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DRAFT - Needs Assessment Memorandum

To: ***Darren Laesch, PE, MnDOT District 2***

From: ***Jack Corkle, PTP, AICP, WSB & Associates, Inc.***

Date: ***April 26, 2016***

Re: ***TH 11 Corridor Needs***
WSB Project No. 03063-000

The purpose of this memo is to document existing and future needs on TH 11 between Greenbush and Roosevelt and to develop a methodology for prioritize needs. The memo is divided into 8 sections.

Section 1 provides general information on TH 11 and the area in which the study is occurring.

Section 2 provides information on corridor segment and intersection operations. Within this section, operational needs are identified and prioritized based upon criteria discussed in the future conditions memo previously produced.

Section 3 provides information on corridor safety. Within this section, safety problem areas are identified and prioritized based upon crash and severity rates, crash clusters and locations with fatal and Type A injuries.

Section 4 provides information on turn lane needs. Within this section, policies and priorities for turn lane construction are identified.

Section 5 provides information on access management needs. These needs are called out separately than safety and mobility needs, but strongly influence both of those areas. As such, it is important to look at locations where excessive access may be contributing to problems today and have the potential to exacerbate future conditions as traffic volumes increase and additional development occurs. Access locations are prioritized based upon clusters of access and opportunities to potentially find alternate solutions.

Section 6 provides information on community desire needs. These needs were identified from PMT members, focus group meetings and general conversations with stakeholder groups.

Section 7 provides information on asset preservation needs. These needs are pulled from the asset management memo previously completed. This memo included time frames and the type of work that was needed to maintain roadway surfaces, corridor drainage, sidewalk needs, and bridges.

Section 8 identifies potential projects/concepts for further evaluation and study as part of the TH 11 Study based upon the priorities and type of project. For example, a project that recommends widening the shoulders on the segment of TH 11 between Warroad and Roosevelt may be more of a policy and safety project that does not require additional drawings and/or investigation. Projects such as that will be identified as part of the needs and will be incorporated into the final plan as part of the tasks associated with developing overall recommendations. Projects identified in Section 8 will include those that will require additional design work and/or technical analyses to better understand the problems at hand and to develop potential solutions. It should be noted that there are still likely projects (based upon the needs) that will need further definition and refinement in the future. These projects will be identified as part of the final report.

Most projects identified as part of this study will require additional coordination between MnDOT, local agencies and property owners.

1. Study Background Information

TH 11 is the primary east-west route for communities located near the Canadian border including, Greenbush, Badger, Roseau, Warroad and Roosevelt (**Figure 1**). It serves an important connection to international border crossings with Canada – including one that is open year-round, 24 hours a day. The corridor is home to two major employers, Polaris and Marvin Windows, as well as the Seven Clans Casino, which is also a larger employer for the area. In addition, Lake of the Woods borders the corridor in Warroad. Much of the area between the communities along the corridor is largely undeveloped, with a smattering of manufactured home communities, contractor yards, agricultural uses, isolated businesses, residential development and the Roseau Airport.

The corridor study area covers the approximately 60 miles of TH 11 between Greenbush and Roosevelt. As part of the study, existing and future conditions were evaluated and recommendations for improvements along the corridor will be identified for implementation over the next 20 years. This memo focuses on identifying and prioritizing needs on the corridor.

2. Operational Needs

Operational needs address specific locations with ongoing and recurring delay due to congestion. The needs can be at the segment level or at the intersection level. Each is discussed in the pages that follow. Segments are discussed first, followed by intersections. For each area, the criteria for identifying a problem are documented followed by a list of problem areas. Priorities are tentatively assigned (prior to going to the TAC) based on consultant and MnDOT review.

Roseau County

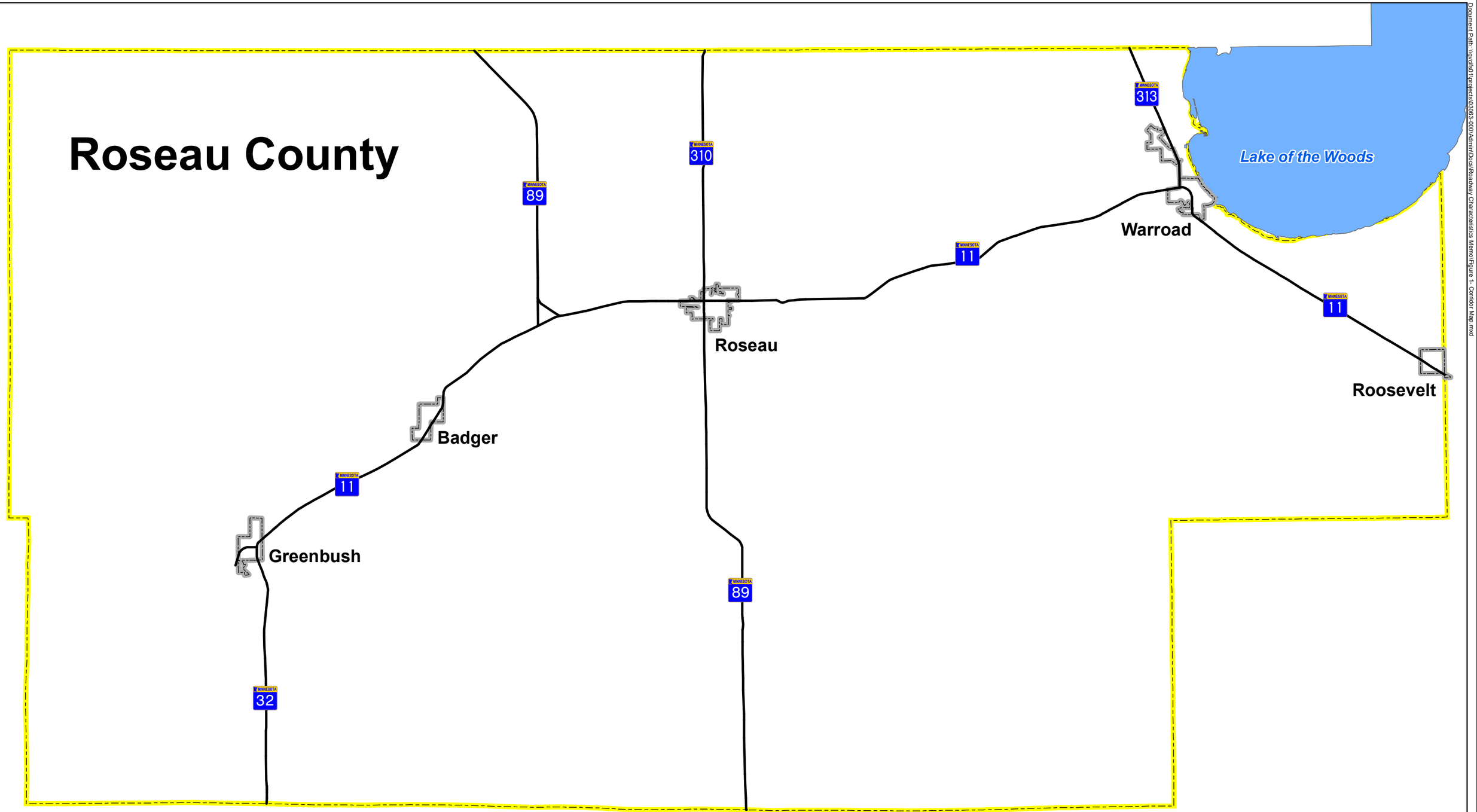

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Figure 1- Corridor Study Area

[redacted]

Corridor Segments

The corridor segments were developed as part of the future operational needs memo completed as part of Task 5. **Table 1** lists the segments and includes information on segment design, current volumes and current volume to capacity (v/c) ratios. As noted in the traffic memo, a v/c ratio of 0.85 to 1 indicates the segment is nearing congestion. A v/c ratio over 1 indicates that the segment is likely to experience some ongoing/reoccurring congestion.

Table 2 lists the segments and includes information on the segment design and future volumes between 2020 and 2040. This table shows how volumes are expected to grow over time. Please note, Segment 10 is being upgraded to a three-lane segment in the summer of 2015 and is noted as such for future conditions.

Table 3 lists the segments and includes information on the segment design and future v/c ratios. Volumes for 2035 and 2040 are also provided.

Criteria for Segments

The intent of the criteria for the segments is to identify the segments that may currently be considered congested or a likely to experience reoccurring delay/congestion in the future. Based upon the v/c threshold of 0.85 as nearing congestion, the criteria below provide an extra buffer to plan for the long-term.

- Identify existing segments with v/c greater than 0.80
- Identify future segments with a v/c greater than 0.80

Problem Segments

There are no segments that are considered as congested currently.

In the future there are two segments that exceed v/c ratios. These segments include:

- Warroad Segment 21 – Lake Street NE/CR 74 to Hallberg
- Warroad Segment 22 – Hallberg to Garfield

Volumes on Segment 21 start to approach congestion in 2025. At that time, the v/c ratio is at 0.86. By 2030 the v/c ratio is approximately 0.93, and in 2035 it is 0.99. It is 1.05 in 2040. Volumes on Segment 22 are 0.82 in 2035 and are 0.86 in 2040.

Need Priorities

The two segments should be combined with one another and completed at the same time given their proximity to one another. In addition to these two segments, it is recommended that the area to CSAH 5 be considered. This will add about a tenth of a mile to the area and would address the urbanizing portions of Warroad.

Table 1: Existing Volumes and V/C Ratios by Segment

			Existing Characteristics						
			Length	Posted	No. of	Design	Maximum	2014	
Segment	From	To	(mi)	Speed	Lanes	Type	Capacity	Volume	V/C Ratio
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	0.49	55	2	R-1	15,000	2,450	0.16
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	0.45	30	2	U-1	10,000	2,450	0.25
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	0.20	40	2	U-1	10,000	2,500	0.25
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	9.45	55	2	R-1	15,000	2,500	0.17
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	0.16	50	2	R-2	15,000	2,500	0.17
6	CSAH 2/University Ave	South of the north junction of CSAH 3	0.67	50	2	R-2	15,000	2,750	0.18
7	South of the north junction of CSAH 3	TH 308	4.98	55	2	R-1	15,000	2,750	0.18
8	TH 308	Western Junction with TH 89	1.00	55	2	R-1	15,000	2,800	0.19
9	Western Junction with TH 89	CR 120/380th/18th Aves	5.11	55	2	R-1	15,000	3,600	0.24
10	CR 120/380th/18th Aves	0.2 miles east of CR 120/380th/18th Aves in Roseau	0.20	55	2	R-1	15,000	8,700	0.58
11	0.2 miles east of CR 120/380th/18th Aves	7th Ave SW in Roseau	0.61	45	3	U-3	17,000	8,700	0.51
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	0.18	30	3	U-2	17,000	8,700	0.51
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	0.26	30	3	U-2	17,000	7,800	0.46
14	Main Ave North	3rd Ave NE in Roseau	0.16	30	3	U-2	17,000	6,300	0.37
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	0.59	30	3	U-2	17,000	5,700	0.34
16	CSAH 24/11th Ave	CSAH 46	16.80	55	2	R-1	15,000	3,900	0.26
17	CSAH 46	TH 313 in Warroad	3.14	55	2	R-1	15,000	4,400	0.29
18	TH 313	300 feet north of Elk St NW in Warroad	0.72	40	3	U-3	17,000	6,800	0.40
19	300 feet north of Elk St NW	Lake St NW in Warroad	0.13	30	3	U-2	17,000	6,800	0.40
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	0.17	30	3	U-2	17,000	7,600	0.45
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	0.15	30	2	U-1	10,000	7,500	0.75
22	Hallberg St SW	Garfield St SW in Warroad	0.21	30	2	U-1	10,000	6,300	0.63
23	Garfield St SW	200 feet east/south CSAH 5	0.09	30	2	U-1	10,000	3,550	0.36
24	200 feet east/south CSAH 5	CSAH 12	3.12	55	2	R-1	15,000	3,550	0.24
25	CSAH 12	Roseau–Lake of the Woods County Line	9.37	55	2	R-1	15,000	1,550	0.10

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Code	Definition	Volume Threshold	Code	Definition	Volume Threshold
U-1	Two-lane urban at 30 - 40 mph.	10,000 ADT	R-1	Two-lane rural at 55 - 55+ mph.	15,000 ADT
U-2	Three-lane urban at 30 mph.	17,000 ADT	R-2	Two-lane rural at 50 mph.	15,000 ADT
U-3	Three-lane urban at 40 - 45 mph.	17,000 ADT			

