6	7.5	11.8	4.3

### Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	15.0

## Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 AM Peak

Average of 5 Runs

1/15/2014

### Intersection: 1: WB Median U-Turn & TH 14

Movement	WB
Directions Served	U
Maximum Queue (ft)	169
Average Queue (ft)	76
95th Queue (ft)	137
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	1000
Storage Blk Time (%)	
Queuing Penalty (veh)	

### Intersection: 2: 471st Street

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	60	20	59
Average Queue (ft)	17	1	24
95th Queue (ft)	46	10	50
Link Distance (ft)	1642		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	500	300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 3: EB Median U-Turn

Movement	EB
Directions Served	U
Maximum Queue (ft)	74
Average Queue (ft)	28
95th Queue (ft)	62
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	805
Storage Blk Time (%)	
Queuing Penalty (veh)	



# Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 AM Peak

Average of 5 Runs

1/15/2014

## Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	40	88	23	33	42	23	32	121
Average Queue (ft)	8	24	2	5	10	2	2	23
95th Queue (ft)	29	53	12	20	31	12	12	80
Link Distance (ft)	2994			1436			1926	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	52	136	109	102	168	129
Average Queue (ft)	12	64	48	53	74	71
95th Queue (ft)	40	107	80	88	121	107
Link Distance (ft)	1194		1832		1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)	0					
Queuing Penalty (veh)	0					

## Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	50
Average Queue (ft)	17
95th Queue (ft)	40
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

## Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 AM Peak

Average of 5 Runs

1/15/2014

Intersection: 12: CSAH 23/TH 111 & TH 14

Movement	EB	WB	WB	WB	NB	SB
Directions Served	L	L	T	R	R	R
Maximum Queue (ft)	97	59	10	31	114	214
Average Queue (ft)	33	10	0	3	43	90
95th Queue (ft)	75	36	7	16	85	159
Link Distance (ft)			817		1935	1926
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	500	500		500		
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Network Summary

Network wide Queuing Penalty: 0

### 1: WB Median U-Turn & TH 14 Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.9	2.3	2.5

### 2: 471st Street Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	2.1	0.3
Total Del/Veh (s)	1.3	3.4	6.1	2.6

### 3: EB Median U-Turn Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.2	0.1
Total Del/Veh (s)	1.7	2.7	2.2

### 4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.6	1.1	0.0	0.0	0.2
Total Del/Veh (s)	41.9	51.5	4.1	6.1	11.3

### 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.3	0.3
Total Del/Veh (s)	9.6	12.3	22.2	21.3	17.7

### 7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.0	0.3	8.3	3.6

### 12: CSAH 23/TH 111 & TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	4.5	2.2	6.4	21.4	7.2

### Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	23.8

## Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 PM Peak

Average of 5 Runs

1/15/2014

### Intersection: 1: WB Median U-Turn & TH 14

Movement	WB
Directions Served	U
Maximum Queue (ft)	124
Average Queue (ft)	56
95th Queue (ft)	103
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	1000
Storage Blk Time (%)	
Queuing Penalty (veh)	

### Intersection: 2: 471st Street

Movement	EB	EB	SB	SB
Directions Served	L	T	L	R
Maximum Queue (ft)	76	9	20	73
Average Queue (ft)	29	0	1	33
95th Queue (ft)	65	6	11	62
Link Distance (ft)		1957	1642	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	500			300
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 3: EB Median U-Turn

Movement	EB
Directions Served	U
Maximum Queue (ft)	114
Average Queue (ft)	38
95th Queue (ft)	84
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	805
Storage Blk Time (%)	
Queuing Penalty (veh)	

# Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 PM Peak

Average of 5 Runs

1/15/2014

## Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	107	96	26	34	168	35	116	301
Average Queue (ft)	20	27	3	5	42	4	11	39
95th Queue (ft)	76	70	13	21	126	20	57	159
Link Distance (ft)	2994			1436			1926	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	50	161	146	171	456	307
Average Queue (ft)	10	65	57	71	161	102
95th Queue (ft)	35	115	111	127	350	230
Link Distance (ft)	1194		1832		1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175	250				
Storage Blk Time (%)	0					
Queuing Penalty (veh)	0					

## Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	66
Average Queue (ft)	0	23
95th Queue (ft)	4	47
Link Distance (ft)	1272	2994
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

## Queuing and Blocking Report

RCI (Alternative No. 3) - 2033 PM Peak

Average of 5 Runs

1/15/2014

Intersection: 12: CSAH 23/TH 111 & TH 14

Movement	EB	WB	WB	WB	NB	SB
Directions Served	L	L	T	R	R	R
Maximum Queue (ft)	169	55	3	68	100	346
Average Queue (ft)	64	9	0	10	40	147
95th Queue (ft)	134	33	2	40	78	293
Link Distance (ft)			817		1935	1926
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	500	500		500		
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Network Summary

Network wide Queuing Penalty: 0



2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.0
Total Del/Veh (s)	3.2	3.9	5.5	4.7

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	1.7	0.0	0.0	0.2
Total Del/Veh (s)	13.9	12.2	2.7	3.7	4.9

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.9	0.0	0.2	0.3
Total Del/Veh (s)	8.5	8.2	8.8	10.0	8.9

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.1
Total Del/Veh (s)	1.2	0.2	8.0	2.7

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.1
Total Del/Veh (s)	3.5	5.8	3.4	3.9

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	15.9

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) 2033 AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	63	53	56
Average Queue (ft)	15	3	4
95th Queue (ft)	50	25	25
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	37	65	20	37	55	30	56	153
Average Queue (ft)	8	23	2	5	13	2	3	24
95th Queue (ft)	26	48	11	20	38	14	25	88
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	56	128	88	106	143	164
Average Queue (ft)	11	63	45	55	76	73
95th Queue (ft)	41	104	75	93	119	122
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) 2033 AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	55
Average Queue (ft)	18
95th Queue (ft)	43
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	80	56	65
Average Queue (ft)	22	16	11
95th Queue (ft)	61	46	44
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
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2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.1	0.1
Total Del/Veh (s)	4.1	4.4	5.5	4.8

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	1.1	0.0	0.0	0.2
Total Del/Veh (s)	45.5	69.4	4.3	6.5	13.8

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.9	0.0	0.3	0.3
Total Del/Veh (s)	10.1	11.7	27.3	19.2	19.4

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.1	0.2	9.0	4.2

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.1
Total Del/Veh (s)	4.2	6.6	3.7	4.5

Total Network Performance

Denied Del/Veh (s)		0.5	
Total Del/Veh (s)		29.9	

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - 2033 PM Peak

Average of 5 Runs

1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	111	81	116
Average Queue (ft)	37	11	13
95th Queue (ft)	85	48	63
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	88	120	32	131	261	89	162	304
Average Queue (ft)	19	32	3	7	70	5	15	46
95th Queue (ft)	67	90	16	50	205	52	85	178
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)					2			
Queuing Penalty (veh)					1			

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	44	144	109	158	498	300
Average Queue (ft)	9	63	54	70	188	91
95th Queue (ft)	32	118	101	123	451	211
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)		1				
Queuing Penalty (veh)		0				

Queuing and Blocking Report  
Interchange with Access (Alternative No. 4) - 2033 PM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	60
Average Queue (ft)	27
95th Queue (ft)	50
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	114	74	77
Average Queue (ft)	29	17	9
95th Queue (ft)	79	53	44
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1
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2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	3.8	4.2	5.9	5.0

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	3.2	0.0	0.0	0.1
Total Del/Veh (s)	5.1	9.7	3.3	3.8	3.8

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	1.2	0.0	0.3	0.4
Total Del/Veh (s)	11.6	11.8	28.9	13.1	18.2

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.0	0.2	7.2	2.0

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.1
Total Del/Veh (s)	3.9	6.7	3.5	4.2

Total Network Performance

Approach	EB	NB	SB	All
Denied Del/Veh (s)				0.5
Total Del/Veh (s)				25.1

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - 2033 AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	90	70	106
Average Queue (ft)	32	5	14
95th Queue (ft)	79	31	61
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	17	23	61	28	34	25	60	132
Average Queue (ft)	1	1	9	4	3	2	4	18
95th Queue (ft)	8	10	33	18	18	12	27	76
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	53	161	178	108	444	163
Average Queue (ft)	11	78	73	54	185	83
95th Queue (ft)	40	125	137	94	409	136
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - 2033 AM Peak