Table 2: Future Volumes (2020 – 2040) by Segment

			Future Characteristics				Most	2020 - 2040 Projections				
	Segment Termini		Length	Posted	No. of	Design	Recent	2020	2025	2030	2035	2040
Segment	From	To	(mi)	Speed	Lanes	Type*	Volume (2014)	Volume	Volume	Volume	Volume	Volume
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	0.49	55	2	R-1	2,450	2,651	2,830	3,022	3,227	3,446
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	0.45	30	2	U-1	2,450	2,651	2,830	3,022	3,227	3,446
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	0.20	40	2	U-1	2,500	2,705	2,888	3,084	3,293	3,516
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	9.45	55	2	R-1	2,500	2,705	2,888	3,084	3,293	3,516
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	0.16	50	2	R-2	2,500	2,705	2,888	3,084	3,293	3,516
6	CSAH 2/University Ave	South of the north junction of CSAH 3	0.67	50	2	R-2	2,750	2,975	3,177	3,392	3,622	3,868
7	South of the north junction of CSAH 3	TH 308	4.98	55	2	R-1	2,750	2,975	3,177	3,392	3,622	3,868
8	TH 308	Western Junction with TH 89	1.00	55	2	R-1	2,800	3,029	3,235	3,454	3,688	3,938
9	Western Junction with TH 89	CR 120/380th/18th Aves	5.11	55	2	R-1	3,600	3,895	4,159	4,441	4,742	5,063
10	CR 120/380th/18th Aves	0.2 miles east of CR 120/380th/18th Aves in Roseau	0.20	45	2	U-3	8,700	9,412	10,051	10,732	11,459	12,236
11	0.2 miles east of CR 120/380th/18th Aves	7th Ave SW in Roseau	0.61	45	3	U-3	8,700	9,412	10,051	10,732	11,459	12,236
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	0.18	30	3	U-2	8,700	9,412	10,051	10,732	11,459	12,236
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	0.26	30	3	U-2	7,800	8,439	9,011	9,622	10,274	10,970
14	Main Ave North	3rd Ave NE in Roseau	0.16	30	3	U-2	6,300	6,816	7,278	7,771	8,298	8,861
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	0.59	30	3	U-2	5,700	6,167	6,585	7,031	7,508	8,017
16	CSAH 24/11th Ave	CSAH 46	16.80	55	2	R-1	3,900	4,219	4,505	4,811	5,137	5,485
17	CSAH 46	TH 313 in Warroad	3.14	55	2	R-1	4,400	4,760	5,083	5,428	5,796	6,188
18	TH 313	300 feet north of Elk St NW in Warroad	0.72	40	3	U-3	6,800	7,357	7,856	8,388	8,957	9,564
19	300 feet north of Elk St NW	Lake St NW in Warroad	0.13	30	3	U-2	6,800	7,357	7,856	8,388	8,957	9,564
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	0.17	30	3	U-2	7,600	8,222	8,780	9,375	10,010	10,689
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	0.15	30	2	U-1	7,500	8,114	8,664	9,252	9,879	10,548
22	Hallberg St SW	Garfield St SE in Warroad	0.21	30	2	U-1	6,300	6,816	7,278	7,771	8,298	8,861
23	Garfield St SE	200 feet east/south CSAH 5	0.09	30	2	U-1	3,550	3,841	4,101	4,379	4,676	4,993
24	200 feet east/south CSAH 5	CSAH 12	3.12	55	2	R-1	3,550	3,841	4,101	4,379	4,676	4,993
25	CSAH 12	Roseau–Lake of the Woods County Line	9.37	55	2	R-1	1,550	1,677	1,791	1,912	2,042	2,180

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Code	Definition	Volume Threshold		Code	Definition	Volume Threshold
U-1	Two-lane urban at 30 – 40 mph.	10,000 ADT		R-1	Two-lane rural at 55 - 55+ mph.	15,000 ADT
U-2	Three-lane urban at 30 mph.	17,000 ADT		R-2	Two-lane rural at 50 mph.	15,000 ADT
U-3	Three-lane urban at 40 - 45 mph.	17,000 ADT				

Table 3: Future Volumes and V/C Ratios by Segment

Segment	Segment Termini From	To	Future Characteristics Length (mi)	Posted Speed	No. of Lanes	Design Type	Maximum Capacity	2040 Volume	2040 V/C Ratio	2035 Volume	2035 V/C Ratio
1	Western Limit of Greenbush	East of Oakview Dr. in Greenbush	0.49	55	2	R-1	15,000	3,446	0.23	3,227	0.22
2	East of Oakview Dr.	Junction with TH 32 in Greenbush	0.45	30	2	U-1	10,000	3,446	0.34	3,227	0.32
3	Junction with TH 32	0.2 miles north/east of the TH 32 Junction	0.20	40	2	U-1	10,000	3,516	0.35	3,293	0.33
4	0.2 miles north/east of the TH 32 Junction	850 feet south of CSAH 2/University Ave in Badger	9.45	55	2	R-1	15,000	3,516	0.23	3,293	0.22
5	850 feet south of CSAH 2/University Avenue	CSAH 2/University Avenue in Badger	0.16	50	2	R-2	15,000	3,516	0.23	3,293	0.22
6	CSAH 2/University Ave	South of the north junction of CSAH 3	0.67	50	2	R-2	15,000	3,868	0.26	3,622	0.24
7	South of the north junction of CSAH 3	TH 308	4.98	55	2	R-1	15,000	3,868	0.26	3,622	0.24
8	TH 308	Western Junction with TH 89	1.00	55	2	R-1	15,000	3,938	0.26	3,688	0.25
9	Western Junction with TH 89	CR 120/380th/18th Aves	5.11	55	2	R-1	15,000	5,063	0.34	4,742	0.32
10	CR 120/380th/18th Aves	0.2 miles east of CR 120/380th/18th Aves in Roseau	0.20	45	2	U-3	17,000	12,236	0.72	11,459	0.67
11	0.2 miles east of CR 120/380th/18th Aves	7th Ave SW in Roseau	0.61	45	3	U-3	17,000	12,236	0.72	11,459	0.67
12	7th Ave SW	Junction with TH 310/89/5th Ave in Roseau	0.18	30	3	U-2	17,000	12,236	0.72	11,459	0.67
13	Junction with TH 310/89/5th Ave	Main Ave North in Roseau	0.26	30	3	U-2	17,000	10,970	0.65	10,274	0.60
14	Main Ave North	3rd Ave NE in Roseau	0.16	30	3	U-2	17,000	8,861	0.52	8,298	0.49
15	3rd Ave NE	CSAH 24/11th Ave in Roseau	0.59	30	3	U-2	17,000	8,017	0.47	7,508	0.44
16	CSAH 24/11th Ave	CSAH 46	16.80	55	2	R-1	15,000	5,485	0.37	5,137	0.34
17	CSAH 46	TH 313 in Warroad	3.14	55	2	R-1	15,000	6,188	0.41	5,796	0.39
18	TH 313	300 feet north of Elk St NW in Warroad	0.72	40	3	U-3	17,000	9,564	0.56	8,957	0.53
19	300 feet north of Elk St NW	Lake St NW in Warroad	0.13	30	3	U-2	17,000	9,564	0.56	8,957	0.53
20	Lake St NW in Warroad	CSAH 74/Lake St NE in Warroad	0.17	30	3	U-2	17,000	10,689	0.63	10,010	0.59
21	CSAH 74/Lake St NE	Hallberg St SW in Warroad	0.15	30	2	U-1	10,000	10,548	**1.05**	9,879	**0.99**
22	Hallberg St SW	Garfield St SW in Warroad	0.21	30	2	U-1	10,000	8,861	**0.89**	8,298	**0.83**
23	Garfield St SW	200 feet east/south CSAH 5	0.09	30	2	U-1	10,000	4,993	0.50	4,676	0.47
24	200 feet east/south CSAH 5	CSAH 12	3.12	55	2	R-1	15,000	4,993	0.33	4,676	0.31
25	CSAH 12	Roseau–Lake of the Woods County Line	9.37	55	2	R-1	15,000	2,180	0.15	2,042	0.14

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Code	Definition	Volume Threshold
U-1	Two-lane urban at 30 - 40 mph	10,000 ADT
U-2	Three-lane urban at 30 mph	17,000 ADT
U-3	Three-lane urban at 40 - 45 mph	17,000 ADT

Code	Definition	Volume Threshold
R-1	Two-lane rural at 55 - 55+ mph	15,000 ADT
R-2	Two-lane rural at 50 mph	15,000 ADT

Intersections

The key intersections studied were identified as part of the existing traffic characteristics and the future operations memo developed as part of Tasks 4 and 5. **Table 4** lists the intersections that were analyzed.

Table 4: Key Intersections Analyzed

	Intersection with TH 11 and	Community	Intersection Type
1.	TH 32	Greenbush	Stop control for TH 11
2.	CR 120/380th/18th Avenues	Roseau	Stop control for side street
3.	TH 89/TH 310	Roseau	Signal
4.	TH 313	Warroad	Signal
5.	CR 74/Lake Street NE	Warroad	Signal

As noted in both the traffic characteristics and future operations memos, intersections are evaluated on how well they operate by a measure called level of service (LOS). Intersections are given a ranking of LOS A through LOS F. LOS "A" represents the best operations and "F" represents the poorest operations. At LOS A, motorists experience very little delay. At LOS F conditions, motorists experience severe congestion and extreme delay, i.e., gridlock. Although LOS A conditions represents the best possible level of traffic flow, the cost to construct intersections to such a high standard exceeds the benefits. Within an urbanized or urbanizing area, it is generally regarded that LOS D provides an acceptable level of service.

Table 5 lists the intersections and provides an overall LOS for the intersection as well as individual movements at the intersection for the AM and PM peak periods as well as a midday period. Table 5 is for existing conditions. **Table 6** lists the same information for future conditions (2040). It should be noted that information in Table 6 includes some adjustment in traffic signal timing and incorporates the flashing yellow arrow as part of improvements to the traffic signals in Warroad planned for 2019.

Criteria for Intersections

The intent of the criteria for the intersections is to identify movements and overall LOS that may be becoming unacceptable.

- Identify existing intersections or movements with LOS D or worse
- Identify future intersections or movements with LOS D or worse

Problem Intersections

There are no intersections or movements now or in the future identified as LOS D or worse.

Table 5: Existing Intersection LOS – AM, PM and Midday Periods

Intersection			AM Peak				Mid-day				PM Peak			
Control	Location	Approach	Movement Delay* (LOS)			Intersection Delay* (LOS)	Movement Delay* (LOS)			Intersection Delay* (LOS)	Movement Delay* (LOS)			Intersection Delay* (LOS)
			Left	Through	Right		Left	Through	Right		Left	Through	Right	
Thru-Stop	TH 11 & TH 32	NB	2 (A)	1 (A)	0 (A)	2 (A)	2 (A)	1 (A)	0 (A)	3 (A)	2 (A)	1 (A)	0 (A)	2 (A)
		WB	0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)	
		SB	0 (A)	1 (A)	1 (A)		0 (A)	1 (A)	1 (A)		0 (A)	1 (A)	1 (A)	
		EB	5 (A)	0 (A)	3 (A)		6 (A)	0 (A)	2 (A)		6 (A)	0 (A)	2 (A)	
Thru-Stop	TH 11 & 18th Ave NW	NB	5 (A)	6 (A)	2 (A)	1 (A)	5 (A)	5 (A)	2 (A)	1 (A)	5 (A)	8 (A)	3 (A)	1 (A)
		WB	1 (A)	1 (A)	0 (A)		1 (A)	2 (A)	1 (A)		1 (A)	2 (A)	0 (A)	
		SB	5 (A)	6 (A)	0 (A)		0 (A)	8 (A)	0 (A)		0 (A)	0 (A)	0 (A)	
		EB	0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)	
Signalized	TH 11 & TH 89/TH 310	NB	9 (A)	10 (B)	4 (A)	9 (A)	10 (B)	7 (A)	4 (A)	10 (B)	11 (B)	9 (A)	5 (A)	10 (B)
		WB	12 (B)	11 (B)	4 (A)		12 (B)	13 (B)	5 (A)		13 (B)	14 (B)	4 (A)	
		SB	10 (B)	9 (A)	3 (A)		10 (B)	10 (B)	3 (A)		9 (A)	11 (B)	4 (A)	
		EB	16 (B)	16 (B)	4 (A)		14 (B)	14 (B)	4 (A)		13 (B)	14 (B)	3 (A)	
Signalized	TH 11 & TH 313	NB	6 (A)	4 (A)	2 (A)	9 (A)	6 (A)	5 (A)	3 (A)	9 (A)	6 (A)	7 (A)	3 (A)	12 (B)
		WB	17 (B)	10 (B)	7 (A)		17 (B)	15 (B)	9 (A)		21 (C)	19 (B)	9 (A)	
		SB	4 (A)	4 (A)	1 (A)		7 (A)	7 (A)	3 (A)		8 (A)	8 (A)	3 (A)	
		EB	19 (B)	14 (B)	3 (A)		16 (B)	9 (A)	2 (A)		21 (C)	13 (B)	3 (A)	
Signalized	TH 11 & Lake St	NB	0 (A)	4 (A)	3 (A)	6 (A)	0 (A)	9 (A)	6 (A)	10 (B)	0 (A)	9 (A)	5 (A)	12 (B)
		WB	17 (B)	0 (A)	7 (A)		22 (C)	0 (A)	11 (B)		24 (C)	0 (A)	15 (B)	
		SB	9 (A)	6 (A)	0 (A)		10 (B)	7 (A)	0 (A)		12 (B)	9 (A)	0 (A)	
		EB	0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)	

* Delay measured in seconds per vehicle

Table 6: Future Intersection LOS – AM, PM and Midday Periods (2040)

Intersection			AM Peak				Mid-day				PM Peak			
Control	Location	Approach	Movement Delay[1] (LOS)			Intersection Delay[1] (LOS)	Movement Delay[1] (LOS)			Intersection Delay[1] (LOS)	Movement Delay[1] (LOS)			Intersection Delay[1] (LOS)
			Left	Through	Right		Left	Through	Right		Left	Through	Right	
Thru-Stop	TH 11 & TH 32	NB	2 (A)	1 (A)	0 (A)	3 (A)	3 (A)	1 (A)	0 (A)	3 (A)	3 (A)	1 (A)	0 (A)	3 (A)
		WB	0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)	
		SB	0 (A)	1 (A)	1 (A)		0 (A)	1 (A)	1 (A)		0 (A)	1 (A)	1 (A)	
		EB	6 (A)	0 (A)	3 (A)		7 (A)	0 (A)	3 (A)		7 (A)	0 (A)	3 (A)	
Thru-Stop	TH 11 & 18th Ave NW	NB	6 (A)	7 (A)	3 (A)	2 (A)	6 (A)	8 (A)	2 (A)	2 (A)	6 (A)	8 (A)	2 (A)[2]	2 (A)
		WB	1 (A)	1 (A)	0 (A)		1 (A)	2 (A)	1 (A)		1 (A)	2 (A)	1 (A)	
		SB	5 (A)	6 (A)	0 (A)		5 (A)	7 (A)[2]	0 (A)		5 (A)	7 (A)	0 (A)	
		EB	1 (A)	1 (A)	0 (A)		0 (A)	1 (A)	0 (A)		0 (A)	1 (A)	0 (A)	
Signalized	TH 11 & TH 89/TH 310	NB	11 (B)	11 (B)	5 (A)	10 (B)	13 (B)	11 (B)	5 (A)	13 (B)	13 (B)	11 (B)	5 (A)	12 (B)
		WB	14 (B)	12 (B)	5 (A)		16 (B)	16 (B)	6 (A)		15 (B)	15 (B)	6 (A)	
		SB	11 (B)	11 (B)	4 (A)		14 (B)	18 (B)	6 (A)		12 (B)	14 (B)	5 (A)	
		EB	15 (B)[3]	18 (B)	5 (A)		15 (B)	20 (C)	5 (A)		16 (B)	17 (B)	5 (A)	
Signalized	TH 11 & TH 313	NB	6 (A)	6 (A)	3 (A)	9 (A)	10 (B)	9 (A)	4 (A)	12 (B)	9 (A)	8 (A)	4 (A)	14 (B)
		WB	16 (B)[3]	11 (B)	9 (A)		20 (C)	19 (B)	11 (B)		26 (C)	23 (C)	10 (B)	
		SB	6 (A)	8 (A)	2 (A)		10 (B)	11 (B)	3 (A)		12 (B)	13 (B)	4 (A)	
		EB	17 (B)[3]	11 (B)[3]	3 (A)		19 (B)	10 (B)	3 (A)		26 (C)	14 (B)	3 (A)	
Signalized	TH 11 & Lake St	NB	0 (A)	7 (A)	5 (A)	8 (A)	0 (A)	16 (B)	12 (B)	16 (B)	0 (A)	18 (B)	13 (B)	18 (B)
		WB	19 (B)	0 (A)	9 (A)		31 (C)	0 (A)	21 (C)		28 (C)	0 (A)	21 (C)	
		SB	11 (B)	7 (A)	0 (A)		16 (B)	10 (B)	0 (A)		19 (B)	13 (B)	0 (A)	
		EB	0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)		0 (A)	0 (A)	0 (A)	

[1] Delay measured in seconds per vehicle

[2] Improvement in operational delay from existing conditions resulted from adjustments in signal timing at the adjacent signalized intersection and the effects of platooning and random arrivals

[3] Improvement in operational delay from existing conditions resulted from adjustments in signal timing to accommodate future volumes

Need Priorities

MnDOT will need to monitor signal timing on a regular basis. Timing plans should be updated every five years at the minimum.