Average of 5 Runs  
1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	34
Average Queue (ft)	0	9
95th Queue (ft)	4	27
Link Distance (ft)	1272	2994
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	90	94	60
Average Queue (ft)	28	22	11
95th Queue (ft)	68	62	41
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
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2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.1
Total Del/Veh (s)	5.6	4.8	6.4	5.7

4: TH 111/TH 111 (Main Street) & OLD TH 14 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.9	1.2	0.0	0.1	0.3
Total Del/Veh (s)	27.3	42.5	4.8	5.9	10.0

6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.6	0.0	0.3	0.3
Total Del/Veh (s)	7.7	11.9	48.4	11.3	27.6

7: OLD TH 14 & Old TH 99 (3rd Street) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0
Total Del/Veh (s)	0.7	0.3	7.2	4.7

13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.1
Total Del/Veh (s)	5.6	7.4	4.1	5.2

Total Network Performance

Approach	EB	NB	SB	All
Denied Del/Veh (s)				0.5
Total Del/Veh (s)				36.1

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex PM Peak

Average of 5 Runs  
1/15/2014

Intersection: 2: TH 111/CSAH 23/TH 111 & WB TH 14 Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	149	107	100
Average Queue (ft)	55	16	17
95th Queue (ft)	121	61	68
Link Distance (ft)	1153	687	1543
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: TH 111/TH 111 (Main Street) & OLD TH 14

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	65	79	57	38	140	55	102	240
Average Queue (ft)	14	27	13	6	41	5	13	49
95th Queue (ft)	42	66	39	22	109	33	59	167
Link Distance (ft)		2994			1436		1543	1653
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	350		325	275		300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: TH 111 (Main Street)/TH 111 & Old TH 99 (3rd Street)

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	46	124	81	197	804	170
Average Queue (ft)	10	64	38	87	353	77
95th Queue (ft)	35	104	73	147	775	131
Link Distance (ft)		1194		1832	1653	2012
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	175		250			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Queuing and Blocking Report  
Interchange with No Access (Alternative No. 5) - Ex PM Peak

Average of 5 Runs

1/15/2014

Intersection: 7: OLD TH 14 & Old TH 99 (3rd Street)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	53
Average Queue (ft)	18
95th Queue (ft)	41
Link Distance (ft)	2994
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: CSAH 23/TH 111/CSAH 23 & EB TH 14 Ramps

Movement	EB	NB	SB
Directions Served	LTR	TR	LT
Maximum Queue (ft)	134	95	101
Average Queue (ft)	44	25	19
95th Queue (ft)	102	67	70
Link Distance (ft)	1168	1547	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0
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# **Preliminary Construction Cost Estimates**