Additionally, since the Seven Clans Casino intersection is currently being upgraded, it was not practical to conduct an analysis at this location at this time. MnDOT should continue to monitor this intersection in conjunction with the Tribal Government as growth and expansions take place. A change in traffic control may be needed at this intersection in the future.

3. Safety Needs

Safety needs address specific locations with noted safety concerns. The needs can be at the segment level or at the intersection level. Each is discussed in the pages that follow. Segments are discussed first, followed by intersections. For each area, the criteria for identifying a problem are documented followed by a list of problem areas. Priorities are tentatively assigned (prior to going to the TAC) based on consultant and MnDOT review.

Segments

Larger corridor segments were identified as part of the existing traffic characteristics memo completed as part of Task 4. At a broader corridor level (based on design type and typical traffic volumes) most of the corridor segments were considered to meet or were better than other similar segments within the state with regard to safety. There was one exception, the segment between Warroad and Roosevelt. In this area, the segment crash rate was worse than the statewide average. This was especially true for the three-year history.

Because the segments were long, smaller problem areas could have been lost in the analysis. As a double check on the safety, the crash history was mapped along the corridor (for the three-year and 10-year and histories). The maps were then reviewed to identify clusters of crashes to identify potential safety problems.

Additionally, because MnDOT has been making an effort to address Fatal and Type A injury crashes as part of its Towards Zero Deaths effort, segments were also reviewed for these types of crashes at the three-year and 10-year history.

Figures 2 – 8 at the end of this section show the three-year crash history on the corridor and **Figures 9 – 15** show the 10-year history.

Criteria for Segments

The intent of the criteria for the segments is to identify the segments that may currently have a crash problem.

- Identify larger segments with crash rates at or above the statewide average for similar roadways
- Identify smaller segments with a cluster of crashes for the three-year history (minimum of five crashes in a mile segment)
- Identify smaller segments with a cluster of crashes for the 10-year history (minimum of 10 crashes in a mile segment)
- Identify segments with a Fatal or Type A crash in the three-year history

- Identify segments with a Fatal or Type A crash in the 10-year history

Problem Segments

Longer Segments

The three-year crash data indicates that the larger segment between Warroad and Roosevelt has a crash rate that is 22 percent higher than the statewide average. In the past three years there have been 21 crashes, with a majority of them occurring in the rural area. A fair number of the crashes were run off the road, sideswipe, head on and rear end crashes at intersection locations. There were also two right angle crashes. All of these crash types can result in severe injuries.

Shorter Segments

For the shorter segments, the three-year and 10-year data was reviewed to find crash clusters. In the three-year history, a crash cluster of five or more crashes was identified within a mile. For the 10-year history areas with a minimum of 10 crashes within a mile were generally considered. Some segments were identified in both the three-year and 10-year history and others just showed up in the one area. Segments included:

- Downtown Greenbush (10-year history)
- 310th – 320th Avenues east of Badger (10-year history)
- 320th – 330th Avenues east of Badger (three-year and 10-year history)
- 340th – 350th Avenues east of Badger (three-year and 10-year history)
- 370th – 380th/18th Avenues Roseau (three-year history)
- 420th – 430th Avenues near airport (10-year history with some [not 5] in three-year history)
- 460th – 470th Avenues (10-year history)
- 490th – 500th Avenues (10-year history)
- 500th – 510th Avenues (10-year history)
- Near 530th Avenues (three-year history)
- 550th – 560th Avenues (10-year history)
- 560th – 570th Avenues (three-year and 10-year history)
- 650th – 660th Avenues (three-year and 10-year history)
- Within Roosevelt (three-year history)

Not making the threshold cutoffs, but with a long string of crashes is the area near the airport between 430th and 460th Avenues for both time periods. Another smaller area of crashes is between 520th and 550th Avenues in the 10-year history. This three-mile segment had 19 crashes.

Fatal and Type A Injury Crashes

The locations of Fatal and Type A injury crashes were noted for both the three-year and 10-year history. In terms of Fatal crashes, they were located near the following locations:

- Near 220th Avenue
- Near 420th Avenue*
- Near 510th Avenue*
- Near 530th Avenue*
- Near the Seven Clans Casino

In terms of Type A crashes, they were located near the following locations:

- Near 375th Avenue*
- At 430th Avenue*
- Near CSAH 34/650th Avenue*

*identified in a shorter segment above

Need Priorities

Safety can be challenging to prioritize because it is important no matter what. However, there are limited dollars available for addressing concerns, so there does need to be priority within the safety evaluation. An approach that can be taken would be to first address areas that show up in multiple time frames, segments and include Fatal and Type A injuries. This puts the segments with the most concerns at the highest priority.

To facilitate the prioritization, the different segments were placed into highest-, high-, medium- and lower-priority. Within each category the segments are listed from west to east.

Highest Priority – Multiple time periods or multiple segment identification (long and short), may or may not include a Type A and/or Fatal

- Near the Seven Clans Casino* (intersection reconfiguration taking place now as well)
- 650th – 660th Avenues*
- Roosevelt

High Priority – Multiple time periods, may or may not include a Type A and/or Fatal (not in list above)

- 320th – 330th Avenues east of Badger
- 340th – 350th Avenues east of Badger
- 420th – 430th Avenues near airport*
- 560th – 570th Avenues near Warroad

Medium Priority – Single time period, may or may not include a Type A and/or Fatal (not in list above)

- Near 220th Avenue*
- 370th – 380th Avenues near Roseau*
- 460th – 470th Avenues beyond airport
- 490th – 500th Avenues east of Salol
- 500th – 510th Avenues* east of Salol
- Near 530th Avenue* east of Salol
- 550th – 560th Avenues near Warroad

Lower Priority – Single time period, does not a Type A and/or Fatal

- Downtown Greenbush
- 310th – 320th Avenues east of Badger

*includes a Fatal or Type A injury crash

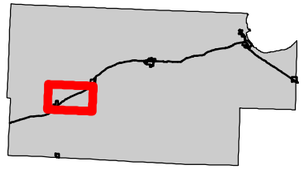

Figure 2 – Three-Year Crash History

Greenbush

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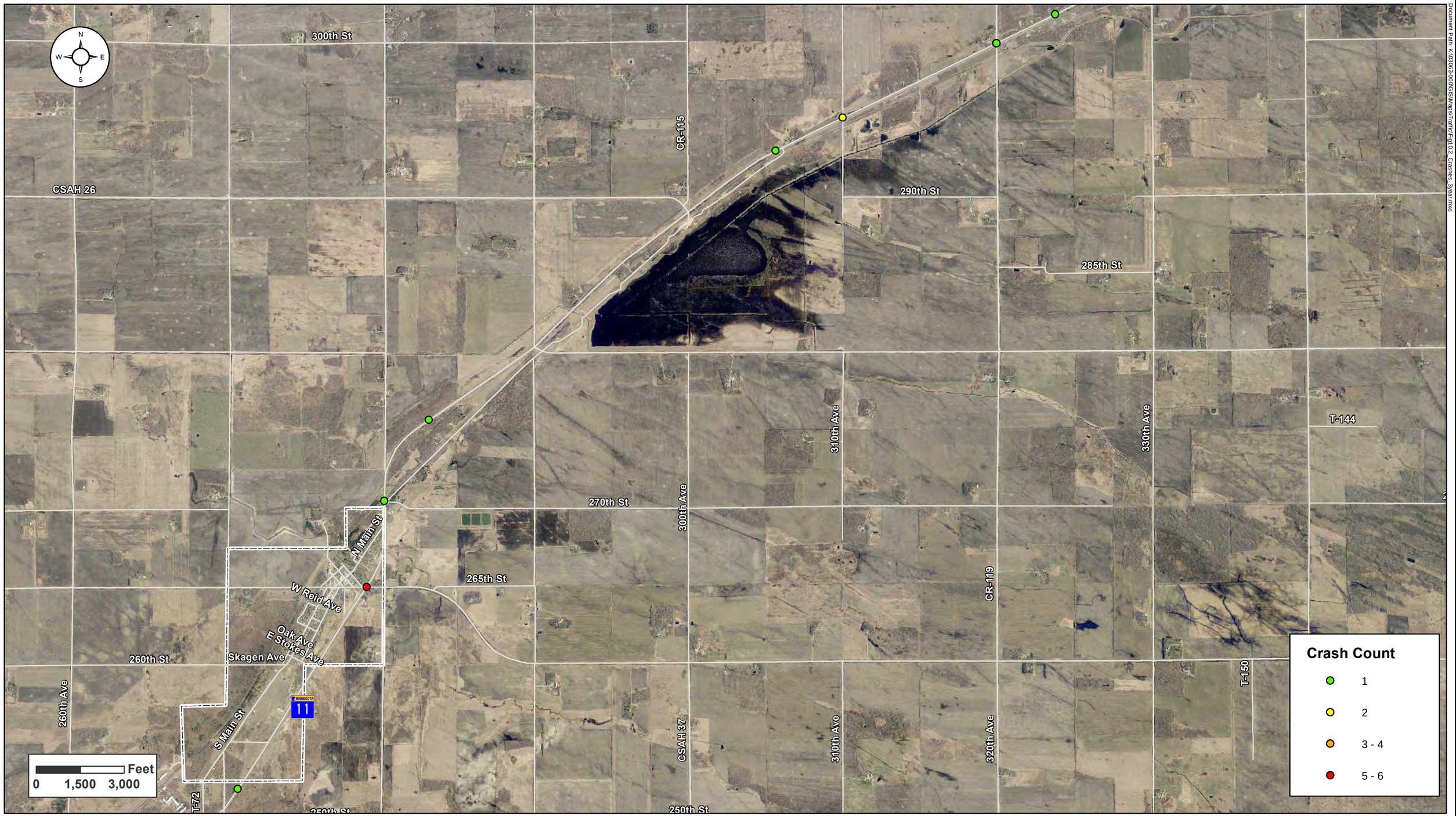


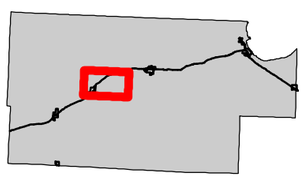


Figure 3 – Three-Year Crash History

Badger

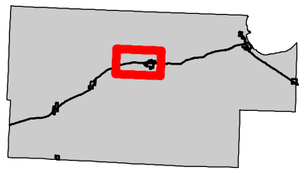
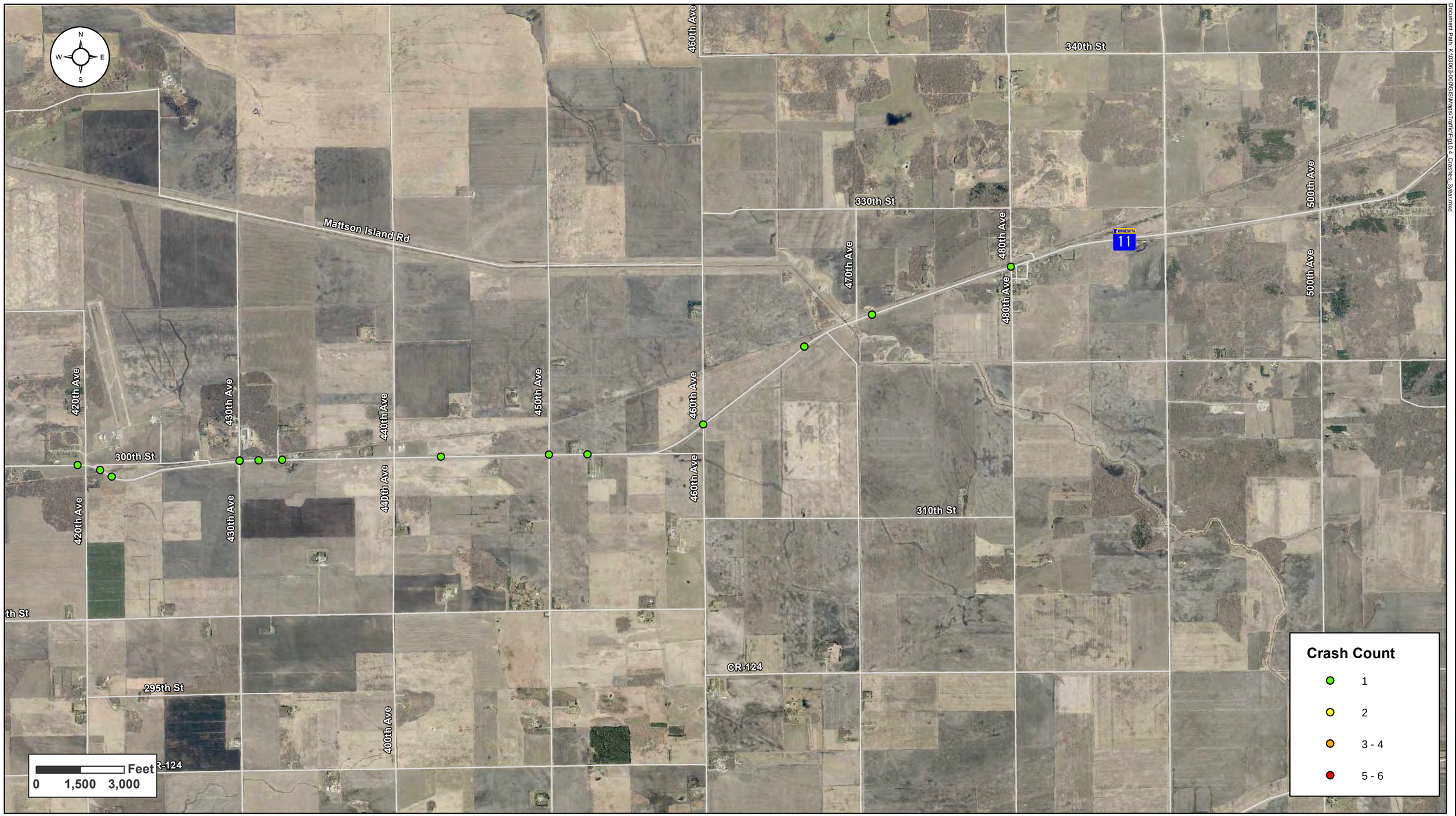


Figure 4 – Three-Year Crash History

Roseau



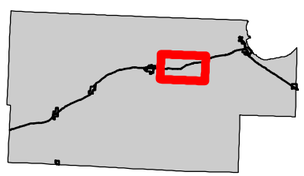


Figure 5 – Three-Year Crash History

Salol

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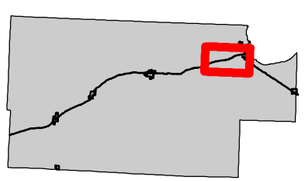
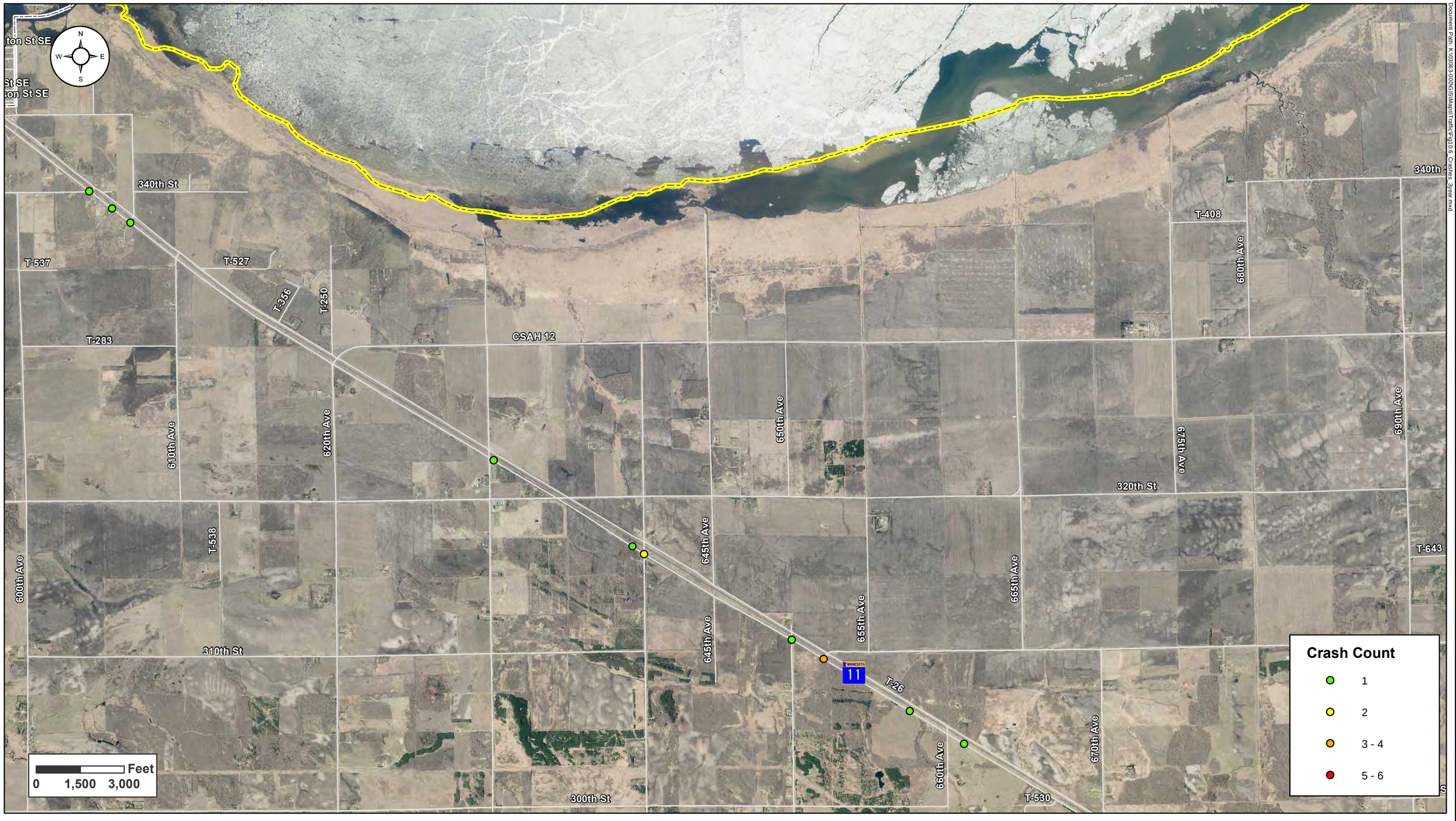


Figure 6 – Three-Year Crash History

Salol to Warroad



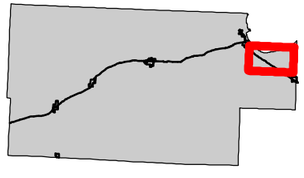
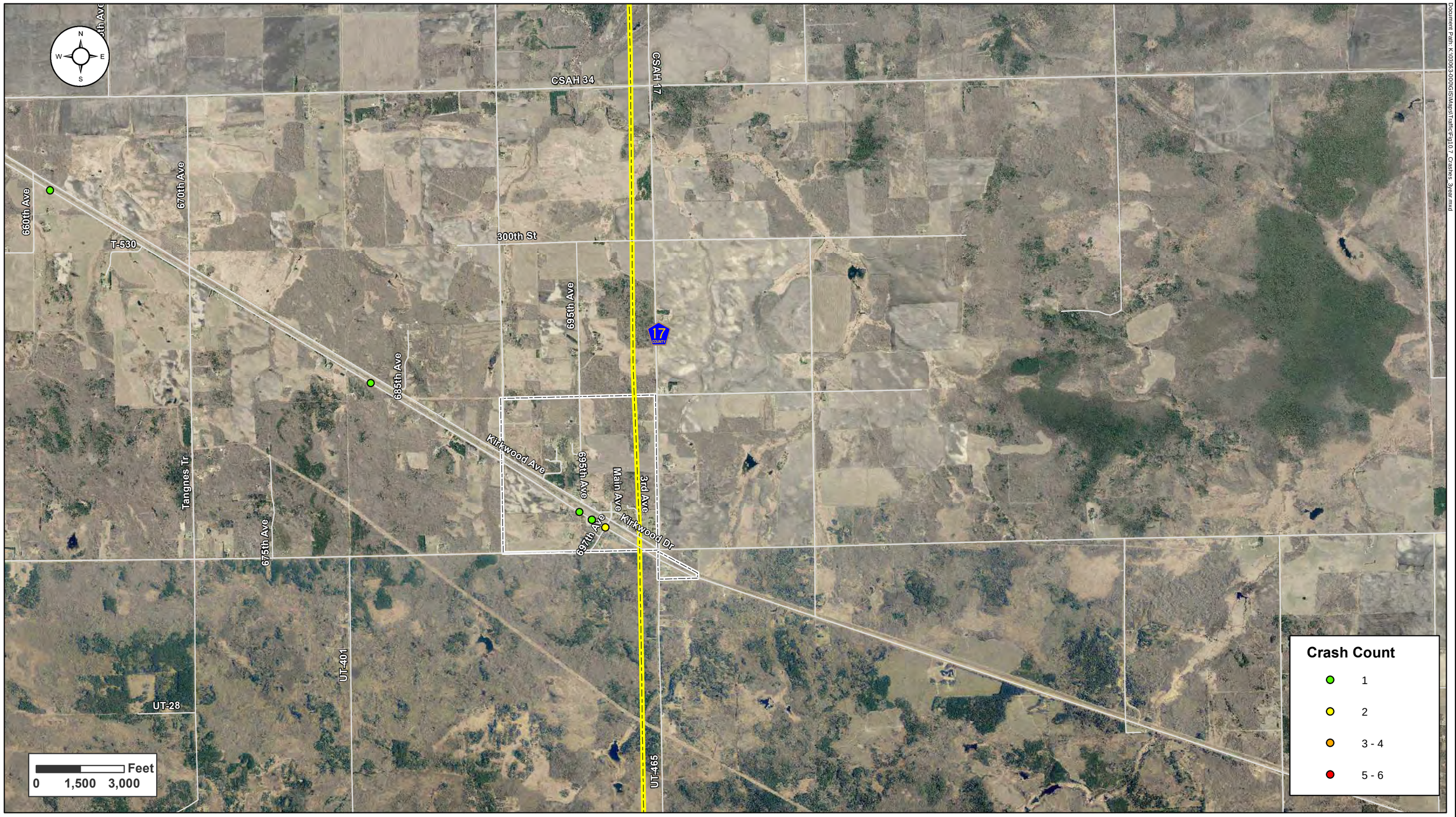


Figure 7 – Three-Year Crash History

East of Warroad



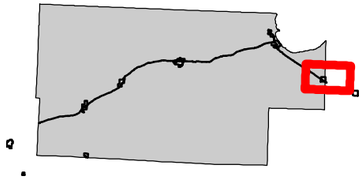


Figure 8 – Three-Year Crash History

Roosevelt

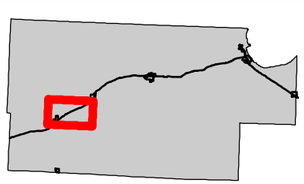


Figure 9 – Ten-Year Crash History

Greenbush

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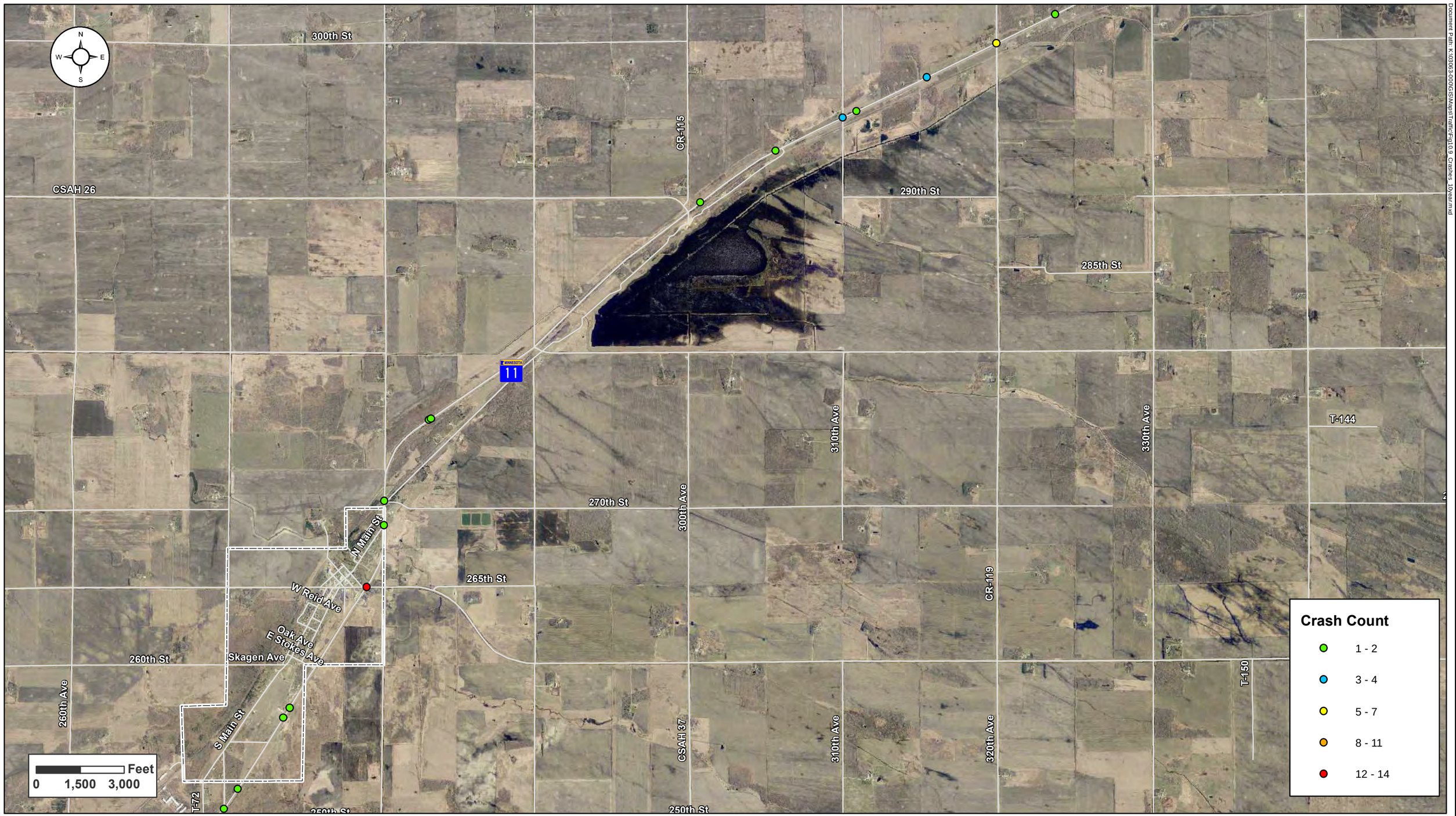