PRELIMINARY COST ESTIMATE

TH14/111 INTERSECTION IMPROVEMENT  
NICOLLET, MN  
SP 5203-106

PREPARED BY: BWL  
REVIEWED BY: JMH  
DATE: 2/12/2014

NO.	MATERIAL NUMBER	ITEM	UNIT	UNIT PRICE	TH14/111															
					OPTION 1 - SIGNAL		OPTION 2 - ROUNDABOUT		OPTION 3 - RCI		OPTION 4 - INTERCHANGE W/ LOCAL ACCESS		OPTION 5 - INTERCHANGE W/O LOCAL ACCESS							
					QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST						
1	2021.501	MOBILIZATION	LUMP SUM	3.00%	1	\$35,254	1	\$17,821	1	\$20,514	See Attached Interchange Cost Estimate Provided by MnDOT	See Attached Interchange Cost Estimate Provided by MnDOT	PAVEMENT SECTIONS							
2	2104.503	REMOVE BITUMINOUS PAVEMENT	SQ FT	\$0.75												CONCRETE	CONCRETE	BITUMINOUS	BIT. SHOULDER	GRAVEL SURFACE
3	2106.607	EXCAVATION - COMMON	CU YD	\$6.00	3179	\$19,074	461	\$2,766	4223	\$25,338					CONCRETE	10"				
4	2106.607	COMMON EMBANKMENT (CY)	CU YD	\$3.00	31052	\$93,156	20001	\$60,003	15937	\$47,811					BIT WEAR		4"	2"		
5	2106.607	SELECT GRANULAR EMBANKMENT (CY)	CU YD	\$12.00	2918	\$35,016	2038	\$24,456	3958	\$47,496					BIT NONWEAR		2"	2"		
6	2118.501	AGGREGATE SURFACING CLASS 5	TON	\$13.00											CLASS 5 AGG.	6"	6"	8"	12"	
7	2211.501	AGGREGATE BASE CLASS 3	TON	\$12.00	9748	\$116,976	3200	\$38,400	1997	\$23,964					CLASS 3 AGG.		18"	18"	18"	
8	2211.501	AGGREGATE BASE CLASS 5	TON	\$16.00	6039	\$96,624	3014	\$48,224	4191	\$67,056					SELECT GRAN.	12"				
9	2301.604	CONCRETE PAVEMENT 10"	SQ YD	\$40.00	6344	\$253,760	4431	\$177,240	8603	\$344,120					COM. EMBANK.	29"	24"	24"	24"	
10	2360.501	TYPE SP 12.5 WEARING COURSE MIX (3,C)	TON	\$60.00	1716	\$102,960	471	\$28,260	296	\$17,760					REMOVE BIT PAVEMENT INCLUDES EXCAVATION, TOPSOIL BORROW, AND SEEDING.					
11	2360.503	TYPE SP 12.5 NON-WEARING COURSE MIX (3,B)	TON	\$55.00	985	\$54,175	323	\$17,765	201	\$11,055					UNIT PRICES TAKEN FROM MNDOT AVERAGE BID PRICES FOR AWARDED PROJECTS LIST 2012					
12	2521.501	4" CONCRETE WALK	SQ FT	\$3.50	511	\$1,789	16192	\$56,672	1215	\$4,253										
13	2531.501	CONCRETE CURB & GUTTER DES. B618	LIN FT	\$14.00	199	\$2,786	4644	\$65,016	597	\$8,358										
14	2565.511	TRAFFIC CONTROL SIGNAL SYSTEM	SIGS	\$250,000.00	1	\$250,000														
15		BRIDGE	SQ FT	\$175.00																
16		SIGNING AND PAVEMENT MARKING (2.5%)	LUMP SUM	2.50%	1	\$25,658	1	\$12,970	1	\$14,930										
17		TRAFFIC CONTROL (2.5%)	LUMP SUM	2.50%	1	\$25,658	1	\$12,970	1	\$14,930										
18		DRAINAGE (7.0%)	LUMP SUM	7.00%	1	\$71,842	1	\$36,316	1	\$41,805										
19		TEMPORARY & PERMANENT EROSION CONTROL (2.5%)	LUMP SUM	2.50%	1	\$25,658	1	\$12,970	1	\$14,930										
SUBTOTAL					\$1,210,386		\$611,849		\$704,320											
CONTINGENCY (15%)					\$181,558		\$91,777		\$105,648											
TOTAL CONSTRUCTION ESTIMATE (PRELIMINARY)					\$1,391,944		\$703,626		\$809,968		\$5,300,000		\$5,300,000							

REMOVE BIT PAVEMENT INCLUDES EXCAVATION, TOPSOIL BORROW, AND SEEDING.