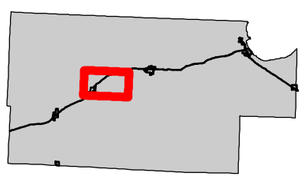
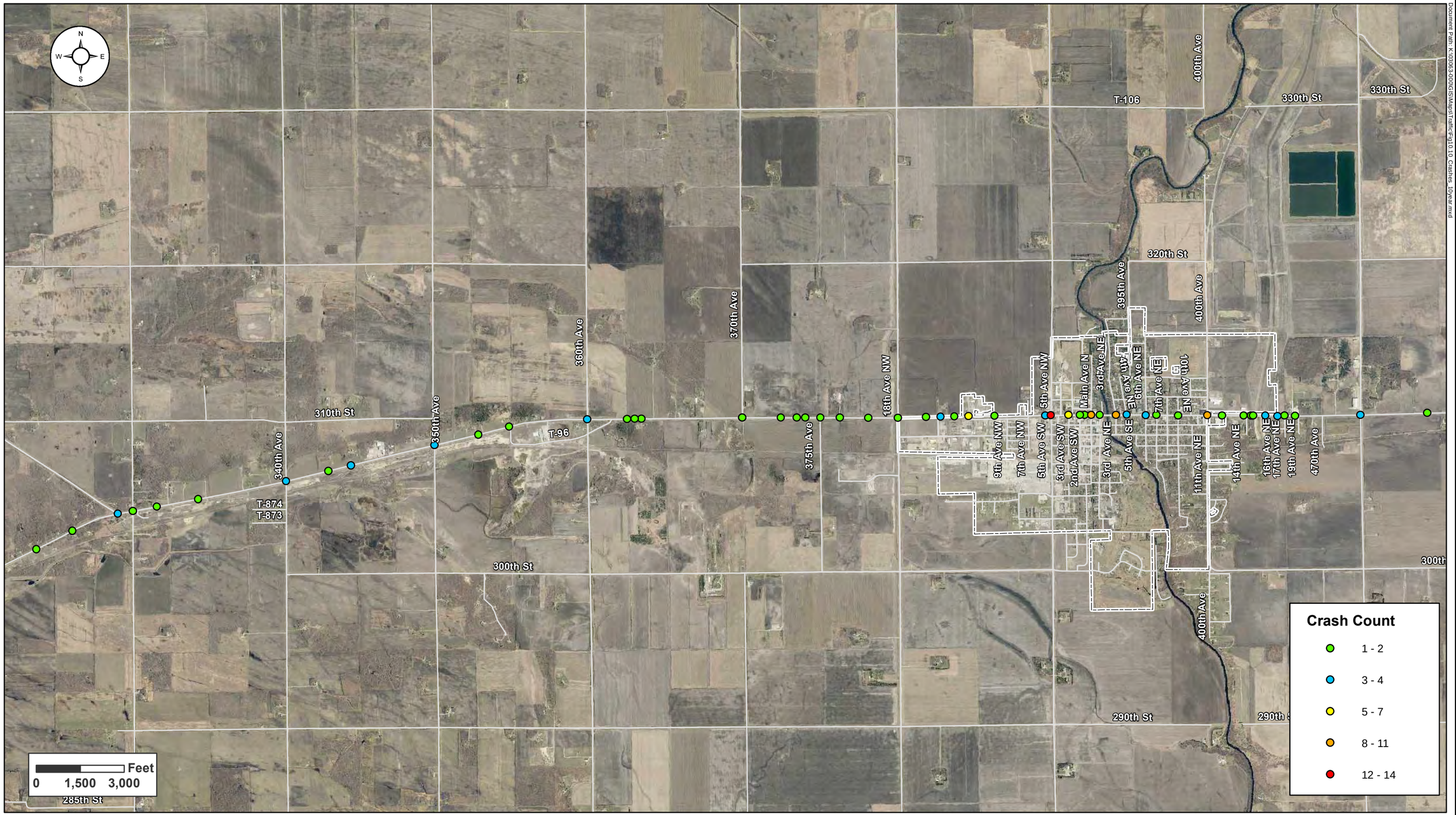


Figure 10 – Ten-Year Crash History

Badger



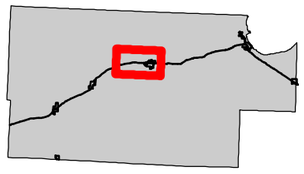
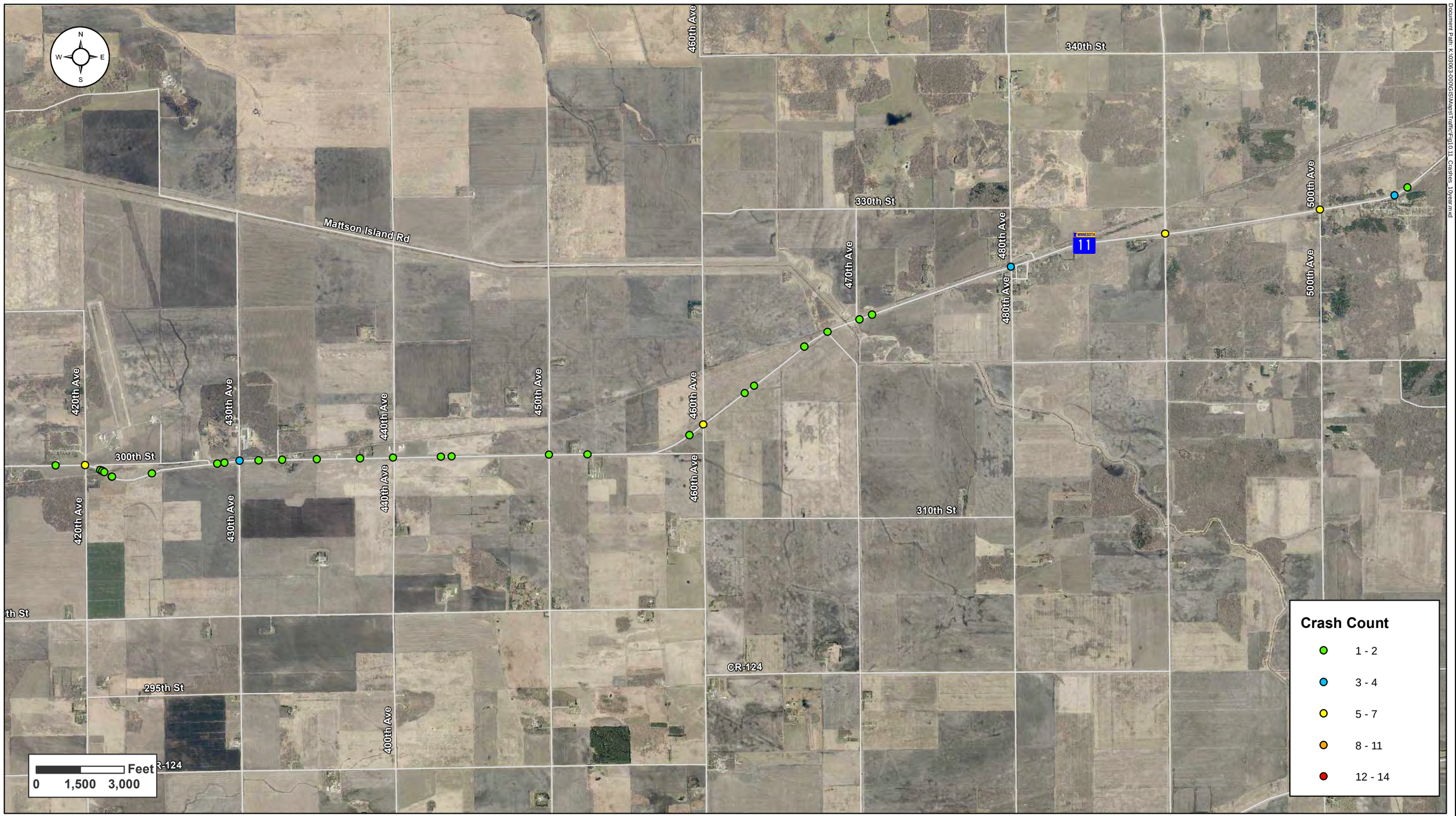


Figure 11 – Ten-Year Crash History

Roseau



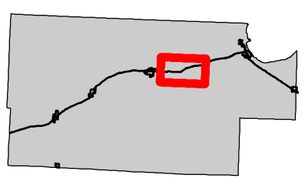


Figure 12 – Ten-Year Crash History

Salol

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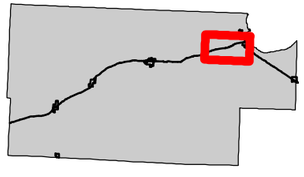

Figure 13 – Ten-Year Crash History

Salol to Warroad

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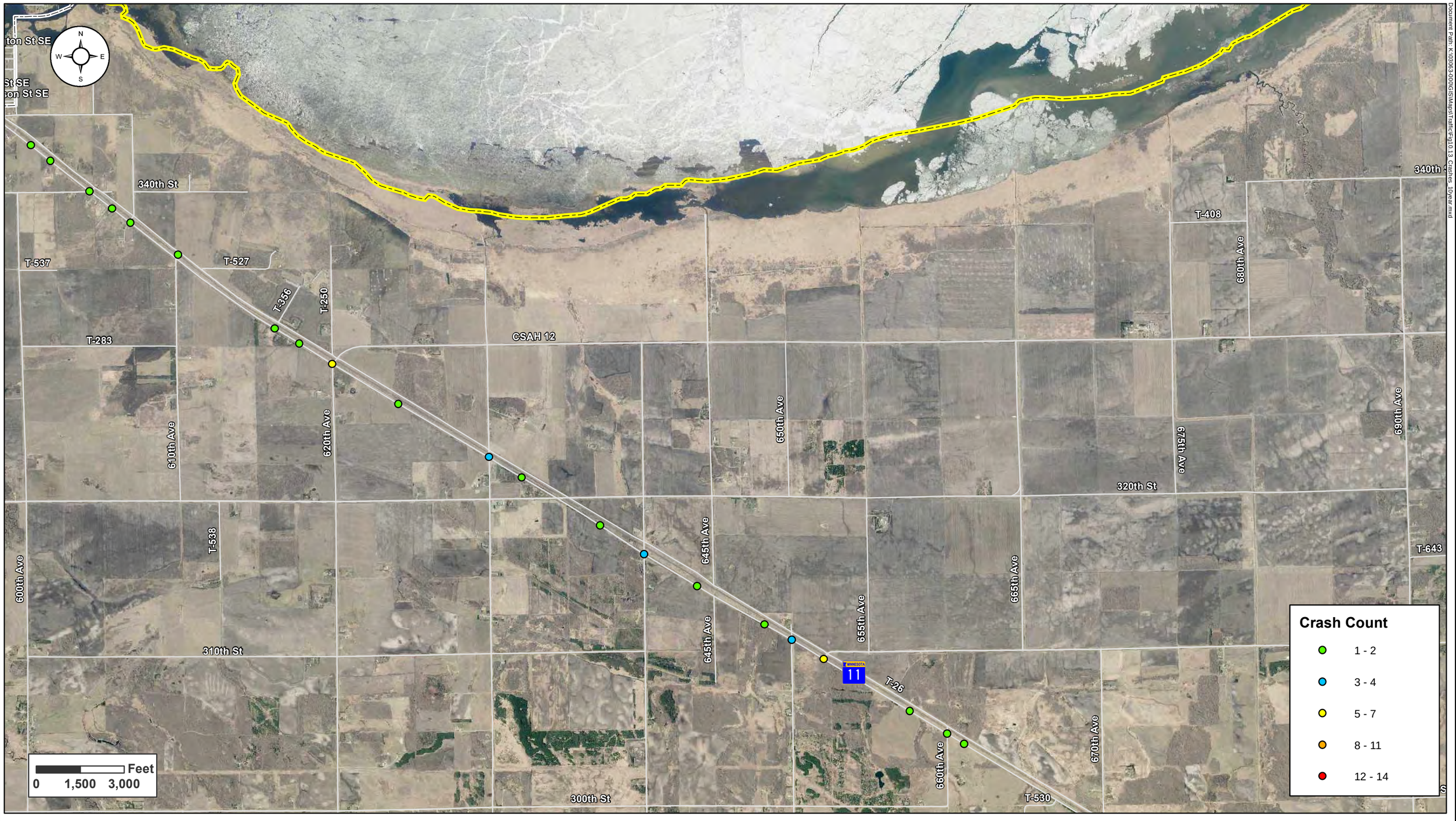