UNIT PRICES TAKEN FROM MNDOT AVERAGE BID PRICES FOR  
AWARDED PROJECTS LIST 2012



PRELIMINARY COST ESTIMATE

TH14/111 INTERSECTION IMPROVEMENT  
NICOLLET, MN  
SP 5203-106

PREPARED BY: BWL  
REVIEWED BY: JMH  
DATE: 2/12/2014

NO.	MATERIAL NUMBER	ITEM	UNIT	UNIT PRICE	471st AVENUE				451st AVENUE		478th STREET				471st, 451st, & 478th WITH OPTION 5 INTERCHANGE		
					NORMAL		RCI		NORMAL		NORMAL		RCI				
					QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
1	2021.501	MOBILIZATION	EACH	3.00%	1	\$15,236	1	\$21,287	1	\$11,430	1	\$16,614	1	\$23,390	1	\$16,925	
2	2104.503	REMOVE BITUMINOUS PAVEMENT	SQ FT	\$0.75	24496	\$18,372	11196	\$8,397	43548	\$32,661					105251	\$78,938	
3	2106.607	EXCAVATION - COMMON	CU YD	\$6.00	1339	\$8,034	1114	\$6,684	1996	\$11,976	2299	\$13,794	3809	\$22,854	3335	\$20,010	
4	2106.607	COMMON EMBANKMENT (CY)	CU YD	\$3.00	15028	\$45,084	22901	\$68,703	11851	\$35,553	27576	\$82,728	31766	\$95,298	12967	\$38,901	
5	2106.607	SELECT GRANULAR EMBANKMENT (CY)	CU YD	\$12.00	2496	\$29,952	3784	\$45,408	1817	\$21,804	2517	\$30,204	3830	\$45,960	2463	\$29,556	
6	2118.501	AGGREGATE SURFACING CLASS 5	TON	\$14.00	2602	\$36,428	1477	\$20,678	1291	\$18,074	3001	\$42,014	2921	\$40,894	2414	\$33,796	
7	2211.501	AGGREGATE BASE CLASS 3	TON	\$12.00	4147	\$49,764	3841	\$46,092	2144	\$25,728	4745	\$56,940	5118	\$61,416	3620	\$43,440	
8	2211.501	AGGREGATE BASE CLASS 5	TON	\$16.00	2257	\$36,112	3979	\$63,664	1657	\$26,512	2274	\$36,384	3624	\$57,984	2120	\$33,920	
9	2301.604	CONCRETE PAVEMENT 10"	SQ YD	\$40.00	5426	\$217,040	8226	\$329,040	3951	\$158,040	5471	\$218,840	8327	\$333,080	5354	\$214,160	
10	2360.501	TYPE SP 12.5 WEARING COURSE MIX (3,C)	TON	\$60.00	24	\$1,440	164	\$9,840	21	\$1,260	24	\$1,440	74	\$4,440			
11	2360.503	TYPE SP 12.5 NON-WEARING COURSE MIX (3,B)	TON	\$55.00	24	\$1,320	164	\$9,020	21	\$1,155	24	\$1,320	74	\$4,070			
12	2521.501	4" CONCRETE WALK	SQ FT	\$3.50			783	\$2,741					1755	\$6,143			
13	2531.501	CONCRETE CURB & GUTTER DES. B618	LIN FT	\$14.00			675	\$9,450					629	\$8,806			
14	2565.511	TRAFFIC CONTROL SIGNAL SYSTEM	SIGS	\$250,000.00													
15		BRIDGE	SQ FT	\$175.00													
16		SIGNING AND PAVEMENT MARKING (2.5%)	LUMP SUM	2.50%	1	\$11,089	1	\$15,493	1	\$8,319	1	\$12,092	1	\$17,024	1	\$12,318	
17		TRAFFIC CONTROL (2.5%)	LUMP SUM	2.50%	1	\$11,089	1	\$15,493	1	\$8,319	1	\$12,092	1	\$17,024	1	\$12,318	
18		DRAINAGE (7.0%)	LUMP SUM	7.00%	1	\$31,048	1	\$43,380	1	\$23,293	1	\$33,856	1	\$47,666	1	\$34,490	
19		TEMPORARY & PERMANENT EROSION CONTROL (2.5%)	LUMP SUM	2.50%	1	\$11,089	1	\$15,493	1	\$8,319	1	\$12,092	1	\$17,024	1	\$12,318	
SUBTOTAL					\$523,097		\$730,863		\$392,443		\$570,410		\$803,073		\$581,090		
CONTINGENCY (15%)					\$78,465		\$109,629		\$58,866		\$85,562		\$120,461		\$87,164		
TOTAL CONSTRUCTION ESTIMATE (PRELIMINARY)					\$601,562		\$840,492		\$451,309		\$655,972		\$923,534		\$668,254		

5203-104 CONSTRUCTION ESTIMATE - CONCRETE ESTIMATE - INTERCHANGE				
ITEM NO.	ITEM		UNIT	ESTIMATED
				QUANTITIES
2021.501	MOBILIZATION		LUMP SUM	1
2104.505	REMOVE BITUMINOUS PAVEMENT		SQ YD	8220
2104.513	SAWING BIT PAVEMENT (FULL DEPTH)		LIN FT	72
2106.607	EXCAVATION - COMMON		CU YD	53,713
2106.607	EXCAVATION - MUCK		CU YD	0
2106.607	GRANULAR EMBANKMENT - MUCK (CV)		CU YD	0
2106.607	COMMON EMBANKMENT (CV)		CU YD	112,548
2106.607	SELECT GRANULAR EMBANKMENT (CV)		CU YD	10,050
2211.503	AGGREGATE BASE (CV) CLASS 6		CU YD	6,453
2221.503	AGGREGATE SHOULDERING (CV) CLASS 1		CU YD	92
2232.501	MILL BITUMINOUS SURFACE (2.0")		SQ YD	0
2301.604	CONCRETE PAVEMENT 10.0"		SQ YD	7589
2360.501	TYPE SP 12.5 WEARING COURSE MIX (2,B)		TON	326
2360.501	TYPE SP 12.5 WEARING COURSE MIX (4,C)		TON	3100
2360.502	TYPE SP 12.5 NON WEAR COURSE MIX (4,B)		TON	3100
2502.501	4" PRECAST CONCRETE HEADWALL		EACH	45
2502.521	4" TP PIPE DRAIN		LIN FT	1,339
2502.541	4" PERF PE PIPE DRAIN		LIN FT	11,160
2521.501	4" CONCRETE WALK		SQ FT	5000
2531.501	CONCRETE CURB & GUTTER DESIGN B424		LIN FT	1700
2563.601	TRAFFIC CONTROL		LUMP SUM	1

2012 ESTIMATED UNIT PRICE	ESTIMATED COST
------------------------------	----------------

\$137,034.42\$137,034

\$6.00\$49,320

\$2.00\$144

\$1.84\$98,832

\$4.30\$0

\$10.00\$0

\$3.00\$337,644

\$12.00\$120,600

\$20.00\$129,060

\$26.00\$2,388

\$0.75\$0

\$36.00\$273,204

\$70.00\$22,820

\$75.00\$232,500

\$75.00\$232,500

\$150.00\$6,696

\$3.25\$4,352

\$2.50\$27,900

\$3.50\$17,500

\$12.00\$20,400

\$34,258.60\$34,259

BRIDGE

SQ FT11000

\$150.00\$1,650,000

landscaping/snow fence\$200,000

TOTAL\$3,597,153

25% other construction\$899,288

10% contingency\$359,715

TOTAL 2012 CONSTRUCTION COST\$4,856,157

INFLATION1.09

TOTAL 2015 CONSTRUCTION COST\$5,300,000

NOTES

mob 4% const

includes minor items including earthwork and aggregates for turn lanes, approach panels, private tile, curb and gutter on rural approaches

# **Benefit-Cost Worksheets**

<h1>B/C</h1> <p>worksheet*</p> <p>(based on Crash Reduction)</p>			Control Section	T.H. / Roadway	Location	Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends	
				TH 14	Intersection of TH 14 and TH 111			City of Nicollet	1/1/2008	12/31/2012	
			Description of Proposed Work								Alternative No. 1 - Traffic Signal
<div> <div>Accident Diagram Codes</div> </div>			1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
Study Period: Number of Crashes	Fatal	F				1					1
	Personal Injury (PI)	A									
		B				1					1
		C				1					1
	Property Damage	PD		2				1			
% Change in Crashes  <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F				-44%					
	PI	A									
		B				-44%					
		C				-44%					
	Property Damage	PD		-44%				-44%			
Change in Crashes  <small>= No. of crashes X % change in crashes</small>	Fatal	F				-0.44					-0.44
	PI	A									
		B				-0.44					-0.44
		C				-0.44					-0.44
	Property Damage	PD		-0.88				-0.44			
Year (Safety Improvement Construction)			2015								
					Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit		
Project Cost (exclude Right of Way)			\$ 1,570,178		F	-0.44	-0.09	\$ 1,080,000	\$ 94,988		
Right of Way Costs (optional)					A			\$ 540,000			
Traffic Growth Factor			3.5%		B	-0.44	-0.09	\$ 160,000	\$ 14,072		
Capital Recovery					C	-0.44	-0.09	\$ 80,000	\$ 7,036		
1. Discount Rate			2.2%		PD	-1.32	-0.26	\$ 3,300	\$ 871		
2. Project Service Life (n)			25		Total				\$ 116,967		
<div> <div> <div>B/C= 2.18</div> <div>           Using present worth values,            B= \$ 3,417,274            C= \$ 1,570,178            See "Calculations" sheet for amortization.         </div> </div> <div>Office of Traffic, Safety and Technology October 2013</div> </div>											