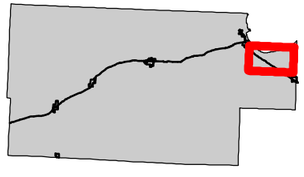
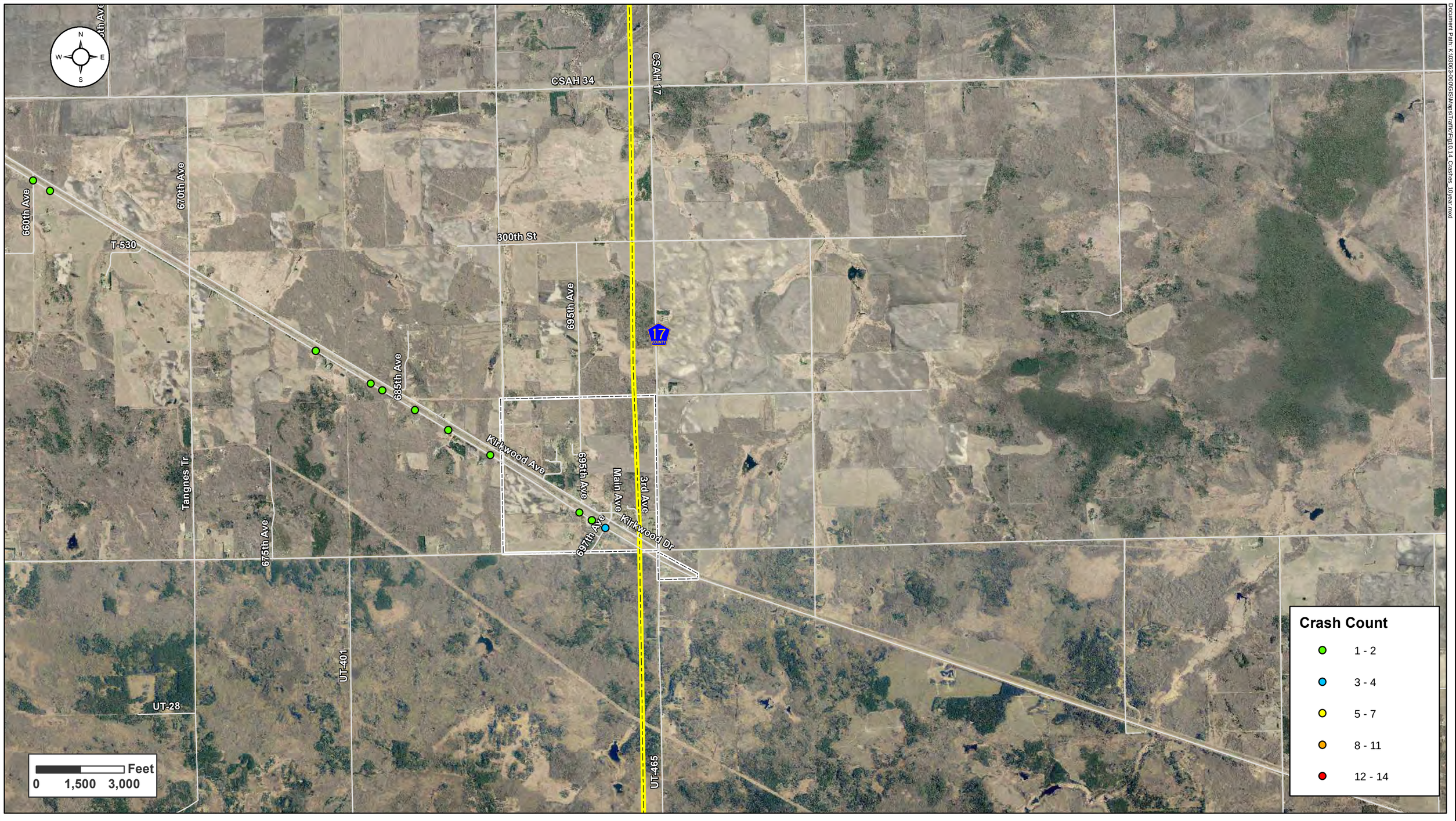


Figure 14 – Ten-Year Crash History

East of Warroad



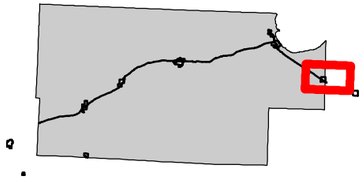


Figure 15 – Ten-Year Crash History

Roosevelt

Intersections

Crash data was analyzed for the numerous public intersections located along the corridor using the three-year and 10-year data. Data was used to calculate intersection crash and severity rates at locations with multiple crashes. The crash and severity rates for the individual intersections were then compared to typical crash rates at similar intersections within the state. This information was summarized in the Traffic Characteristics Memo completed as part of Task 4.

In addition, because MnDOT has been making an effort to address fatal and Type A injury crashes as part of its Towards Zero Deaths effort, intersections were also reviewed for these types of crashes at the three-year and 10-year history.

Tables 7 and 8 show intersection crash and severity rates for the 10-year history and the three-year history.

Criteria for Intersections

The intent of the criteria for the intersections is to identify the segments that may currently have a crash problem.

- Identify intersections with a critical crash rate above the statewide average
- Identify intersections with a severity rate above the statewide average
- Identify intersections with a crash rate above the statewide average, but does not have a critical crash rate above the required threshold
- Identify intersections with a fatal or Type A crash in the three-year and 10-year histories

Crash and Severity Rates

Tables 7 and 8 highlight problem intersections related to crash and severity rates for the 10-year and three-year histories. Some intersections are reflected in both time periods. Intersections with a critical crash rate highlighted in red indicate that the intersection has a statistically significant crash rate and that problems at that location are not random. Crash and severity rates highlighted in orange indicate that either the crash rate or the severity rate is above statewide average.

Intersections with a statistically significant crash rate include:

- TH 11 and CSAH 2/University Avenue in Badger
- TH 11 and TH 89 between Badger and Roseau (west junction)

Intersections with crash and severity rates above the statewide average not listed above include:

- TH 11 and 3rd Avenue in Roseau
- TH 11 and 11th Avenue in Roseau
- TH 11 and CSAH 12 east of Warroad
- TH 11 and CSAH 34 east of Warroad

Intersections with either a crash rate or a severity rate above the statewide average include:

- TH 11 and TH 32 in Greenbush
- TH 11 and 340th Avenue
- TH 11 and Timberline Manufactured Home Community (10-year period)

Table 7: Intersection Crash and Severity Rates – 10-Year History

Location	Number of Crashes	Daily Entering Vehicles	Crash Rate[1]			Severity Rate		Notes
			Calculated	Average	Critical[2]	Calculated	Average	
TH 11 and TH 32	4	3,575	**0.31**	**0.28**	0.56	0.38	0.47	(3)
TH 11 and CSAH 2/University Ave	12	3,505	**0.94**	**0.28**	**0.57**	**1.17**	**0.47**	(3)
TH 11 and TH 89	3	3,288	0.25	0.28	0.58	0.33	0.47	(3)
TH 11 and 340th Ave	3	3,775	0.22	0.28	0.56	**0.51**	**0.47**	(3) (6)
TH 11 and 360th Ave	3	3,863	0.21	0.28	0.55	0.21	0.47	(3) (6)
TH 11 and 15th Ave	3	8,850	0.09	0.28	0.45	0.15	0.47	(3) (6)
TH 11 and Frontage Road West Access between 7th Ave & 15th Ave	3	9,100	0.09	0.28	0.45	0.12	0.47	(3) (6)
TH 11 and TH 89/TH 310	13	12,075	0.29	0.48	0.67	0.41	0.70	(4)
TH 11 and Main Ave	8	9,085	0.24	0.48	0.70	0.30	0.70	(4) (6)
TH 11 and 3rd Ave	4	6,800	0.16	0.20	0.37	0.24	0.30	(5) (6)
TH 11 and 4th Ave	3	7,050	0.12	0.20	0.37	0.12	0.30	(5) (6)
TH 11 and 11th Ave	3	6,000	0.14	0.20	0.38	0.14	0.30	(5) (6)
TH 11 and CSAH 28	3	4,520	0.18	0.28	0.53	0.36	0.47	(3)
TH 11 and CSAH 9	4	4,230	0.26	0.28	0.54	0.39	0.47	(3) (6)
TH 11 and CSAH 13	3	4,068	0.20	0.28	0.54	0.27	0.47	(3)
TH 11 and Timberline Manufactured Home Park East Entrance	3	4,025	0.20	0.28	0.55	**0.48**	**0.47**	(3) (6)
TH 11 and TH 313	7	8,450	0.23	0.48	0.71	0.42	0.70	(4)
TH 11 and Glady's St	3	7,300	0.11	0.20	0.37	0.19	0.30	(5) (6)
TH 11 and Lake St NW	4	7,500	0.15	0.20	0.36	0.22	0.30	(5) (6)
TH 11 and CSAH 74/Lake St NE	6	10,300	0.16	0.48	0.68	0.19	0.70	(4)
TH 11 and CSAH 12	5	2,970	**0.46**	**0.28**	0.60	**0.92**	**0.47**	(3)
TH 11 and CSAH 34	3	1,660	**0.50**	**0.28**	0.72	**1.16**	**0.47**	(3)

(1) Intersection crash rates are expressed in crashes per million entering vehicles.

(2) Critical crash rates are expressed in crashes per million entering vehicles with 0.95 confidence level.

(3) Average crash and severity rates are from MnDOT 2013 green sheets for rural through-stop intersections.

(4) Average crash and severity rates are from MnDOT 2013 green sheets for high-volume, low-speed signalized intersections using.

(5) Average crash and severity rates are from MnDOT 2013 green sheets for urban through-stop intersections.

(6) AADT used to determine daily entering vehicles estimated using engineering judgement for one or both minor approaches when no MnDOT AADT available.

Table 8: Intersection Crash and Severity Rates – Three-Year History

Location	Number of Crashes	Daily Entering Vehicles	Crash Rate[1]			Severity Rate		Notes
			Calculated	Average	Critical[2]	Calculated	Average	
TH 11 and CSAH 2/University Ave	5	3,505	**1.30**	**0.25**	**0.80**	**1.82**	**0.41**	(3)
TH 11 and TH 89	3	3,288	**0.83**	**0.25**	**0.82**	**1.11**	**0.41**	(3)
TH 11 and TH 89/TH 310	5	12,075	0.38	0.69	1.10	0.61	0.96	(4)
TH 11 and 3rd Ave	2	6,800	**0.27**	**0.18**	0.50	**0.40**	**0.26**	(5) (6)
TH 11 and 11th Ave	2	6,000	**0.30**	**0.18**	0.53	**0.30**	**0.26**	(5) (6)
TH 11 and TH 313	2	8,450	0.22	0.69	1.19	0.22	0.96	(4)
TH 11 and CSAH 34	2	1,660	**1.10**	**0.25**	1.13	**2.20**	**0.41**	(3)

(1) Intersection crash rates are expressed in crashes per million entering vehicles.

(2) Critical crash rates are expressed in crashes per million entering vehicles with 0.95 confidence level.

(3) Average crash and severity rates are from MnDOT 2013 green sheets for rural through-stop intersections.

(4) Average crash and severity rates are from MnDOT 2013 green sheets for high-volume, low-speed signalized intersections using.

(5) Average crash and severity rates are from MnDOT 2013 green sheets for urban through-stop intersections.

(6) AADT used to determine daily entering vehicles estimated using engineering judgement for one or both minor approaches when no MnDOT AADT available.

Fatal and Type A

Based on the crash data, there does not appear to be any intersection fatalities or Type A injuries. A couple of points on the map suggest that there are intersection crashes, but a review of the data indicates that the crashes were not intersection related. These crashes were included in the segment analysis in the previous section.

Need Priorities

Safety can be challenging to prioritize because it is important no matter what. However, there are limited dollars available for addressing concerns, so there does need to be priority within the safety evaluation. An approach that can be taken would be to first address intersections that have critical crash rates and severity rates above the statewide average. This puts the intersections with the most concerns as the highest priority. Other tiers that show either a high crash rate or severity rate for multiple periods would be ranked next, then followed by those that occur in a single analysis period. Finally, those that have a high crash rate or severity rate for a single analysis period would be prioritized.

To facilitate the prioritization, the different segments were placed into highest-, high-, medium- and lower-priority. Within each category the segments are listed from west to east.

Highest Priority – Critical crash rate and severity rate

- TH 11 and CSAH 2/University Avenue in Badger
- TH 11 and TH 89 between Badger and Roseau (west junction)

High Priority – Crash and severity rates above statewide average, multiple analysis periods

- TH 11 and CSAH 34 east of Warroad

Medium Priority – Crash and severity rates above statewide average, single analysis period

- TH 11 and 3rd Avenue in Roseau
- TH 11 and 11th Avenue in Roseau
- TH 11 and CSAH 12 east of Warroad

Lower Priority – Single analysis period, just crash or severity rate

- TH 11 and TH 32 in Greenbush (problem likely taken care of with bypass lane addition on TH 32)
- TH 11 and 340th Avenue
- TH 11 and Timberline Manufactured Home Community

4. Turn Lane and Bypass Lane Needs

Turn lanes have proven to be an effective measure in reducing crashes on highway facilities as well as enhancing mobility. They are noted in several publications by the Federal Highway Administration, the National Highway Traffic Safety Administration, the Insurance Institute for Highway Safety, the American Association of State Highway and Transportation Officials, the Transportation Research Board and others as an effective counter measure in reducing rear end and angle crashes in both urban and rural environments. They are especially effective in reducing the severity of crashes in locations where travel speeds are higher.

As documented in previous memos, there is little consistency on TH 11 with regard to turn lanes outside of the three-lane sections in Roseau and Warroad, which have a continuous left-turn lane. This inconsistency is confusing to motorists and creates situations where drivers may unexpectedly be turning. This can result in rear end crashes, run off the road crashes and sideswipe crashes. Additionally, if left-turning motorists feel rushed because they see the car behind them is not slowing they may turn in front of oncoming traffic, further increasing the likelihood of a crash.

Lack of turn lanes also results in inconsistent use of the shoulder. Some right-turning traffic may use the shoulder to decelerate and some may not. Some through traffic may pass left-turning traffic on the shoulder and some will not. This adds to the confusion and cause problems when there are platoons of traffic – you can have motorists making a left-turn waiting for oncoming traffic and traffic goes around that driver on the shoulder, only to have someone make a right-turn. All of the above scenarios can be eliminated with the construction of dedicated left- and right-turn lanes.

Bypass lanes, when used appropriately, can also contribute to corridor safety. Bypass lanes are most effective at "T" intersections for left-turns. In these situations they provide motorists with a dedicated area to make a left turn and a space for traffic to go around them without conflicting with other movements. They can contribute to safety problems if left- and right-turns are occurring at the intersection because through and right-turning traffic have to share a space.

Rationale for Additional Turn and Bypass Lanes

There are four primary reasons to consider constructing additional turn lanes or bypass lanes on TH 11. First, as described above, turn lanes are inconsistently applied in areas outside of the three lane sections in Roseau and Warroad. This inconsistency affects driver expectations and can create situations in which drivers may unexpectedly be turning. This can result in rear end crashes, run off the road crashes, and sideswipe crashes.

Second, TH 11 is on a skew in much of the corridor, which results in many intersections that are at acute angles. Acute turns require additional turning time as compared to right angle turns. This extends the amount of time that turning vehicles are in conflict with through vehicles.