\*Source: MnDOT HSIP Worksheet, Office of Traffic, Safety, and Technology, October 2013.






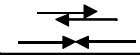
<h1>B/C</h1> <p>worksheet*</p> <p>(based on Crash Reduction)</p>			Control Section	T.H. / Roadway	Location	Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
				TH 14	Intersection of TH 14 and TH 111			City of Nicollet	1/1/2008	12/31/2012
			Description of Proposed Work							
<div> <div>Accident Diagram Codes</div> </div>			1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8,9 Head On/Sideswipe Opposite Direction	6, 90, 99	
									Pedestrian	Other
Study Period: Number of Crashes	Fatal	F				1				1
	Personal Injury (PI)	A								
		B				1				1
		C				1				1
	Property Damage	PD		2				1		
% Change in Crashes <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F				-44%				
	PI	A								
		B				-44%				
		C				-44%				
	Property Damage	PD		-44%			-44%			
Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F				-0.44				-0.44
	PI	A								
		B				-0.44				-0.44
		C				-0.44				-0.44
	Property Damage	PD		-0.88			-0.44			-1.32
Year (Safety Improvement Construction)			2015							
				Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit	<div>B/C= 4.30</div> <div>Using present worth values,</div> <div>B= \$ 3,417,274</div> <div>C= \$ 794,013</div> <div>See "Calculations" sheet for amortization.</div> <div>Office of Traffic, Safety and Technology October 2013</div>		
Project Cost (exclude Right of Way)			\$ 794,013	Type of Crash						
Right of Way Costs (optional)				F	-0.44	-0.09	\$ 1,080,000 \$ 94,988			
Traffic Growth Factor			3.5%	A			\$ 540,000			
Capital Recovery				B	-0.44	-0.09	\$ 160,000 \$ 14,072			
1. Discount Rate			2.2%	C	-0.44	-0.09	\$ 80,000 \$ 7,036			
2. Project Service Life (n)			25	PD	-1.32	-0.26	\$ 3,300 \$ 871			
				Total			\$ 116,967			

\*Source: MnDOT HSIP Worksheet, Office of Traffic, Safety, and Technology, October 2013.

<h1>B/C</h1> <p>worksheet*</p> <p>(based on Crash Reduction)</p>			Control Section	T.H. / Roadway	Location	Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends	
				TH 14	Intersection of proposed TH 14 and TH 111			City of Nicollet	1/1/2008	12/31/2012	
			Description of Proposed Work								Alternative No. 3 - RCI
<div> <div>Accident Diagram Codes</div> </div>			1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
Study Period: Number of Crashes	Fatal	F				1					1
	Personal Injury (PI)	A									
		B				1					1
		C				1					1
	Property Damage	PD		2				1			
% Change in Crashes  <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F				-44%					
	PI	A									
		B				-44%					
		C				-44%					
	Property Damage	PD		-44%				-44%			
Change in Crashes  <small>= No. of crashes X % change in crashes</small>	Fatal	F				-0.44					-0.44
	PI	A									
		B				-0.44					-0.44
		C				-0.44					-0.44
	Property Damage	PD		-0.88				-0.44			
Year (Safety Improvement Construction)			2015								
					Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit	<div>B/C= 3.61</div> <div>Using present worth values,</div> <div>B= \$ 3,417,274</div> <div>C= \$ 945,592</div> <div>See "Calculations" sheet for amortization.</div> <div>Office of Traffic, Safety and Technology October 2013</div>	
Project Cost (exclude Right of Way)			\$ 945,592		F	-0.44	-0.09	\$ 1,080,000	\$ 94,988		
Right of Way Costs (optional)					A			\$ 540,000			
Traffic Growth Factor			3.5%		B	-0.44	-0.09	\$ 160,000	\$ 14,072		
Capital Recovery					C	-0.44	-0.09	\$ 80,000	\$ 7,036		
1. Discount Rate			2.2%		PD	-1.32	-0.26	\$ 3,300	\$ 871		
2. Project Service Life (n)			25		Total				\$ 116,967		

\*Source: MnDOT HSIP Worksheet, Office of Traffic, Safety, and Technology, October 2013.