A third issue relates to the vehicle mix along the corridor. As has been documented in previous memos, many segments in the corridor have more than 5 percent of heavy commercial vehicle (semitrailer truck) traffic. With large manufacturers (i.e., major freight generators at Polaris and Marvin) utilizing the corridor, along with connections to international border crossings, TH 11 carries a high number of trucks. In considering turn lanes, the vehicle mix is important because it is more difficult for trucks to slow for turning traffic. Additionally, trucks take longer to make turns, which leads to the need for larger gaps in oncoming traffic in order to make left turns, resulting in longer delays for vehicles approaching a turning truck from behind.

The fourth primary rationale for considering additional turn lanes is related to the active rail lines in the study area. A spur of the Minnesota Northern railroad is active between Greenbush and Roseau. This rail line varies in its proximity to TH 11, but there are some segments where it is 100–200 feet from the highway. The Canadian National (Wisconsin Central) rail line is also present east of Warroad. This rail line runs parallel to TH 11 and is typically 100–200 feet northeast of the highway. Due to the railroads' proximity to TH 11, storage space on some of the cross streets may be limited, and traffic attempting to

turn from TH 11 onto the cross street may need to wait for an extended period of time for the train to pass and the cross street to clear.

Criteria for Turn Lanes

The intent for the turn lane criteria is to identify locations where it is appropriate to construct dedicated turn lanes. There are several sources that can be used to determine the need for turn lanes. At MnDOT, engineering judgement is considered in a number of cases, along with recommendations from guidance documents such as the Road Design Manual and Access Management Manual.

Road Design Manual

- In urban areas, right- and left-turn lanes should be considered whenever construction is economically feasible (5-3.01.01).

- In urban areas, for preservation projects, left-turn lanes should be provided if feasible at non-public access locations generating high traffic volumes, at locations where crash locations confirm the existence of a hazard, and at locations determined by the District Traffic Engineer in consideration of crashes, capacity and traffic volumes (5-3.01.01).

- In urban areas, for preservation projects, right-turn lanes should, if feasible, be provided at all public road intersections and other locations as determined by the District Traffic Engineer in consideration of crashes, capacity and traffic volumes (5-3.01.01).

- Continuous left-turn lanes for urban areas have no rigid design criteria – but generally should be considered in the following: when shifting from rural to suburban or urban areas; generally used with lower speeds; volumes should not be excessive for the facility type; center turn lane should generally be 14 feet wide; if the roadway is being reconstructed, realign opposite side driveway entrances if feasible; and pavement markings should be developed by the District Traffic Engineer (5-3.01.05).

- Continuous right-turn lanes may be considered in locations where driveways are closely spaced. They should not be longer than a quarter of a mile and speeds must be greater than 30 miles per hour, with heavier volumes and high turning demands (5-3.01.07).

- In rural areas, right-turn lanes should be considered when the projected ADT is over 1,500, the design speed is 45 miles per hour or higher at all public road access points, if industrial, commercial or substantial trip generating land use is to be served or if the access serves more than 10 residential units (5-4.01.02).

- In rural areas, left-turn lanes should be provided when the access is to a public road, an industrial tract or a commercial center (5-4.01.02).

- In rural areas, if a left-turn lane is not warranted or if the construction of a left-turn lane is not practical (due to right of way, environmental constraints, etc.), a bypass should be considered. Preferably only at “T” intersections. Four-legged intersections should only consider a bypass

lane after all other solutions have been found impractical and the cross street volume is low (5-4.01.02).

As can be seen from the information above, the Road Design Manual is conservative with regard to the construction of dedicated right- and left-turn lane construction. Guidance from this document suggests that turn lanes should be constructed at all public streets in rural areas, along with selected locations for commercial, residential and industrial uses. In urban areas they are to be considered whenever feasible.

MnDOT Access Management Manual

MnDOT's Access Management Manual is less conservative than the Road Design Manual and identifies higher thresholds on the need for dedicated turn lanes. The Access Management Manual and Road Design Manual should be reviewed with one another and the particular location when determining final improvements for a particular location. Highlights from the Access Manual are listed below:

- Right-turn treatment versus a right-turn lane: the guidelines indicate that a right-turn lane may not be needed if a right-turn treatment can be provided (widening of the shoulder, removing conflicting striping and shoulder rumble strips, prohibiting on street parking in urban areas and/or adding pavement thickness to the shoulder) instead.

- Turn lanes should be provided at public street connections and driveways in accordance with the MnDOT Road Design Manual – Section 5-3 (Please note: section 5-4 is not referenced. This section is the Road Design Manual recommendation for turn lanes on rural two-lane highways) and the guidance below:

    - Left-turn lanes: a left-turn lane should be provided when there is a site-specific geometric or safety concern as indicated by the turn-lane warrants 1-8 or if the traffic volume levels meet Warrant 9.

    - Right-turn lanes: a right-turn lane should be provided when there is a site-specific geometric or safety concern as indicated by the turn-lane warrants 1-8 or if the traffic volume levels meet Warrant 9.

    - Bypass lanes: a left-turn bypass lane may be considered when a left-turn lane is warranted but where its construction is not practical. The bypass lane is for use at "T" intersections where no other public street connection or driveway will be located in the bypass lane or corresponding tapers.

    - Right-turn/bypass lanes at four-legged intersections: should only be used after all other solutions have been found impractical and where the cross-street volume is low.

- Turn lane warrants:
  - Warrant 1: Passing lane/climbing lane – at high volume driveways (>100 trips per day) and all public street connections located on highway segments where passing lanes or climbing lanes are present in the approach direction. [presently do not exist on TH 11]

  - Warrant 2: Limited sight distance/terrain – at all driveways and public street connections with inadequate stopping sight distance or located on short vertical curves or steep grades.

  - Warrant 3: Railroad crossings – at high volume driveways (>100 trips per day) and all public street connections where a railroad is parallel to the highway and where the potential exists for vehicles delayed by a train to back up into the through lanes of the highway, creating both safety and operational problems.

  - Warrant 4: Signalized intersections – at all signalized public street connections and driveways.

  - Warrant 5: Heavy-vehicle traffic – at all driveways and public street connections on high-speed highways (posted speed $\geq$45 mph) where the heavy-vehicle turning volume is 15 or more vehicles per hour for at least eight hours a day for four months or more per year. [based on corridor side street volumes, this is not likely to occur in locations outside the three-lane roadway sections]

  - Warrant 6: School entrances – at public and private school driveways on high-speed highways used by school traffic. [no school driveways presently on corridor in non-three-lane sections]

  - Warrant 7: Crash history – at high-volume driveways (>100 trips per day) and all public street connections that demonstrate a history of crashes of the type suitable to correction by a turn lane or turn-lane treatment, or where adequate trial of other remedies has failed to reduce crash frequency.

  - Warrant 8: Corridor crash experience – on highway corridors that demonstrate a history of similar crash types suitable to correction by providing corridor-wide consistency in turn-lane use.

- Warrant 9: Vehicular volumes – at high-volume driveways (>100 trips per day) and all public street connections on high-speed highways (posted speeds ≥ 45 mph) that satisfy the following:

2-Lane Highway AADT	Cross Street/Driveway ADT	Turn Lane Requirement
> 1,500	>100	Right-turn lane warranted
1,500 – 2,999	>1,500	Left-turn lane warranted
3,000 – 3,999	>1,200	Left-turn lane warranted
4,000 to 4,999	>1,000	Left-turn lane warranted
5,000 to 6,499	>800	Left-turn lane warranted
≥6,500	101 – 400	Left-turn lane or bypass lane
≥6,500	>400	Left-turn lane warranted

Highway AADT one year after opening; posted speed of 45 mph or higher

Under the warrant analysis outlined by the Access Management Manual, right-turn lanes would be recommended at all public street locations as well as private driveways that generate 100 trips or more per day. In general, this would equate to 10 home sites, a typical commercial use and some industrial uses. This is generally consistent with the Road Design Manual; however, there are some very low cross street volumes on TH 11 that would not meet the 100-vehicle threshold.

Construction of left-turn lanes outlined by the Access Management Manual would require most side street cross volumes to be significantly higher than they currently are on TH 11 in order to construct a dedicated turn lane. A few additional locations would be suggested as meeting the threshold due to their proximity of the adjacent rail lines on the corridor. This varies from the Road Design Manual, which would indicate that in rural areas, left-turn lanes should be provided at all public streets – regardless of volumes – if they are feasible to construct.

Problem Areas

Most of the corridor lacks dedicated left- and right-turn lanes at public street locations and there are very few locations where dedicated left- and/or right-turn lanes are provided at commercial and industrial areas with the exception of locations where there is a three-lane facility.

Please refer to the Turn Lane Memo Dated April 26, 2016 for locations that currently have dedicated left- and/or right-turn lanes at public street locations, clustered residential areas and/or commercial locations outside of the three-lane roadway sections. The Roadway Characteristics Memo Dated July 23, 2015 shows all access locations on the corridor, including the public street locations and commercial/industrial driveways. It also has the tables and figures for locations with dedicated left- and/or right-turn lanes.

Need Priorities

With all of the access points on the TH 11 corridor it can be challenging to prioritize locations for dedicated turn lanes, especially since the Road Design Manual would suggest that their construction is warranted at all public streets along the corridor and should be considered at other locations such as industrial and commercial centers and locations where multiple residential units are served by a driveway. Unfortunately, funding constraints and the magnitude of existing access on TH 11 suggest that this is not going to be feasible in the short-term and would be challenging to achieve even over the long-term.

An approach that can be taken would be to combine the recommendations laid out in the Road Design and Access Management Manuals. Because right-turn lanes are significantly less expensive than left-turn lanes, a recommendation could be made that would include constructing right-turn lanes at all public street locations as outlined in the Road Design Manual and use the Access Management Manual Warrants for construction of the more expensive left-turn lanes. Following the Road Design Manual for right-turn lanes would provide consistency in terms of driver expectations when approaching public street locations given the amount of access on the corridor. Using the Access Management Manual for the left-turn lanes, would focus priorities on those locations that have rationale beyond being a public street location. While using the warrants outlined in the Access Management Manual for construction of left-turn lanes does not result in consistency that may be readily apparent to drivers, it follows a process that can be easily documented and show prioritization.

Highest Priority – Safety Problem Locations

Priorities would first take into consideration locations with safety problems. Locations with high crash and/or severity rates (above statewide average) or have crashes that are correctable with turn lane construction would be the highest priority for constructing left- and/or right-turn lanes. Additional consideration, with input from the traffic engineer would consider turn-lanes at locations with Type A or Fatal crashes regardless of the number of crashes and crash/severity rates.

Based on safety information for the most recent three-year history, turn lanes would be recommended at the following locations outside of the three-lane sections:

- TH 11 & CSAH 2/University Avenue in Badger – Left-turn lanes
- TH 89 – “Y” area west of Roseau – Left-turn lanes
- CSAH 34 – between Warroad and Roosevelt – Left- and right-turn lanes

Crash data for the corridor should be reviewed regularly to ensure that additional locations for turn lanes are considered for safety reasons.

High Priority – Railroad Stacking Distance

Another priority for turn lane construction should include locations where there is the potential for train and vehicle traffic to conflict. Where the stacking distance between TH 11 and the railroad is 100 feet or less, there is potential for traffic to back up on TH 11. Locations where this occurs include:

- CSAH 4/210th Street in Greenbush – Left- and right-turn lanes
- CSAH 2/University Avenue in Badger – Left-turn lanes
- T-420 in Badger – Left- and right-turn lanes
- 340th Street in Warroad – Left- and right-turn lanes
- 610th Avenue in Warroad – Left- and right-turn lanes
- CSAH 12 in Warroad – Left- and right-turn lanes
- 630th Avenue in Warroad – Right-turn lanes
- CSAH 34 in Swift/Roosevelt – Left- and right-turn lanes
- CR 140/670th Avenue in Roosevelt – Left- and right-turn lanes
- 690th Avenue in Roosevelt – Left- and right-turn lanes

If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

High Priority – Left-Turn Lane Volume Warrants

Another priority for turn lane construction would include locations where cross street volumes meet the thresholds for left-turn lanes. While data was not collected as part of this study, volumes from MnDOT traffic flow maps were consulted. Most roadways that do not have posted volumes would be anticipated to have lower traffic since they are not state aid routes. Additionally, a majority of the city streets that would have higher traffic volumes that are not on the State Aid System are within the three-lane roadway sections of the corridor, which have dedicated left-turn lanes. The only location outside of the three-lane section, where cross street volumes are available, that suggests a warrant for a left-turn lane is:

- CSAH 5 in Warroad

If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

Medium Priority – Right-Turn Lanes as Part of Roadway Preservation/Rehabilitation Projects

This recommendation would be for construction of right-turn lanes at all public street locations as part of roadway preservation projects in the non-three-lane sections. A list of these roadways is available in the Turn Lane Memo dated April 26, 2016. There are approximately 80 locations where right-turn lanes would be considered.

It should be noted that sight distance, feasibility, spacing, etc. should be reviewed by the District Traffic Engineer as part of the review and recommendation process during the preservation/rehabilitation project development.

Medium Priority – Left-Turn Lanes as Part of Roadway Preservation/Rehabilitation Projects

For public street and commercial/industrial/residential driveway locations that do not meet crash, railroad or volume thresholds (based on traffic flow maps) for the construction of dedicated left-turn lanes, the District Traffic Engineer should review sight distance and freight turning movements during the preservation/rehabilitation project development. Updated crash data for the most recent three-year history should also be reviewed for correctable crashes and crash/severity rates.

If a left-turn lane is not feasible due to costs and/or environmental constraints a bypass lane should be considered at "T" intersections.

5. Access Needs

As noted in the existing roadway conditions memo, there is a significant amount of access on the corridor and much of it does not meet the access guidelines established by MnDOT due to access already being in place when the guidelines were established and a general lack of a supporting roadway network. This is not unexpected in the largely rural and undeveloped areas where one would not expect a strong grid of local roadways. It is, however, problematic, especially on the fringe areas of communities such as Roseau and Warroad and near smaller hamlets such as Fox and Salol. It is also problematic in some areas between Badger and Roseau where there are a lot of single family homes constructed adjacent to the TH 11 corridor.