<h1>B/C</h1> <p>worksheet*</p> <p>(based on Crash Reduction)</p>			Control Section	T.H. / Roadway	Location	Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
				TH 14	Intersection of TH 14 and TH 111			City of Nicollet	1/1/2008	12/31/2012
			Description of Proposed Work							
<div>Accident Diagram Codes</div>			1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	6, 90, 99	
									Pedestrian	Other
Study Period: Number of Crashes	Fatal	F				1				1
	Personal Injury (PI)	A								
		B				1				1
		C				1				1
	Property Damage	PD		2			1			3
% Change in Crashes <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F				-82%				
	PI	A								
		B				-82%				
		C				-82%				
	Property Damage	PD								
Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F				-0.82				-0.82
	PI	A								
		B				-0.82				-0.82
		C				-0.82				-0.82
	Property Damage	PD		0.00			0.00			
Year (Safety Improvement Construction)			2015							
Project Cost (exclude Right of Way)			\$ 6,800,000		Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit	<div>B/C= 0.93</div> <p>Using present worth values,</p> <p>B= \$ 6,321,147</p> <p>C= \$ 6,800,000</p> <p>See "Calculations" sheet for amortization.</p> <p>Office of Traffic, Safety and Technology October 2013</p>
Right of Way Costs (optional)					F	-0.82	-0.16	\$ 1,080,000	\$ 177,023	
Traffic Growth Factor			3.5%		A			\$ 540,000		
Capital Recovery					B	-0.82	-0.16	\$ 160,000	\$ 26,226	
1. Discount Rate			2.2%		C	-0.82	-0.16	\$ 80,000	\$ 13,113	
2. Project Service Life (n)			25		PD			\$ 3,300		
					Total			\$ 216,361		

\*Source: MnDOT HSIP Worksheet, Office of Traffic, Safety, and Technology, October 2013.

<h1>B/C</h1> <p>worksheet*</p> <p>(based on Crash Reduction)</p>			Control Section	T.H. / Roadway	Location	Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends	
				TH 14	Intersection of TH 14 and TH 111			City of Nicollet	1/1/2008	12/31/2012	
			Description of Proposed Work								Alternative No. 5 - Interchange with no Access
<div> <div>Accident Diagram Codes</div> </div>			1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
Study Period: Number of Crashes	Fatal	F				1					1
	Personal Injury (PI)	A									
		B				1					1
		C				1					1
	Property Damage	PD		2				1			
% Change in Crashes <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F				-82%					
	PI	A									
		B				-82%					
		C				-82%					
	Property Damage	PD									
Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F				-0.82					-0.82
	PI	A									
		B				-0.82					-0.82
		C				-0.82					-0.82
	Property Damage	PD		0.00				0.00			
Year (Safety Improvement Construction)			2015								
Project Cost (exclude Right of Way)			\$ 5,800,000		Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit	<div>B/C= 1.09</div> <div>Using present worth values,</div> <div>B= \$ 6,321,147</div> <div>C= \$ 5,800,000</div> <div>See "Calculations" sheet for amortization.</div> <div>Office of Traffic, Safety and Technology October 2013</div>	
Right of Way Costs (optional)					F	-0.82	-0.16	\$ 1,080,000	\$ 177,023		
Traffic Growth Factor			3.5%		A			\$ 540,000			
Capital Recovery					B	-0.82	-0.16	\$ 160,000	\$ 26,226		
1. Discount Rate			2.2%		C	-0.82	-0.16	\$ 80,000	\$ 13,113		
2. Project Service Life (n)			25		PD			\$ 3,300			
					Total						
										\$ 216,361	

\*Source: MnDOT HSIP Worksheet, Office of Traffic, Safety, and Technology, October 2013.