On TH 11 it will not be possible to eliminate all of the access locations that are inconsistent with MnDOT guidelines. It is therefore important that additional access be minimized to the extent practical as part of plat review. It is also recommended that efforts be made to work with Roseau County and the communities along the corridor to proactively address access needs through the development and implementation of local access guidelines, access overlay districts along TH 11 or as part of subdivision ordinances. These options will be further explored as part of the final report recommendations.

In terms of addressing existing access problems, it is recommended that MnDOT complete additional studies or work with communities in areas where public street access and private driveway access is concentrated so as to consolidate or eliminate access. In practice, field access points – even if concentrated – are less of a concern in terms of safety and mobility because they are used less frequently than other types of access. With the lower use, the likelihood of a crash decreases. However, if they are not being used and can be eliminated, they should be. Frontage roads should be considered as a tool in locations with the largest concentration of access locations.

Because efforts to eliminate access require the involvement of the communities and property owners, this study cannot make recommendations for implementation without further study. This study will develop alternatives for some of the locations identified under problem areas, but it cannot do that for all of the problem areas identified. Further study by MnDOT will be required for areas that are prioritized, but not identified as a detailed study area (Section 8).

Criteria for Access Management

Potential criteria include:

- Outside the three-lane sections identify locations with concentrations of public street and private driveway accesses
- Outside the three-lane sections identify segment locations with higher crash rates to see if there is a correlation with the amount of access

Problem Areas

There are many locations on the TH 11 corridor where access points are dense and are likely contributing to crash concerns. These areas were documented in the Existing Roadway Conditions Memo. Areas where access is concentrated (beyond the three-lane sections) are listed below.

- Greenbush – between Oak Lane and Old Highway 11
- East of Greenbush – between CSAH 11 and 230th Avenue

- East of Greenbush – between 260th and 270th Avenues
- Badger – CSAH 2 to the northern end of town
- East of Badger – TH 308 to TH 89
- East of Badger – TH 89 to 340th Avenue
- East of Badger – 350th to 360th Avenue
- East of Badger/West of Roseau – 360th to 370th Avenue
- Near Salol – 480th Avenue area
- West of Warroad – 550th to 560th Avenues
- West of Warroad – 570th to 580th Avenues
- Warroad – Lake Street NE/CR 74 to CSAH 5

Need Priorities

Areas with the higher concentration of access with public streets and residential driveways should be prioritized over those locations with less concentration and those that have a clustering of crashes should be prioritized over those that have fewer crashes.

Highest Priority – High Concentration of Access and has Crashes

- Badger – CSAH 2 to the northern end of town
- West of Warroad – 550th to 560th Avenues
- West of Warroad – 570th to 580th Avenues
- Warroad – Lake Street NE/CR 74 to CSAH 5

High Priority – High Concentration of Access and has Fewer Crashes

- East of Badger – TH 308 to TH 89
- East of Badger – TH 89 to 340th Avenue

Medium Priority – Concentration of Access and has Fewer Crashes

- East of Badger – 350th to 360th Avenue
- East of Badger/West of Roseau – 360th to 370th Avenue
- Near Salol – 480th Avenue area

Lower Priority – Concentration of Access with Limited Crashes

- Greenbush – between Oak Lane and Old Highway 11
- East of Greenbush – between CSAH 11 and 230th Avenue
- East of Greenbush – between 260th and 270th Avenues

6. Community/Stakeholder Desires - Expansion

As part of the TH 11 study efforts were made to engage the communities along the corridor and the various user groups (schools, businesses, public safety, etc.) that travel it on a regular basis. One clear desire (recognized that it was not a need borne out by data) was for some corridor expansion that would allow users to more easily pass slower vehicles. This was especially true between the communities of Roseau and Warroad, where a bulk of the corridor businesses is located and a majority of the population is concentrated.

While it is believed that raising the speed limit to 60 miles per hour in locations that are currently 55 miles per hour will help alleviate some of the concerns with passing opportunities, stakeholders still indicated a desire for super-two roadway improvements.

Super-Two Conditions

A super-two roadway provides an opportunity for vehicles wanting to go faster to pass vehicles going slower. The super-two generally provides a mile or longer of two travel lanes in one direction and one travel lane in the other direction. Slower traffic moves to the right in the two lane section, affording some vehicles the opportunity to pass without travelling into oncoming travel lanes. The passing opportunities are staggered so that vehicles in opposite directions are able to pass at one point in time or another. A minimum of a mile of passing should be provided.

When developing a super-two design, it is important to minimize/eliminate turning traffic or at the very least providing dedicated turn lanes to do so. This means that access along the corridor needs to be minimized to the extent practical and it may require purchasing access and/or homes to do so.

Roseau and Warroad

There are two segments between Roseau and Warroad that may be able to work for a super-two condition. Some access would have to be removed and field entrances would have to be purchased or closed as well. The segments that could potentially work (additional study is needed) would be between 440th and 470th Avenues for traffic going eastbound and between 520th and 550th Avenues for traffic going westbound. Other locations have much more access and would require more closures/relocations.

Greenbush to Roseau

There are limited opportunities for passing between Badger and Roseau due to the large amount of access along the corridor, so areas west of Badger needed to be considered in order to provide a passing opportunity in each direction.

An opportunity may exist for a potential super-two between CR 115 and TH 308. There is still a lot of access in this segment, but it is about the least constrained segment in the general area. Going further to the south to 290th Avenue may be an option, but there are a couple of bridges that would need to be considered as well. Traffic travelling west would use this segment.

The other segment that would potentially work is the segment between 230th and 250th Avenues closer to Greenbush. While this segment is relatively good from an access standpoint, it is near wetlands, which could make the project challenging. Another option may be from CSAH 4 to just east/north of CR 11. Access may be a little more in this area but it likely has fewer environmental constraints.

Need Priorities

While not a documented data need, there is a strong desire from users and the communities along the corridor to have dedicated areas for passing that do not require travelling into oncoming traffic. In terms of priorities, it was clear from the focus groups that something between Roseau and Warroad was the first priority.

7. Preservation Needs

The asset preservation memo identified preservation activities and their timing for MnDOT's assets along the corridor. These include pavement, bridges, sidewalks, traffic signals, culverts, and storm sewer. Based on normal repair and rehabilitation – all portions of the corridor will need some type of maintenance activity to keep assets in working condition up until 2040.

Because of the nature of preservation activities, this section of the report does not identify problem areas or need priorities. Instead it identifies the timing of preservation activities by resource. The schedules below are based upon MnDOT best practices and historic District experience.

Pavement Needs

Table 9 shows the pavement/maintenance activity by segment between now and 2040. It also includes information on ride quality for 2025 if improvements are not made between now and then.

2025-2029: Segments Needing Pavement Maintenance

- Segment 1: Mill and overlay (if not completed during 2020-2025 timeframe)

2030-2034: Segments Needing Pavement Maintenance

- Segment 2: Mill and overlay
- Segment 3: Mill and overlay
- Segment 8: Mill and overlay
- Segment 9: Mill and overlay
- Segment 10: Mill and overlay

2035-2039: Segments Needing Pavement Maintenance

- Segment 1: Mill and overlay (if completed during 2020-2025 timeframe)
- Segment 4: Mill and overlay
- Segment 5: Mill and overlay

2040+: Segments Needing Pavement Maintenance

- Segment 5: Mill and overlay
- Segment 6: Mill and overlay
- Segment 7: Mill and overlay
- Segment 11: Reclaim and overlay

Table 9 – Pavement Maintenance Needs – 2015 to 2040

Segment	General Location	From (Mile Point)	To (Mile Point)	RQI (2025)	Next Planned Maintenance Activity	Approximate Next Recommended Maintenance: 2025-2040
1	Greenbush – Start of project to TH 32	47.2	48.098	2.3	2025 or sooner	Post 2040
2	TH 11/TH 32 to 250th Ave - Greenbush/Badger	48.098	54.972	3.5		2032
3	250th Ave to CSAH 15/360th Ave – Badger/Roseau	54.972	67.76	3.4		2032
4	CSAH 15/360th Ave to TH 310/TH 89 – Roseau	67.76	70.678	2.0	2016	2036
5	TH 310/TH 89 to 14th Ave NE - Roseau	70.678	71.84	1.5	2024	2042
6	14th Ave NE to west of 18th/580th Avenues – Roseau to Warroad	71.84	90.031	2.1	2024	2044
7	West of 18th/580th Avenues to TH 313 - Warroad	90.031	91.6	2.6	2024	2044
8	TH 313 to Riverview Drive – Warroad	91.6	92.779	0.1	2015	2030
9	Riverview Drive to McKinley St SW - Warroad	92.779	93.019	1.7	2015	2030
10	McKinley St SW to Laznicka Lane - Warroad	93.019	93.17	1.5	2015	2030
11	Laznicka Lane to Eastern project limits – Warroad to Roosevelt	93.17	105.595	2.1	2024	2042*

*Reclaim and overlay

Bridge Needs

Based upon 2014 inspections, there are no immediate needs for bridge rehabilitation or replacements. The bridges are generally in good condition and will only need ongoing maintenance in the near term. There are no bridges within the study area considered functionally obsolete or fracture critical.

While the bridges are in good condition today, rehabilitation or replacement activities will be needed prior to 2040 in four locations (expected sufficiency ratings will be close to or below 80).

2024

Warroad Bridge 9059 – Beams in poor condition and re-decking (evaluate as 2024 approaches)

2025

Roseau Bridge 5814 – paint, low-slump overlay and repair to approach panels. Consider installing guardrail on approaches.

Post 2025 – Prior to 2040

Bridge 8580 4 miles east of Roseau – Replace W-type box culvert

Hay Creek Bridge 68001 1.3 miles west of Salol – cracking on the bridge deck – low-slump overlay

Sidewalk Needs

MnDOT has developed a policy to make sidewalks compliant with ADA requirements prior to 2025. Within the TH 11 corridor there are sidewalks within the communities of Roseau, Warroad and Greenbush. As part of pavement projects, MnDOT will be addressing ADA needs. Please refer to the Asset Management Memo for more detailed locations within each community for slope and pedestrian ramp needs.

2019

Warroad – replace 4,960 feet of sidewalk, replace all curb ramps and add 2 new curb ramps

2024

Roseau – replace 3,860 feet of sidewalk and replace all curb ramps

2025

Greenbush – replace 1,280 feet of sidewalk, replace all curb ramps and add 5 new curb ramps

Traffic Signal Needs

Three out of the four traffic signals along the corridor have recently been replaced or will be replaced in 2019. Timing of signals should be reviewed every five years at a minimum to ensure efficient operations. Because galvanized steel traffic signal poles have been (and will be) installed, signals will not need repainting.

Prior to 2025

- Upgrade the traffic signal at Main Street in Roseau with pedestrian updates (countdown timer)
- Upgrade the traffic signal at TH 313 in Warroad (as part of the 2019 project) to include protective/permissive turns or flashing yellow arrow

Culvert Needs

There are currently 137 culverts located on TH 11. Culvert condition varies in the corridor based upon initial construction timeframes and timing of roadway rehabilitation projects. Of the 137 culvers, 19 culverts are rated excellent, 63 rated in fair condition, and 47 rated in poor condition and needing repair or replacement.

Based on the culvert inspections conducted by MnDOT in 2015, 55 culverts are recommended for replacement. Most (49) of these culverts were recommended for replacement in conjunction with programmed roadway projects in 2024. Additionally, seven culverts are recommended for repair and 13 are recommended to be cleaned to improve drainage.

Storm Sewer Needs

Storm sewer assets are limited to the communities of Roseau and Warroad. Roseau's storm sewer was installed in 2005 and 2006 and is in good condition. No immediate or mid-term needs for repair or replacement are anticipated in Roseau. Warroad's storm sewer was constructed in 1953 (between Elk and Lincoln Streets) and 1989 (between TH 313 and Elk Street). The storm sewer located between TH

313 and Elk Street is in good condition but has some needs for repair and replacement (approximately $20,500 worth of repair and replacement needs). The storm sewer located between Elk and Lincoln Streets is in poor condition and is recommended to be replaced. The 2015 inspection report identifies approximately $234,000 worth of storm sewer replacements in this area. The report recommends including storm sewer repair and replacements with planned ADA, sidewalk, and signal improvements programmed for 2019. Both storm sewer areas should be addressed at this time.

8. Potential Projects/Concepts Development

Based on the information identified in the previous memos and the list of identified needs for the corridor drafted as part of this memo, there have been a limited number of problem areas identified for further investigation as part of the TH 11 Study. Many of the problem areas identified have needs reflected in multiple topic areas (safety, mobility, access) addressed in this memo. The projects suggested for consideration of additional investigation will be further developed as this study progresses. Potential projects/concepts include both more complex and less complex problem areas.

More Complex

- Three-lane section in Warroad between CR 74/Lake Street NE and CSAH 5
- TH 89 intersection near split with TH 308
- CSAH 2/University Avenue to North Main Street in Badger
- Warroad frontage road between TH 313 and 580th Avenue/CSAH 35 (preventative)
- Access management – Warroad between 560th and 570th Avenues
- Access management/frontage road – Roseau from existing frontage road to CR 120/18th Avenue/380th Avenue
- Access management/frontage road – TH 308/CR 119/320th Avenue to 330th Avenue
- Access management/frontage road – 330th Avenue – 350th Avenue
- Super-two alternative between Roseau and Warroad [look between 440th – 480th Avenues and 530th – 550th Avenues]
- Super-two alternative between Greenbush and Roseau [look at area between 290th Avenue and TH 308 and 230th – 250th Avenues and CSAH 4 to CR 11

Less Complex

- CSAH 34 intersection between Warroad and Roosevelt
- 650th – 660th Avenue crashes
- Crashes in Roosevelt area
- 3rd Avenue intersection in Roseau
- 11th Avenue intersection in Roseau
- CSAH 12 intersection between Warroad and Roosevelt

It should be noted that the area near the airport was identified for safety reasons due to the number and severity of crashes in the general vicinity. MnDOT District 2 is completing a separate study of the entire airport area and will be developing potential solutions/concepts as a part of that study. This study will not develop concepts/solutions.